AJ Institute of Engineering and Technology Mangaluru.

VTU Question Papers

Civil Engineering

III to VIII Semester

2022 SCHEME

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AJ Institute of Engineering and Technology, Mangaluru.

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CBCS SCHEME

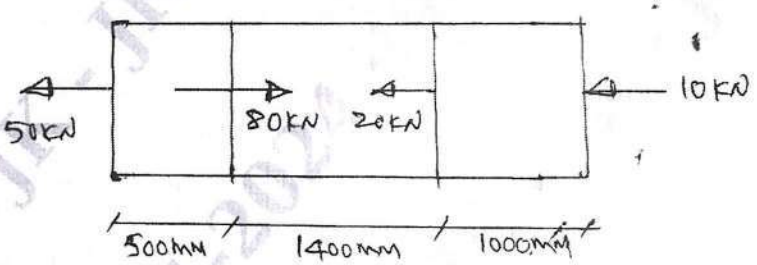
USN | | | | | | | | | | |

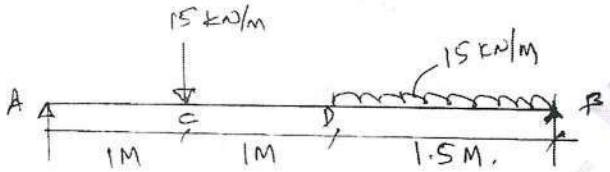
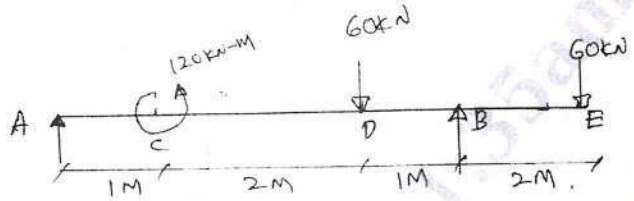
BCV301

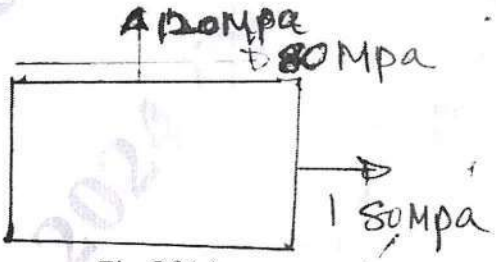
Third Semester B.E/B.Tech. Degree Examination, Dec.2023/Jan.2024
Strength of Materials

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions, choosing ONE full question from each module.*
2. M : Marks , L: Bloom's level , C: Course outcomes.
3. Missing data, if any, may be suitably assumed.

		Module – 1	M	L	C
1	a.	Define the following terms : i) Poisson's ratio ii) Modulus of rigidity iii) Impact load iv) Volumetric strain.	4	L1	CO1
	b.	The following data refers to mild steel tested on a lab. Diameter of the specimen 25mm, length of the specimen 300mm, Extension under a load of 15kN is 0.045mm, load at yield point 127.65kN, mix load 208.60kN, length of the specimen at failure 375mm, diameter at failure 17.75mm. Determine young's modulus, yield strength, ultimate strength, % elongation of the specimen, % decrease in c/s at area of specimen.	10	L3	CO1
	c.	A brass bar having cross-sectional area 300sq.mm is subjected to axial forces as shown in the Fig.Q1(c). Determine the total elongation of the bar taking E = 84GPa.  Fig.Q1(c)	6	L3	CO1
		OR			
2	a.	A steel rod 20mm diameter, length 6m is connected at the ends to a pair of walls at a temperature of 120°C. Find the pull exerted on the wall if the temperature falls to 40°C when : i) Supports don't yield ii) Supports yield by 1.1mm, take E = 200GPa. $\alpha = 12 \times 10^{-6}$/°C.	6	L3	CO1
	b.	Derive the relationship between modulus of elasticity, modulus of rigidity and Poisson's ratio.	6	L3	CO1
	c.	A load of 270kN is acting on a short RCC column of size (200 × 200)mm^2. The column is reinforced with 10 bars of 12mm diameter. Determine the loads and the corresponding stresses on steel and concrete. Take $E_s = 16.5E_c$.	8	L3	CO1

		Module – 2			
3	a.	Define Hogging Bending moment and sagging bending moment.	**4**	**L2**	**CO2**
	b.	Derive the relationship between loading, shear force and bending moment.	**6**	**L3**	**CO2**
	c.	A simply supported beam is subjected to point load of 15kN together with a udl of 15kN/m as shown in the Fig.Q3(c). Draw SFD and BMD. Find also point of low shear and the corresponding bending moment.  Fig.Q3(c)	**10**	**L3**	**CO2**
		OR			
4	a.	Show that maximum bending moment for a simply supported beam carrying udl of intensity w/unit length is $\frac{w\ell^2}{8}$.	**6**	**L2**	**CO2**
	b.	Draw SFD and BMD for an overhanging beam carrying forces as shown in the Fig.Q4(b).  Fig.Q4(b)	**14**	**L3**	**CO2**
		Module – 3			
5	a.	Define : i) Modulus of rupture ii) Section modulus iii) Flexural rigidity.	**6**	**L1**	**CO3**
	b.	Derive bending equation with usual notation.	**6**	**L3**	**CO3**
	c.	A simply supported beam of span 5m has cross section 150mm × 250mm. If the permissible stress is 10N/mm^2. Find : i) Maximum intensity of UDL it can carry ii) Maximum concentrated kind P applied 2m from one end.	**8**	**L3**	**CO3**
		OR			
6	a.	List the assumptions made pure torsion.	**6**	**L1**	**CO3**
	b.	Drive torque – equation with usual notation.	**4**	**L3**	**CO3**
	c.	A solid shaft has to transmit 250KW power at 100rpm. If the shear stress not to exceed 75MPa what should be the diameter of the shaft. If this shaft is to be replaced by a hallow shaft whose internal diameter, is 0.6 times the external diameter determine the size of the shaft. Also determine the saving on the weight of the material. Assume max shear stress remain the same for both the shifts.	**10**	**L3**	**CO3**

		Module – 4			
7	a.	Define slope, deflection and curvature.	6	L1	CO4
	b.	Derive moment–curvature equation.	6	L3	CO4
	c.	A girder of uniform section and constant depth is simply supported over a span of 3m. If the point load at the mid span is 30kN and $I_{XX} = 15.614 \times 10^{-6} m^4$, calculate : i) Central deflection ii) The slopes at the ends if he beam. Take $E = 200 GN/m^2$.	8	L3	CO4
		OR			
8	a.	Differentiate between long columns and short columns.	4	L1	CO4
	b.	Derive Euler's Buckling load for long columns whose ends are hinged.	6	L3	CO4
	c.	A hallow tube 6m length of external diameter 16mm and thickness 10mm is subjected to minimum crippling load. Find Euler's load for this column when : i) Both ends fixed ii) One end fixed and other end hinged. Take E = 200GPa.	10	L3	CO4
		Module – 5			
9	a.	Derive principle planes and principle stresses.	4	L1	CO5
	b.	Differentiate between thin cylinders and thick cylinders.	4	L1	CO5
	c.	The state of stress at a point on a strained material is 120Mpa and is an as shown in the Fig.Q9(c). Determine : i) The direction of principal planes ii) The magnitude of principal stresses iii) The magnitude of maximum shear stress and its directions. Sketch the stresses and planes.  Fig.Q9(c)	12	L3	CO5
		OR			
10	a.	Drive Lame's equation with usual notation.	8	L3	CO5
	b.	A shell 3.25m long; 1m in diameter is subjected to internal fluid pressure of 1MPa, if the thickness of the shell is 10mm find : i) Hoop-stress ii) Longitudinal stress iii) Maximum shear stress iv) Change in diameter and length v) Voltmeter strain and hence measure in volume Take $E = 2 \times 10^3 MPa$; $\frac{1}{m} = 0.30$.	12	L3	CO5

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CBCS SCHEME

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BCV302

Third Semester B.E./B.Tech. Degree Examination, Dec.2023/Jan.2024
Engineering Survey

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Explain in brief about: i) Topographical survey ii) Cadastral survey iii) Hydrographic survey iv) Control survey v) Under ground survey.	10	L2	CO1
	b.	Discuss in detail about the advantages and disadvantages of plane table survey.	5	L2	CO1
	c.	Explain classification of survey by objective of survey.	5	L2	CO1
		OR			
Q.2	a.	Discuss in detail about the EDM.	10	L2	CO1
	b.	List and discuss the sources of errors in compass survey.	5	L2	CO1
	c.	Explain the classification of survey by nature of survey.	5	L2	CO1
		Module – 2			
Q.3	a.	Explain in detail the procedure for the measurement of horizontal angle by thedolite by repetition method.	10	L2	CO2
	b.	What are the accessories and advantages of total station survey?	5	L2	CO2
	c.	The following staff readings were observed successively with a level the instrument is moved by 3rd, 6th and 8th readings 2.228, 1.606, 0.988, 2.090, 2.864, 1.262, 0.602, 1.982, 1.044, 2.684m record the readings in a level book and calculate RL, if the first reading was taken at a B.M of 432.384m use HI method.	5	L3	CO2
		OR			
Q.4	a.	Explain in detail the procedure for differential leveling by plane of collimation method using dumpy level.	10	L2	CO2
	b.	Explain in detail how horizontal angle is measured with the total station.	5	L2	CO2
	c.	The following observations were taken with dumpy level and 4m leveling staff. The instrument was shifted after 4th and 7th reading. The first reading was taken on a bench mark whose RL was 15.575m. Prepare a page of level book and calculate RL of all the points. The observations were taken at every 30m interval. Also find out the gradient between first and last point use rise and fall method. Observations are 0.565, 1.250, 1.675, 3.695, 0.125, 2.345, 0.500, 1.785 and 2.535.	5	L3	CO2

		Module – 3			
Q.5	**a.**	Discuss in detail about characteristics of contours.	**10**	**L2**	**CO3**
	b.	Explain the procedure of conducting the L/S and C/S by using level.	**10**	**L2**	**CO3**
		OR			
Q.6	**a.**	Discuss in detail about contouring using level.	**10**	**L2**	**CO3**
	b.	Explain how coordinates are measured using total station.	**10**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	For applying Rankine's method, provide the procedure of setting out of horizontal curve.	**10**	**L3**	**CO4**
	b.	Explain the procedure of setting out two room building by center line method.	**10**	**L2**	**CO4**
		OR			
Q.8	**a.**	Explain how areas are measured by trapezoidal and Simpson's rule.	**10**	**L2**	**CO4**
	b.	A railway embankment is 10m wide with side slope $1\frac{1}{2}$ to 1. Assuming the ground to be level in a direction transverse to the center line, calculate the volume contained in a length of 120m, the center heights at 20m intervals being in meters are 2.200, 3.700, 3.800, 4.000, 3.800, 2.800, 2.500. Calculate volume by trapezoidal rule and prismoidal rule.	**10**	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	What is absolute and differential positioning with GPS? Explain about Gagan system in India.	**10**	**L2**	**CO5**
	b.	What are the applications and advantages of surveying with drone?	**10**	**L3**	**CO5**
		OR			
Q.10	**a.**	What are the applications and uses of remote sensing and GIS in engineering surveying.	**10**	**L3**	**CO5**
	b.	Outline the process of drone surveying.	**10**	**L2**	**CO5**

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BCV303

Third Semester B.E./B.Tech. Degree Examination, Dec.2023/Jan.2024
Engineering Geology

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Explain the role of Geology in the Civil Engineering.	08	L2	CO1
	b.	What is Plate tectonics? Explain different type of plate boundaries.	06	L2	CO1
	c.	Explain causes, effects of earthquake.	06	L2	CO1
		OR			
Q.2	a.	Explain briefly the internal structure of the earth.	10	L2	CO1
	b.	Write short notes on: i) Tsunami – causes and effect ii) Land Slides – causes and remedial measures	10	L1	CO1
		Module – 2			
Q.3	a.	What is a mineral? Describe the following physical properties of a mineral. i) Quartz ii) Hematite iii) Gypsum.	12	L2	CO2
	b.	Enumerate the classification of Igneous Rocks.	08	L2	CO2
		OR			
Q.4	a.	What is Metamorphism? Explain the different kinds of metamorphism with example.	08	L2	CO2
	b.	Describe the following rocks for its geological/physical and engineering properties and its suitability as building material. i) Granite ii) Lime Stone	08	L2	CO2
	c.	Describe the character of good building stones.	04	L2	CO2
		Module – 3			
Q.5	a.	What is weathering? Explain the types of weathering.	08	L2	CO3
	b.	Distinguish between Black Cotton Soil and Laterite Soil.	06	L2	CO3
	c.	Explain the effect of weathering on Monumental rock.	06	L2	CO3
		OR			
Q.6	a.	Explain soil formation and its profile.	10	L2	CO3
	b.	Explain the classification of soil based on their grain size.	06	L2	CO3
	c.	Write a note on drifted soil.	04	L1	CO3
		Module – 4			
Q.7	a.	A bed of shale is dipping maximum of 32° along S45°E. Determine the amount of its apparent dip along S80°E. (Solve by Graphical / Trigonometric method).	06	L3	CO4
	b.	What are folds? Explain briefly the different types of folds with neat sketches.	10	L2	CO4
	c.	On a horizontal tunnel, a bed of sandstone dips 30° eastward. Its true thickness is 200m. Determine its vertical thickness and width of the out crop in the tunnel. [Scale : 1cm = 100m].	04	L3	CO4

		OR			
Q.8	**a.**	Three test bore holes (P, Q, R) are sunk at 3 point of an equilateral triangle, whose sides are 480m each. P is west of Q and R is midpoint of PQ. Bore holes P, Q and R reach the upper surface of a rich coal seam at 100 m, 220 m and 260 m depth respectively. Determine i) The altitude [Dip and Strike] of the coal seam ii) Another borehole 'S' is sunk exactly at midpoint of QR. Determine at what depth the new bore hole reaches the same coal seam.	**10**	**L3**	**CO4**
	b.	Explain the impact of faults on Dam and Tunnel project.	**04**	**L2**	**CO4**
	c.	What are Faults? Explain the parts of Faults.	**06**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	Define Aquifer. Explain briefly the different types of Aquifer with a neat sketch.	**12**	**L2**	**CO5**
	b.	Explain water bearing properties of Rocks.	**08**	**L2**	**CO5**
		OR			
Q.10	**a.**	Explain the electric resistivity method for exploration of Ground Water.	**12**	**L2**	**CO5**
	b.	Explain the factors affecting permeability of Rocks.	**08**	**L2**	**CO5**

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BCV304

Third Semester B.E./B.Tech. Degree Examination, Dec.2023/Jan.2024
Water Supply and Waste Water Engineering

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Briefly explain : i) Factors affecting per capita demand of water. ii) Factors affecting design period. iii) Domestic water demand.	12	L2	CO1
	b.	Explain the need and importance of protected water supply to the community.	8	L2	CO1
		OR			
Q.2	a.	The population of 5 decades from 1980 to 2020 are given in below table. Find out the population after 3 decades beyond the last known decades by using arithmetic increase method.	12	L2	CO1
	b.	List different methods of population forecasting. Explain briefly Arithmetical and Geometrical Increase method.	8	L2	CO1
		Module – 2			
Q.3	a.	Explain the objectives of Water treatment or Water purification.	4	L2	CO2
	b.	Describe briefly the construction and working of coagulation sedimentation tank with neat sketch.	10	L2	CO2
	c.	Briefly explain the terms : i) Sedimentation ii) Coagulation iii) Flocculation.	6	L2	CO2
		OR			
Q.4	a.	The maximum daily demand at a water purification plant has been estimated as 12 million litres per day. Design the dimensions of a suitable sedimentation tank (fitted with mechanical sludge removal arrangements) for the raw supplies , assuming a detention period of hours and velocity of flow as 20cm per minute.	8	L2	CO2
	b.	List the coagulants used in water treatment.	4	L2	CO2
	c.	Briefly explain the mechanism of Filtration.	8	L2	CO2
		Module – 3			
Q.5	a.	What is Disinfection of water? What are the characteristics of good disinfectant?	6	L2	CO3

Year	1980	1990	2000	2010	2020
Population	25,000	28,000	34,000	42,000	47,000

	b.	Explain the different types of sewerage system with their merits and demerits of suitability.	12	L2	CO3
		OR			
Q.6	a.	Calculate the velocity of flow and discharge of sewer of a circular section having a diameter of 1m laid at a gradient of 1 in 500. Use Manning's formula taking N = 0.012. Assume that the sewer is running half full.	8	L3	CO3
	b.	Explain the process and objective of sampling with different methods.	6	L2	CO3
	c.	Explain DWF and WWF.	6	L2	CO3
		Module – 4			
Q.7	a.	Illustrate the layout of a conventional municipal treatment plant and infer upon importance of each unit in sanitation.	10	L2	CO4
	b.	Elucidate the working principle of sludge digester, with a neat labeled sketch.	6	L2	CO4
	c.	Explain different types of screens.	4	L2	CO4
		OR			
Q.8	a.	Discuss briefly with a neat sketch Grit Chamber and Oil and Grease removal tank.	10	L2	CO4
	b.	Explain the working of Conventional Activated Sludge Process (ASP) with flow diagram.	10	L2	CO4
		Module – 5			
Q.9	a.	Determine the size of a high rate trickling filter for the following data : i) Sewage flow = 4.5 mld ii) Recirculation Ratio = 1.5 iii) BOD of raw sewage = 250 mg/ℓ. iv) BOD Removal in primary settling tank = 30%. v) Final effluent BOD desired = 30 mg/ℓtr.	10	L3	CO5
	b.	Explain the concept of BoD and CoD. Enumerate their limitation.	6	L2	CO5
	c.	Briefly explain Self – Cleansing Velocity.	4	L2	CO5
		OR			
Q.10	a.	Draw a neat sketch of Skimming tank. Enumerate importance of Skimming tank.	10	L2	CO5
	b.	Draw and explain Oxidation Pond and Oxidation ditch.	10	L2	CO5

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BCV306D

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Third Semester B.E./B.Tech Degree Examination, Dec.2023/Jan.2024
Fire Safety in Buildings

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Define Fire. Basic concepts of fire protection.	10	L2	CO1
	b.	Explain design of fire resistance steel – structure.	10	L2	CO1
		OR			
Q.2	a.	Explain fire as a process of combustion.	10	L2	CO1
	b.	Explain effect of fire on concrete, steel, timber, plastic.	10	L2	CO1
		Module – 2			
Q.3	a.	Define urban planning, aspects of urban planning.	10	L2	CO2
	b.	Define Lift and classification of Lift.	10	L2	CO2
		OR			
Q.4	a.	Define escalators and factors affecting escalators design.	10	L2	CO2
	b.	Explain advantages and disadvantages of elevators/Lifts.	10	L2	CO2
		Module – 3			
Q.5	a.	Define flow system, explain types of flow system.	10	L3	CO3
	b.	Explain water supply diversity factors.	10	L2	CO3
		OR			
Q.6	a.	Explain system of flow in waste water pipes.	10	L2	CO3
	b.	Define and explain water sprinkler types.	10	L2	CO3
		Module – 4			
Q.7	a.	Define HVAC and governing equations to HVAC process.	10	L2	CO4
	b.	Explain factors to be considered while designing and planning electrical installation.	10	L2	CO4
		OR			
Q.8	a.	Explain electrical power distribution system in building.	10	L2	CO4
	b.	Explain steps involved in maintenance planning.	10	L2	CO4
		Module – 5			
Q.9	a.	Explain effect of corrosion and alkali aggregate reactions.	10	L2	CO5
	b.	Define NDT? Explain rebound hammer test.	10	L3	CO5
		OR			
Q.10	a.	Explain the repair sages of a building.	10	L2	CO5
	b.	Explain carbonation, chroide attack and sulphate attack.	10	L2	CO5

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CBCS SCHEME

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BCV301

Third Semester B.E./B.Tech. Degree Examination, June/July 2024
Strength of Materials

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

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		Module – 1	M	L	C
Q.1	a.	A rod of length 'L' tapers uniformly from a diameter 'D' at one end to a diameter 'd' at the other. Derive the expression for the extension caused by an axial load 'P' the material has Young's modulus of Elasticity 'E'.	10	L3	CO1
	b.	A specimen of 15mm diameter and 200mm long is subjected to tensile test and data at proportional and elastic limits were recorded as below.	10	L3	CO1

Limit	Stress (MPa)	Increase in length (mm)	Reduction in diameter (mm)
Proportional	340	0.90	?
Elastic	350	1.00	0.0225

Find modulus of Elasticity, Poisson's ratio and the reduction in diameter.

OR

Q.2	a.	A steel bar is 4 m long and its both ends are firmly fixed to two walls. The original temperature of the bar is 40°C. If the bar is cooled to 25°C, determine the thermal strain and stress in the bar. Assume E_s = 200 kN/mm^2 and $\alpha_s = 12\times10^{-6}$ per °C. State the nature of stress set up.	10	L3	CO1
	b.	A structural member 5m long is made up of two materials as shown in Fig.Q2(b). The bar is in tension under load 'P' and the total Elongation of the bar is 0.1 cm. Determine (i) The magnitude of the load (ii) The work done is Elongation of the bar. Take E_s = 210 GPa and E_b = 84 GPa.	10	L3	CO1

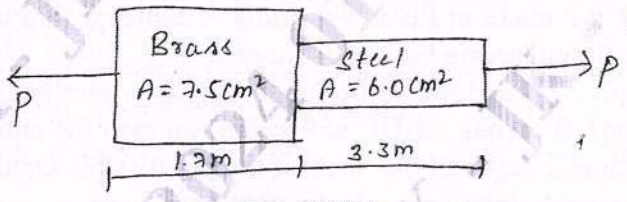


Fig.Q2(b)

		Module – 2			
Q.3	a.	Derive the relationship between Shear Force and Bending Moment.	05	L3	CO2
	b.	A Beam of length 10m is simply supported at it ends. It carries a UDL of 20 kN/m run over the length of left half of its span together with concentrated loads of 20 kN, 40 kN and 20 kN situated at 1.5m, 2.5m and 5m respectively from right hand support. Draw the bending moment and shear force diagram. [Refer Fig.Q3(b)]	15	L3	CO2

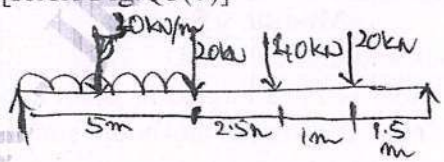
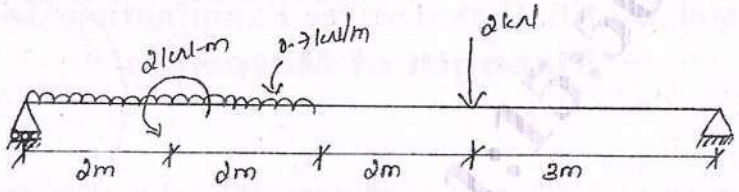
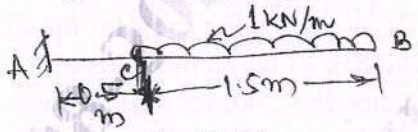


Fig.Q3(b)

		OR			
Q.4	**a.**	Draw Shear force and Bending moment diagram for the beam shown in Fig.Q4(a) and label the salient values.  Fig.Q4(a)	**12**	**L3**	**CO2**
	b.	A cantilever beam of length 2.0m carries a UDL of 1 kN/m run over a length of 1.5m from free end. Draw the shear force and bending moment diagram for the cantilever. [Refer Fig.Q4(b)]  Fig.Q4(b)	**08**	**L3**	**CO2**
		Module – 3			
Q.5	**a.**	Prove that in case of rectangular section of a beam, the maximum shear stress is 1.5 times average shear stress.	**10**	**L3**	**CO3**
	b.	A hallow shaft is to transmit 300 kW power at 80 rpm. If the shear stress is not to exceed 60 N/mm^2 and the internal diameter is 0.6 times the external diameter, find the external and internal diameter assuming that the minimum torque is 1.4 times the mean.	**10**	**L3**	**CO3**
		OR			
Q.6	**a.**	Derive the equation of pure bending with usual notations.	**10**	**L3**	**CO3**
	b.	A simply supported wooden beam of spam 1.3m having a cross-section 150mm wide and 250mm deep carries a point load 'W' at the centre. The permissible stress are 7 N/mm^2 in bending and 1 N/mm^2 in shearing. Calculate the safe load 'W'.	**10**	**L3**	**CO3**
		Module – 4			
Q.7	**a.**	What assumptions are made in Euler's formula? Deduce a formula for the critical load of a column having both ends hinged.	**10**	**L3**	**CO4**
	b.	A beam of length 5m and of uniform rectangular section is simply supported at its ends. It carries a UDL of 9 kN/m run over the entire length. Calculate the width and depth of the beam if the permissible bending stress is 7 N/mm^2 and the central deflection is not to exceed 1 cm.	**10**	**L4**	**CO4**
		OR			
Q.8	**a.**	For a simply supported beam carrying a point load at the centre. Determine the magnitude of maximum deflection.	**10**	**L3**	**CO4**
	b.	A hollow mild steel tube 6m long and 4 cm internal diameter and 6mm thick is used as a strut. Find the crippling load and safe load taking FoS as 3. Take E = 2×10^5 N/mm^2 when (i) Both ends Hinged (ii) Both Ends Fixed.	**10**	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	Differentiate between thick and thin cylinder.	**04**	**L2**	**CO5**
	b.	Pressure inside a thin cylinder is 2115 Pa and its diameter 1 m. If thickness of the cylinder wall is 5mm, determine the hoop stress and longitudinal stress induced in the cylinder material.	**06**	**L3**	**CO5**
	c.	The tensile stresses at a point across two mutually perpendicular planes are 120 N/mm^2 and 60 N/mm^2. Determine the normal, tangential and resultant stresses on a plane inclined at 30° to the axis of minor stress.	**10**	**L3**	**CO5**

		OR			
Q.10	a.	A point in a strained material possesses principal stresses of 600 N/mm^2 (tensile) and 400 N/mm^2 (compressive). Draw Mohr's stress circle and determine the following on an oblique plane, inclined at 40° with the plane of the major principal stress: i) Normal stress ii) Shear stress iii) Maximum shear stress iv) Resultant stress	10	L3	CO5
	b.	The external and internal diameter of a thick cylinder are respectively 800mm and 400mm. The cylinder is subjected to an external and internal fluid pressure of 100 GPa and 10 GPa. Determine the maximum hoop stress induced in the shell material.	10	L3	CO5

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BCV302

Third Semester B.E./B.Tech. Degree Examination, June/July 2024
Engineering Survey

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	What is Surveying? Briefly explain the classification of a survey based on the object of the survey.	8	L2	CO1
	b.	Explain briefly topographical survey and cadastral survey.	8	L1	CO1
	c.	Explain briefly laser distance meter.	4	L1	CO1
		OR			
Q.2	a.	What are the advantages and disadvantages of plane table surveying?	8	L2	CO1
	b.	Explain briefly various types of chain.	8	L1	CO1
	c.	How is surveying classified based on instrument used?	4	L2	CO1
		Module – 2			
Q.3	a.	The following consecutive readings were taken with a level and 3 meter leveling staff on a continuously sloping ground at a common interval of 20m: 0.602, 1.234, 1.860, 2.574, 0.238, 0.914, 1.936, 2.872, 0.568, 1.824, 2.722. The R.L of the first point was 192.122. Rule out the page of a level field book and enter the above readings. Calculate the reduced levels of the point.	10	L3	CO2
	b.	With a neat sketch, explain the measurement of horizontal angle by method of repetition with necessary, standard tabular format.	10	L2	CO2
		OR			
Q.4	a.	It is required to ascertain the elevations of two points P and Q and line of levels was run from P to Q. The lavelling was then continued to Bench mark. The readings obtained to being as shown below. Calculate the RL of P & Q.	10	L3	CO2

B.S.	I.S.	F.S.	R.L.	Remarks
1.622				P
1.874		0.354		
2.032		1.780		
	2.362			Q
0.984		1.122		
1.906		2.824		
		2.036	83.500	B.M

	b.	Explain temporary adjustment of dumpy level.	10	L2	CO2
		Module – 3			
Q.5	a.	Explain the characteristics of contours.	8	L1	CO3
	b.	What do you mean by contour? Explain the factors governing the choice of the proper contour interval.	8	L2	CO3
	c.	Differentiate between direct and indirect methods of contouring.	4	L2	CO3
		OR			
Q.6	a.	Explain the procedure of data refinement and plotting in CAD using total station.	8	L2	CO3
	b.	Define the following: Station, Turning point, Fore sight, Back sight.	8	L1	CO3
	c.	With a neat sketch, explain profile leveling.	4	L2	CO3
		Module – 4			
Q.7	a.	A railway embankment is 10m wide with side slope 1.5 to 1. Assuming ground to be level in a direction transverse to the centre line. Calculate the volume by prismoidal and trapezoidal formula. Contained in the length of 120m, the centre heights at 20m intervals being in meters 2.2, 3.7, 3.8, 4.0, 3.8, 2.8, 2.5.	10	L3	CO4
	b.	Obtain an expression for simple curve by Rankine's method.	10	L3	CO4
		OR			
Q.8	a.	Two tangents intersect at a chainage of 1000 meter, the deflection angle being 28°. Calculate all the data necessary to set out a curve of 250 meter radius by Rankine's method and tabulate the results. Peg interval = 20m, least count of instrument = 20″.	10	L3	CO4
	b.	The following perpendiculars offsets were taken at 10m intervals from a survey line to an irregular boundary line: 3.25, 5.60, 4.20, 6.65, 8.75, 6.20, 3.25, 4.20 and 5.65. Calculate area by trapezoidal and Simpson's rule.	10	L3	CO4
		Module – 5			
Q.9	a.	List the GPS errors.	5	L1	CO5
	b.	What are the applications of Drones? Explain any one.	7	L2	CO5
	c.	Explain any two applications of remote sensing and GIS in Civil Engineering.	8	L2	CO5
		OR			
Q.10	a.	List the different types of drones.	5	L1	CO5
	b.	What are the advantages of drones? Explain any one.	7	L2	CO5
	c.	Explain any four drone surveying requirements.	8	L2	CO5

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BCV303

Third Semester B.E/B.Tech. Degree Examination, June/July 2024
Engineering Geology

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions, choosing ONE full question from each module.*
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
1	a.	With neat sketch, explain internal structure of earth based on different discontinuities and add a note on its composition.	10	L2	CO2
	b.	Discuss the following terms : i) Focus and Epicenter ii) P and S waves.	4	L1	CO2
	c.	Define plate tectonics. Describe plate boundaries with their land forms.	6	L2	CO1
		OR			
2	a.	Define land slide. Discuss its impact and preventive measures.	10	L2	CO1
	b.	Explain seismic zones of India as per Indian standard code and give safety measures on seismic resistant structure.	10	L3	CO2
		Module – 2			
3	a.	Explain requirement of good building stones with suitable rock examples.	4	L2	CO3
	b.	Define mineral and rock. Explain 'light dependent' properties of minerals with an example.	8	L2	CO3
	c.	Differentiate between texture and structure in rocks and discuss textures in igneous rocks.	8	L3	CO2
		OR			
4	a.	Briefly explain how igneous, sedimentary and metamorphic rocks are formed and enumerate their broad classification with suitable example.	6	L1	CO2
	b.	Discuss physical/geological and engineering properties along with their uses as building material for the following : i) Granite ii) Quartzite.	6	L3	CO3
	c.	Write the physical properties and industrial uses of two minerals each in the following group : i) Carbonate ii) Oxide.	8	L2	CO3
		Module – 3			
5	a.	Define soil and its formation. Explain soil profile.	6	L2	CO2
	b.	Discuss chemical weattering and add a note on effect of weattering on monumental rocks.	8	L2	CO2
	c.	Define insitu and drifted soil. Enumerate the types of residual soil.	6	L3	CO3

		OR			
6	a.	With neat trilinear diagram explain soil texture and describe engineering classification of soil based on grain size.	**10**	**L3**	**CO2**
	b.	Explain mechanical and biological weattering.	**10**	**L2**	**CO2**
		Module – 4			
7	a.	Discuss the formation of folds and faults and a note on their engineering significance.	**6**	**L2**	**CO2**
	b.	Define dam and explain its types. Discuss selection of dam site in folded and faulted rocks.	**8**	**L3**	**CO3**
	c.	A bed of limestone has a maximum dip of 30° along N15°E. Find the amount of apparent dip along N30°W. State the strike.	**6**	**L3**	**CO3**
		OR			
8	a.	Define dip, strike and outcrop with neat sketch explain recognition of any two geological structures in field.	**10**	**L3**	**CO2**
	b.	Three boreholes are sunk at three points of an equilateral triangle whose sides are 240 meters each. P is West of Q and R is North of midpoint between PQ, Boreholes P, Q and R reach the upper surface of a rich coal seam at 30 μt. 70μt and 90μt depths respectively. i) Determine the attitude (Dip and strike) of the coal seam ii) One more borehole is proposed at S exactly at the centre of the triangle. Determine at what depth the new borehole 'S' reaches the upper bedding plane of the coal seam.	**10**	**L4**	**CO3**
		Module – 5			
9	a.	Define Aquifer and explain its types.	**6**	**L2**	**CO4**
	b.	Explain electric resistivity method and its applications in civil engineering and add a note on components, accessories of resistivity meter.	**10**	**L3**	**CO4**
	c.	Give a brief account on occurrence of ground water in igneous rocks.	**4**	**L2**	**CO4**
		OR			
10	a.	Define permissibility and explain factors affecting permeability.	**6**	**L2**	**CO4**
	b.	Explain seismic method, its types and application in civil engineering projects.	**10**	**L3**	**CO4**
	c.	Explain any two sedimentary rocks suitable for ground water occurrence.	**4**	**L2**	**CO4**

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BCV304

Third Semester B.E./B.Tech. Degree Examination, June/July 2024
Water Supply and Waste Water Engineering

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Discuss the need of protected Water Supply.	10	L1	CO1
	b.	List the various types of Water demand. Explain any three only.	10	L1	CO1
		OR			
Q.2	a.	What are the factors affecting per capita demand? Explain in detail.	10	L1	CO1
	b.	Calculate probable population in the year 1980 , 1990 and 2000 by using arithmetical increase method. 1940 | 1950 | 1960 | 1970 8000 | 12000 | 17000 | 22500	10	L3	CO1
		Module – 2			
Q.3	a.	Draw unit flow diagram of water treatment plant, explain each unit in brief.	10	L2	CO2
	b.	Explain the theory of Sedimentation tank. What are the types of Sedimentation tank? Explain any one.	10	L1	CO2
		OR			
Q.4	a.	Draw the neat sketches of Rapid sand filters. Explain working and cleaning of filters.	10	L2	CO2
	b.	Design the approximate dimensions of a set of rapid gravity filters for treating water required for a population of 50,000. The rate of water supply being 180/Liters/day/person. The filters are rated to work 5000 Lit/hr/Sqm.	10	L3	CO2
		Module – 3			
Q.5	a.	What is Disinfection? What are the minor methods of disinfection? Explain any two methods.	10	L1	CO3
	b.	What is Chlorination? What are the types of chlorination? Explain any two methods.	10	L1	CO3
		OR			
Q.6	a.	What are the types of Sewerage System? Explain their suitability in detail.	10	L1	CO3
	b.	Explain any two Waste water physical , chemical and biological characteristics in detail.	10	L1	CO3

		Module – 4			
Q.7	**a.**	Draw flow diagram of Municipal waste water treatment unit operations and explain each units.	**10**	**L2**	**CO4**
	b.	Explain the importance of screens and types of screens in the sewage treatment process.	**10**	**L1**	**CO4**
		OR			
Q.8	**a.**	Explain the working of conventional Activated Sludge Process (ASP) with flow diagram.	**10**	**L2**	**CO5**
	b.	What is Suspended growth process? What are the examples of suspended growth process units? Explain any one.	**10**	**L1**	**CO5**
		Module – 5			
Q.9	**a.**	Explain the constructional details of a conventional trickling filters , with a neat sketch.	**10**	**L1**	**CO5**
	b.	The sewage flows from a primary settling tank to a standard rate trickling filter at a rate of 5 million liter per day having a 5 – day BOD of 150mg/lit. Determine the depth and the volume of the filter, adopting a surface loading of 2500ℓ/m^2/day and an urgent loading of 165/g/m^3/day. Also determine the efficiency of the filter unit, using NRC formula.	**10**	**L3**	**CO5**
		OR			
Q.10	**a.**	Explain the Rotating biological contactors, with neat sketch.	**10**	**L2**	**CO5**
	b.	Write a short note on : i) Oxidation ditch ii) Stabilization Ponds.	**10**	**L1**	**CO5**

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BCV306D

Third Semester B.E./B.Tech. Degree Examination, June/July 2024
Fire Safety in Buildings

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	What are the safety measures to be adopted in advance to prevent a fire in a building?	10	L2	CO1
	b.	Write short notes on the following : i) Effect of fire on construction materials ii) Role of oxygen in combustion iii) Planning for fire protection iv) Fire escape v) Fire Hazard losses	10	L2	CO1
		OR			
Q.2	a.	Discuss the fire as a process combustion, explain the steps for the fire protection.	10	L2	CO1
	b.	Explain the design of fire resistance reinforced concrete building and steel framed structure.	10	L2	CO1
		Module – 2			
Q.3	a.	Explain urban planning, escape and refuge in detail.	10	L2	CO2
	b.	What are the main objectives of the fire safety? List out the various types of fire extinguishers.	10	L2	CO2
		OR			
Q.4	a.	Write briefly about the following : i) lift design ii) external escape route.	10	L2	CO2
	b.	What are general guidelines for good fire safety management?	10	L2	CO2
		Module – 3			
Q.5	a.	Explain with a neat sketch of water supply system for a building.	10	L2	CO2
	b.	Write short notes on the following : i) Constant demand ii) Diversion factor.	10	L2	CO2
		OR			
Q.6	a.	Explain water control system in pipe networks and fixtures units.	10	L2	CO3
	b.	Explain flow in waste water pipes in detail.	10	L2	CO3
		Module – 4			
Q.7	a.	What is HVAC system? Write briefly about psychometric chart.	10	L2	CO4
	b.	Write short notes on the following : i) Life cycle of cost ii) intelligent building iii) estimation of repair cycle iv) building maintenance v) interpretation of test result.	10	L2	CO4

		OR			
Q.8	**a.**	Write briefly about building inspection, planned and adhoc maintenance.	**10**	**L2**	**CO4**
	b.	Discuss briefly cost profile maintenance of a building.	**10**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	Explain briefly health evaluation surveys of a buildings.	**10**	**L2**	**CO5**
	b.	Write short notes on the following : i) Effect of corrosion Alkali Aggregate reaction ii) Condition survey iii) Non destructive testing iv) The benefits of non destructive testing v) Core strength test	**10**	**L2**	**CO5**
		OR			
Q.10	**a.**	Explain briefly Carbonation and Chloride measurement test.	**10**	**L2**	**CO5**
	b.	Exp[lain the method of retrofitting in building.	**10**	**L2**	**CO5**

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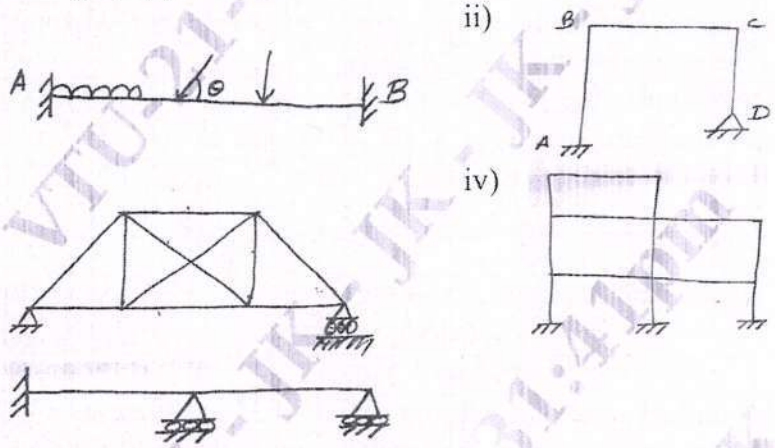
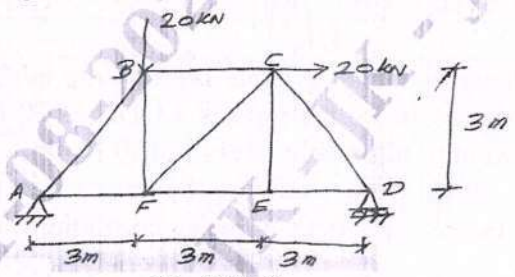
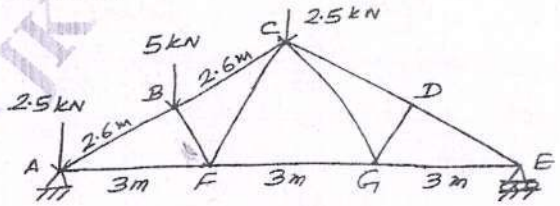
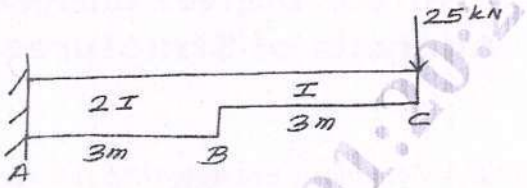
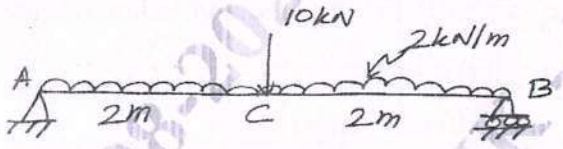
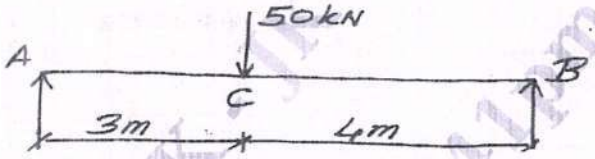
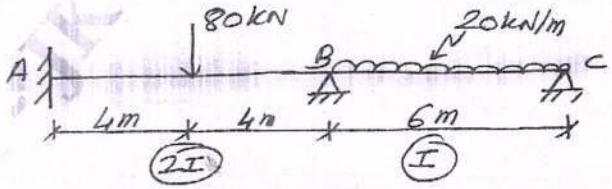
BCV401

Fourth Semester B.E./B.Tech. Degree Examination, June/July 2024
Analysis of Structures

Time: 3 hrs. Max. Marks: 100

Note: **1.** ***Answer any FIVE full questions, choosing ONE full question from each module.***
2. ***M : Marks , L: Bloom's level , C: Course outcomes.***

		Module – 1	M	L	C
Q.1	a.	Differentiate between statically determinate and indeterminate beams with an example for each.	06	L1	CO1
	b.	Define degree of freedom. What is the degree of freedom for a : (i) Fixed support (ii) Hinged support	04	L1	CO1
	c.	Determine static and kinematic indeterminacy for the following structures shown in Fig.Q1(c). i) ii) iii) iv) v)  Fig.Q1(c)	10	L3	CO1
		OR			
Q.2	a.	Determine the forces in all the members of the truss shown in Fig.Q2(a), adopting method of joints.  Fig.Q2(a)	10	L3	CO1
	b.	Determine the forces in all the members listed below using method of sections. [Refer Fig.Q2(b)] (i) Force in member CD (ii) Force in member CG (iii) Force in member FG.  Fig.Q2(b)	10	L3	CO1

		Module – 2			
Q.3	**a.**	Determine slope and deflection under the load for the beam as shown in Fig.Q3(a), using moment area method.  Fig.Q3(a)	**10**	**L3**	**CO2**
	b.	Calculate the slope at support A and deflection at the centre of a simply supported beam as shown in Fig.Q3(b) by moment area method.  Fig.Q3(b)	**10**	**L3**	**CO2**
		OR			
Q.4	**a.**	Obtain an expression for strain energy stored in a member when it is subjected to (i) Bending moment (ii) Shear	**10**	**L2**	**CO2**
	b.	Find the deflection under the load for the beam shown in Fig.Q4(b), by using Castiglino's theorem. Take $E = 2 \times 10^8$ kN/m^2 and $I = 14 \times 10^{-6}$ m^4.  Fig.Q4(b)	**10**	**L3**	**CO2**
		Module – 3			
Q.5	**a.**	A symmetrical 3-hinged parabolic arch has a span of 25 m. It carries a UDL of intensity 20 kN/m over the entire span and 2 point loads of 20 kN each at 3 m and 6 m from the left support. Compute the reactions at the supports and also find the bending moment, radial shear and normal thrust at a section 4m from the left end. Take central rise as 5m.	**12**	**L3**	**CO3**
	b.	Show that the shape of parabolic arch is a funicular shape for a three hinged arch subjected to UDL over its entire span.	**08**	**L2**	**CO3**
		OR			
Q.6		A symmetrical unstiffened suspension cable is parabolic in shape and has a span of 300 m and a dip of 30 m. It supports a UDL of 20 kN/m over the whole span. If the maximum allowable stress is 150 N/mm^2, determine the length and area of the cable. What would be the increase in length and sag for a rise of temperature of 50°F. Given, coefficient of expansion, $\alpha = 6 \times 10^{-6}$ per °F.	**20**	**L3**	**CO3**
		Module – 4			
Q.7		Analyze the beam completely by slope deflection method, when support B sinks by 1 mm and support C rises by 0.5 mm. Take EI = 30000 kN.m^2. Refer Fig.Q7. Draw BMD, SFD and Elastic Curve.  Fig.Q7	**20**	**L3**	**CO4**

		OR			
Q.8		Analyze the portal frame shown in Fig.Q8 by slope-deflection method. Draw bending moment diagram.	**20**	**L3**	**CO4**

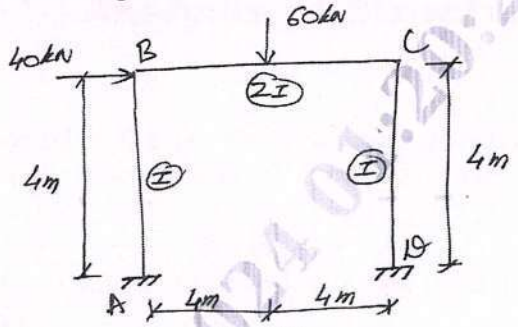


Fig.Q8

		Module – 5			
Q.9		Analyze the continuous beam shown in Fig.Q9 by moment distribution method. Draw bending moment and shear force diagram.	**20**	**L3**	**CO5**

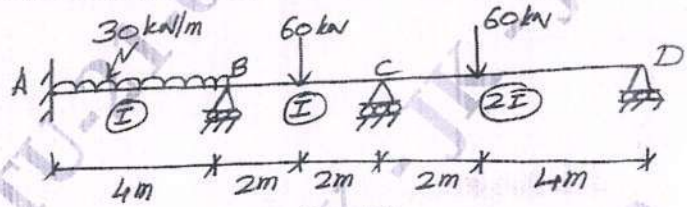


Fig.Q9

		OR			
Q.10		Analyze the frame by moment distribution method. Draw BMD and SFD. Refer Fig.Q10.	**20**	**L3**	**CO5**

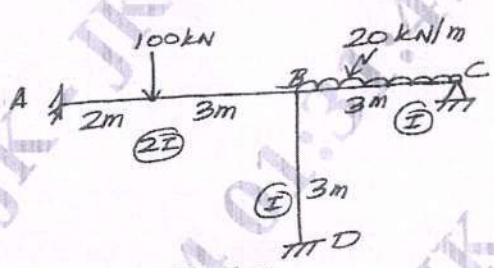


Fig.Q10

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BCV402

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Fourth Semester B.E./B.Tech. Degree Examination, June/July 2024
Fluid Mechanics and Hydraulics

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Define the following terms along with symbols and units : (i) Compressibility (ii) Capillarity (iii) Surface tension	6	L1	CO1
	b.	State and prove Pascal's law.	6	L2	CO1
	c.	A tube differential manometer connects two pipes A and B. Pipe A contains carbon tetra chloride having specific gravity 1.594 under a pressure of 117.72 kN/m^2 and pipe B contains oil of specific gravity 0.8 under a pressure of 117.72 kN/m^2. The pipe A lies 2.5 m above pipe B. Find the difference in pressure measured by mercury as fluid filling U-tube. Assume mercury in the right limb is 50 cm below centre of pipe B.	8	L2	CO1
		OR			
Q.2	a.	Differentiate between : (i) Pressure intensity and Pressure head (ii) Simple and differential manometers. (iii) Absolute and Gauge pressure.	6	L2	CO1
	b.	Derive an expression for total pressure and centre of pressure on a plane surface immersed vertically in water.	6	L2	CO1
	c.	A 1200 mm × 1800 mm size rectangular plate is immersed in water with an inclination of 30° to the horizontal. The 1200 mm side of the plate is kept horizontal at a depth of 30 m below the water surface. Compute the total pressure on the surface and the position of centre of pressure.	8	L3	CO1
		Module – 2			
Q.3	a.	Differentiate between : (i) Laminar and turbulent flow (ii) Uniform and non uniform flow (iii) Steady and Unsteady flow	6	L2	CO2
	b.	Derive continuity equation for a three dimensional flow in Cartesian co-ordinates.	6	L2	CO2
	c.	The velocity potential function is given by $\phi = 5(x^2 - y^2)$. Calculate the velocity components at the points (4, 5)	8	L3	CO2
		OR			
Q.4	a.	List the assumptions made in deriving Bernoulli's equation.	6	L2	CO2
	b.	Derive the equation for the discharge through Venturimeter.	6	L2	CO2
	c.	Crude oil of G = 0.84 flow through a pipe with a rate of 450 lps. The diameter of pipe and pressure in the pipe at one section are respectively 25 cm and 55 kPa and at section two are 50 cm and 320 kPa. Find the direction of flow through the pipe and head loss. Pipe is horizontal.	8	L3	CO2

		Module – 3			
Q.5	**a.**	Define Orifice and Mouth piece. Also derive the hydraulic co-efficients experimentally.	**6**	**L2**	**CO3**
	b.	Derive an expression for discharge over a triangular notch.	**6**	**L2**	**CO3**
	c.	A rectangular channel 2 m wide has a discharge 250 lps, which is measured by a right angled V-notch weir. Find the position of the apex of the notch from the bed of the channel of maximum depth of water is not to exceed 1.3 m. Take $C_d = 0.62$.	**8**	**L3**	**CO3**
		OR			
Q.6	**a.**	Define : (i) Major and Minor losses in a pipe flow. (ii) Pipes in series and parallel (iii) Water hammer in pipe flow	**6**	**L2**	**CO3**
	b.	Derive Darcy-Weisbach equation for head loss due to friction in a pipe.	**6**	**L2**	**CO3**
	c.	Water is required to be supplied to a colony of 4000 residents at a rate of 180 litres per person from a source 3 km away. If half the daily requirement needs to be pumped in 8 hours against a friction of 18 m, find the size of the main pipe supplying water. Assume friction factor as 0.028.	**8**	**L3**	**CO3**
		Module – 4			
Q.7	**a.**	Define most economical channel section. For the most economical trapezoidal section show that half of top width is equal to the side slope length.	**6**	**L2**	**CO4**
	b.	What is specific energy curve? Draw and derive expressions for critical depth and critical velocity.	**6**	**L2**	**CO4**
	c.	The discharge of water through a rectangular channel of width 8 m is 15 m^3/s. When the depth of flow of water is 1.2 m. Calculate (i) Specific energy of flowing water. (ii) Critical depth and critical velocity. (iii) Value of minimum specific energy.	**8**	**L3**	**CO4**
		OR			
Q.8	**a.**	What is gradually varied flow? Derive the dynamic equation for gradually varied flow.	**6**	**L2**	**CO4**
	b.	Derive an expression for conjugate depths in case of hydraulic jump in a rectangular channel laid horizontal.	**6**	**L2**	**CO4**
	c.	A sluice gate discharges water into a horizontal rectangular channel with a velocity of 6 m/s and depth of flow is 0.4 m. The width of the channel is 8 m. Determine whether a hydraulic jump will occur, and if so, find its height and loss of energy per kg of water. Also determine the power lost in the hydraulic jump.	**8**	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	Obtain an expression for force exerted by a jet striking at the centre of a moving symmetrical curved vane. And show that its maximum efficiency is limited to $\frac{16}{27}$.	**6**	**L3**	**CO5**
	b.	Give the classification of turbines based on different criteria.	**6**	**L2**	**CO5**
	c.	A jet of water having velocity 45 m/s impinges without shock on a series of curved vanes moving at 15 m/s, the direction of motion of vanes being 20° to that of jet. The relative velocity at the outlet is 0.9 of that at inlet and the absolute velocity of water at the exit is to be normal to the motion of vanes. Find (i) Vane angles at entrance and exit. (ii) Hydraulic efficiency.	**8**	**L3**	**CO5**

		OR			
Q.10	**a.**	By means of neat sketch, explain the Francis turbine.	**6**	**L2**	**CO5**
	b.	A Pelton wheel turbine has to be designed for the following : Data : Power = 6000 kW, Net head = 300 m, Speed = 550 rpm, Jet ratio = $\frac{1}{10}$, Overall efficiency = 85%, C_V = 0.98, Speed ratio = 0.46 Determine diameter of runner and jet, discharge and number of jets required.	**6**	**L3**	**CO4**
	c.	Explain various efficiencies of centrifugal pumps. Also define (i) Manometric head (ii) Static head (iii) Suction head (iv) Delivery head	**8**	**L1**	**CO5**

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CBCS SCHEME

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BCV403

Fourth Semester B.E./B.Tech. Degree Examination, June/July 2024
Transportation Engineering

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Mention the different modes of transportation. Explain the characteristics of road transport.	6	L1	CO1
	b.	Mention the Jayakar committee recommendations and its implementations.	6	L1	CO1
	c.	Calculate the minimum sight distance required to avoid a head on collision of 2 cars approaching from the opposite direction at 90 and 60 kmph. Assume a reaction time of 2.5 sec, co-efficient of friction of 0.7 and break efficiency of 50% in both the cases.	8	L2	CO1
		OR			
Q.2	a.	Explain Engineering surveys.	6	L1	CO1
	b.	Mention the various cross-sectional elements to be designed for a highway and explain them briefly.	6	L1	CO1
	c.	Vertical summit curve is formed due to the intersection of 2 gradients +5% and -6%. Design the length of summit curve to provide SSD for a design speed of 80kmph. Assume any other data suitably.	8	L2	CO1
		Module – 2			
Q.3	a.	Explain the desirable properties of subgrade soil.	6	L2	CO2
	b.	With a neat sketch, explain the functions of component parts of flexible pavement.	6	L2	CO2
	c.	Explain the significance of Highway Drainage.	8	L2	CO2
		OR			
Q.4	a.	Explain the desirable properties of road aggregates.	6	L2	CO2
	b.	Distinguish between flexible pavement and rigid pavement.	6	L2	CO2
	c.	List the objectives of i) Surface drainage ii) Sub-surface drainage of roads.	8	L2	CO2
		Module – 3			
Q.5	a.	List the different road user characteristics and explain the concept of PIEV theory.	10	L2	CO3

	b.	Following data were obtained from the spot speed studies suggest: i) Speed limit for regulation ii) Lower speed causing congestion iii) Speed to check the geometric design elements Speed range (kmph) — No. of vehicles 5-10 — 230 10-15 — 375 15-20 — 500 20-25 — 680 25-30 — 525 30-35 — 430 35-40 — 290 40-50 — 110 50-60 — 25 60-70 — 8	10	L3	CO3
		OR			
Q.6	a.	Discuss the various types of traffic studies. What are the objects of carrying out traffic volume studies?	10	L2	CO3
	b.	The average normal flow on cross roads A and B during design period are 400 and 250 PCU per hour. The saturation flows are 1250 and 1000 PCU per hour respectively. The all red time required for pedestrian crossing is 12 seconds. Design a two-phase signal by Webster's method.	10	L3	CO3
		Module – 4			
Q.7	a.	Describe the requirements of an ideal permanent way.	10	L2	CO4
	b.	Determine the quantity of materials required to construct a 800m long B.G. railway track, assuming a sleeper, density of (n + 5).	10	L2	CO4
		OR			
Q.8	a.	What are the functions and requirements of sleepers and Ballast?	10	L2	CO4
	b.	If a 8° curve track diverges from a main curve of 5° in an opposite direction in the layout of a B.G yard, calculate the super elevation and the speed on the branch line, if the maximum speed permitted on the main line is 45kmph.	10	L2	CO4
		Module – 5			
Q.9	a.	List the various elements of an air port and explain with a neat sketch.	10	L2	CO4
	b.	Describe the elements of taxiway geometric design.	10	L2	CO4
		OR			
Q.10	a.	Explain the factors, which influence the site selection for airport.	10	L2	CO4
	b.	List the assumed conditions under which basic runway length is determined. Explain the normal landing case.	10	L2	CO4

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CBCS SCHEME

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BCV405B

Fourth Semester B.E./B.Tech. Degree Examination, June/July 2024
Construction Equipment, Plants and Machinery

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Explain different types of hydraulic machines used in construction.	10	L2	CO1
	b.	Explain in detail applications and operation of Trenchers, Graders, Fell Bunchers, Tower cranes.	10	L2	CO1
		OR			
Q.2	a.	Explain in detail basic components and classification of hydraulic system.	10	L2	CO1
	b.	In detail explain applications of hydraulic system.	10	L2	CO1
		Module – 2			
Q.3	a.	List the equipments used for earthwork excavation and explain in detail.	10	L1	CO2
	b.	Differentiate between standard and special equipment.	6	L4	CO2
	c.	List types of concrete mixers.	4	L1	CO2
		OR			
Q.4	a.	Explain with neat sketch Back Hoe operation along with application.	10	L4	CO2
	b.	Explain the classification and components of Bull dozer.	6	L4	CO2
	c.	Write short notes on Hot mix plant.	4	L2	CO2
		Module – 3			
Q.5	a.	Define life cycle management. What are the four phases of the equipment cycle?	10	L1	CO3
	b.	Explain briefly necessity of preparation of equipment schedule.	10	L2	CO3
		OR			
Q.6	a.	Define total effective equipment performance explain why is it required.	10	L1	CO3
	b.	Define maintenance. List and explain the types of maintenance of equipment.	10	L1	CO3

		Module – 4			
Q.7	**a.**	Discuss the specific ground conditions for different types of tunnel boring machine.	**10**	**L2**	**CO4**
	b.	Describe the components and operation process of a hard rock tunneling boring machine.	**10**	**L2**	**CO4**
		OR			
Q.8	**a.**	Describe the components and operational process of an earth pressure balance machine. Also explain challenges associated.	**10**	**L2**	**CO4**
	b.	Discuss in detail the effective use of rig on construction site.	**10**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	Illustrate the types and roles of digitalized equipment used in the various stages of railway track construction.	**10**	**L3**	**CO4**
	b.	Explain the concept of 3D concrete printing along with application and benefits.	**10**	**L2**	**CO4**
		OR			
Q.10	**a.**	Write the important safety measures and practices in construction activities involving tools and tackles.	**10**	**L2**	**CO4**
	b.	Differentiate between mechanized and digitalization in the construction industry.	**10**	**L3**	**CO4**

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BCV502

Fifth Semester B.E./B.Tech. Degree Examination, June/July 2024
Geotechnical Engineering

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Time: 3 hrs. Max. Marks: 100

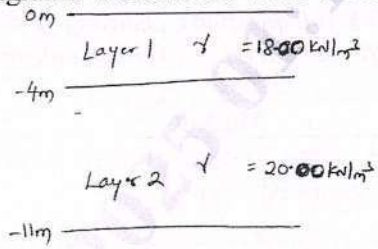
Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	With neat sketch of 3 phase system of soil. Explain dry soil, partially saturated soil and fully saturated soil.	6	L1	CO1
	b.	Derive the relationship: $WG = S_r e$	6	L2	CO1
	c.	A fully saturated sample has water content of 25% and unit weight of 20kN/m^3. Calculate: i) Dry unit weight ii) Specific gravity iii) Porosity iv) Unit weight, when degree of saturation is 80%.	8	L3	CO1
		OR			
Q.2	a.	Explain the different types of soil structures with neat sketch.	4	L2	CO1
	b.	Explain IS plasticity chart with neat sketch.	6	L2	CO1
	c.	In a sieve analysis test, the weight retained on each sieve is as given below, classify the soil.	10	L2	CO1

Soil type	A	B
% passing through 75 μm sieve	4%	52%
% passing through 4.75 mm sieve	74%	36%
D_{10} mm	0.40	
D_{30} mm	1.00	
D_{60} mm	2.00	
Liquid limit (W_L)	-	75%
Plastic limit (W_P)	-	30%

		Module – 2			
Q.3	a.	Explain Darcy's law with assumptions and limitations.	6	L2	CO4
	b.	List and explain factors affecting permeability of soil.	6	L2	CO4
	c.	A permeameter of diameter 75 mm contains a column of fine sand 400 mm long. When water flows through under constant head at the rate of 60 ml in 60 sec, the loss of head between two points 250 mm apart is 375 mm. Determine the coefficient of permeability (k). If a variable head test is made on the same soil sample using a stand pipe of diameter 30 mm. Estimate the time required for the water level in the stand pipe to fall from 1600 to 1560 mm above the outflow level.	8	L3	CO4

OR

Q.4	**a.**	What is meant by total stress, neutral stress and effective stress?	**6**	**L1**	**CO2**
	b.	What is flow net? Mention its applications.	**6**	**L2**	**CO2**
	c.	For the soil deposit shown below, draw the total stress, pore water pressure and effective stress diagrams. Assume the water table is at ground level.  Fig.Q.4(c)	**8**	**L3**	**CO2**

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Module – 3

Q.5	**a.**	Differentiate between standard proctor test and modified proctor test.	**6**	**L2**	**CO2**
	b.	What are the effects of compaction on soil properties? Explain.	**6**	**L1**	**CO2**
	c.	The following data was obtained from a proctor compaction test: Water content (%): 5.90, 7.50, 9.7, 11.65, 13.85 Weight of wet sample (N): 18.20, 19.50, 20.10, 20.00, 19.70 Assume G = 2.7, volume of mould = 9.5×10^{-4} m^3. Plot the compaction curve. Determine OMC and MDD. Also plot Zero Air voids line.	**8**	**L3**	**CO2**

OR

Q.6	**a.**	Explain the concept of consolidation by mass spring analogy.	**6**	**L2**	**CO2**
	b.	Explain the Terzaghi's consolidation theory with its limitations.	**6**	**L2**	**CO2**
	c.	The time to reach 40% consolidation of a two way drained laboratory 12 mm thick saturated clayey soil sample is 40 sec. Determine the time required for 60% consolidation of the same soil of 10 m thick on the top of a rocky surface subjected to the same loading conditions as laboratory sample.	**8**	**L3**	**CO2**

Module – 4

Q.7	**a.**	Explain assumptions of Mohr's strength theory and mention its limitations.	**6**	**L2**	**CO3**
	b.	Explain the factors affecting shear strength of soil.	**6**	**L2**	**CO3**
	c.	An unconfined compression test was conducted on an undisturbed sample of clay. The sample had a diameter of 38 mm and was 80 mm long. The load at failure measured as 30 N and the axial deformation of the sample at failure was 12 mm. Determine the unconfined compressive strength and undrained shear strength of clay, if failure angle = 50°.	**8**	**L3**	**CO3**

OR

Q.8	**a.**	Briefly explain different drainage conditions of triaxial shear test.	**6**	**L2**	**CO3**
	b.	Mention any 4 advantages of triaxial shear test.	**4**	**L1**	**CO3**
	c.	A consolidated undrained test was carried out on a clayey sample and the results are as follows. Find total and effective shear parameters of soil.	**10**	**L3**	**CO3**

Cell pressure, kN/m^2	100	200	400	600
Deviator stress, kN/m^2	300	410	610	850
Pore water pressure, kN/m^3	-45	-15	50	110

Module – 5

Q.9	**a.**	Explain the assumptions of Terzaghi's bearing capacity theory.	**6**	**L2**	**CO4**
	b.	Differentiate between general shear failure, local shear failure, punching shear failure.	**6**	**L2**	**CO4**
	c.	What will be the gross and net safe bearing pressure of sand having $\phi = 40°$, unit weight of sand = 19 kN/m^3 under i) 1.2 m wide strip footing ii) 1.2 m square footing. Assume the footings are placed at a depth of 1.2 m below G.L and water table is at greater depth. Also assume F.O.S. = 3 and $N_c = 95.7$, $N_q = 81.3$, $N_y = 100.4$.	**8**	**L3**	**CO4**

OR

Q.10	**a.**	Differentiate immediate settlement, consolidation and secondary settlements.	**6**	**L2**	**CO4**
	b.	Give the tolerance limits as per BIS specifications for total and differential settlements for footing and rafts.	**8**	**L2**	**CO4**
	c.	A clayey stratum of 5 m thick has a unit weight of 15 kN/m^3 water content of 43% liquid limit = 80%, specific gravity G = 2.7. Initial overburden pressure due to old structure is 300 kN/m^2, due to construction of a building stress increased to 120 kN/m^2. Determine the consolidation settlement.	**6**	**L3**	**CO4**

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CBCS SCHEME

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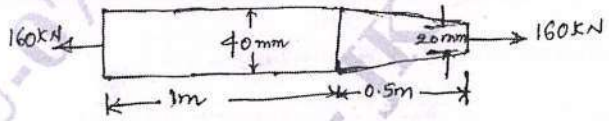
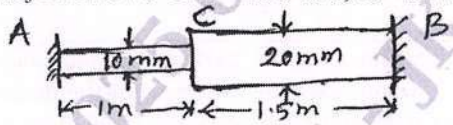
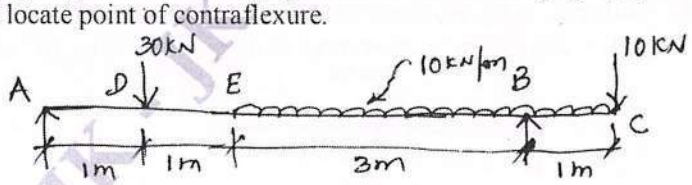
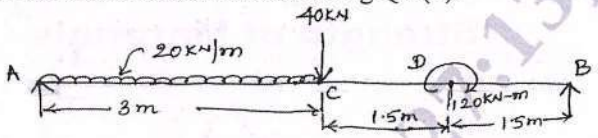
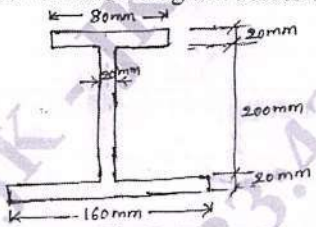
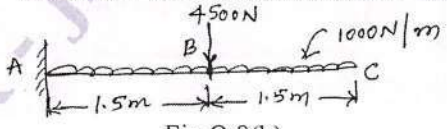
BCV301

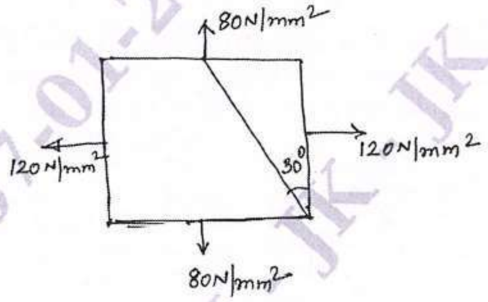
Third Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
Strength of Materials

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Sketch a typical stress-strain curve for a ductile material and explain briefly the salient features of the curve.	6	L2	CO1
	b.	Define: i) Strain ii) Poisson's ratio.	4	L1	CO1
	c.	A 1.5 m long steel bar is having uniform diameter of 40 mm for a length of 1 m. In the next 0.5 m its diameter gradually reduces from 40 mm to 20 mm as shown in Fig.Q.1(c). Determine the elongation of this bar when subjected to an axial tensile load of 160 kN. Given E = 200 GN/m^2.  Fig.Q.1(c)	10	L3	CO1
		OR			
Q.2	a.	What are the elastic constants and explain them briefly?	6	L2	CO1
	b.	Explain St Venant's principle.	4	L2	CO1
	c.	The steel rod shown in Fig.Q.2(c) is in two parts. It has a diameter of 10 mm for a length of 1 m and 20 mm for the remaining length of 1.5 m. If it is constrained between two parts A and B and is stress free at 20°C. Find the stress in the material, when it is subjected to 70°C. E = 200 GPa, $\alpha = 12 \times 10^{-6}$/°C.  Fig.Q.2(c)	10	L3	CO1
		Module – 2			
Q.3	a.	For a cantilever beam subjected to a udl of intensity w/unit length throughout, plot SFD and BMD.	6	L3	CO2
	b.	For a simply supported overhanging beam as shown in Fig.Q.3(b), draw SFD and BMD and locate point of contraflexure.  Fig.Q.3(b)	14	L3	CO2

		OR			
Q.4	**a.**	For a simply supported beam subjected to udl of w/unit length throughout. Plot SFD and BMD.	**6**	**L3**	**CO2**
	b.	Draw SFD and BMD for the beam shown in Fig.Q.4(b).  Fig.Q.4(b)	**14**	**L3**	**CO2**
		Module – 3			
Q.5	**a.**	Derive the relation between bending stress and radius of curvature $\frac{\sigma}{y} = \frac{E}{R}$.	**6**	**L3**	**CO3**
	b.	Define: i) Neutral axis ii) Section modulus	**4**	**L2**	**CO3**
	c.	A hollow propeller shaft of a steam ship is to transmit 3750 KW at 240 rpm. If the internal diameter is 0.8 times the external diameter and if the maximum shear stress developed is to be limited to 160 N/mm^2, determine the size of the shaft.	**10**	**L3**	**CO4**
		OR			
Q.6	**a.**	Derive the torsion equation with usual notations.	**8**	**L3**	**CO4**
	b.	The unsymmetrical I-section shown in Fig.Q.6(b) is subjected to a shear force of 40 KN. Draw the shear stress variation diagram across the depth.  Fig.Q.6(b)	**12**	**L3**	**CO3**
		Module – 4			
Q.7	**a.**	Derive differential equation for beam deflection with usual notations.	**8**	**L3**	**CO4**
	b.	Determine the critical load for a hollow cast iron rectangular column of external dimensions 200 mm × 150 mm with the thickness of the metal being 25 mm. The height of the column is 6 m and both ends are fixed. Use Euler's formula and compare the value with that obtained by using Rankine's formula taking σ_c = 500 N/mm^2 and a = 1/1600, which of the above formula decides the safe crippling load?	**12**	**L3**	**CO4**
		OR			
Q.8	**a.**	Derive an expression for Euler's crippling load for both ends hinged columns with usual notations.	**8**	**L3**	**CO4**
	b.	Compute the mid-span and maximum deflection for the beam shown in Fig.Q.8(b). Given E = 210 GN/m^2 and moment of inertia = 36000 × 10^{-9} m^4.  Fig.Q.8(b)	**12**	**L3**	**CO4**

		Module – 5			
Q.9	a.	With a neat sketch, explain the two-dimensional stress system.	8	L2	CO5
	b.	A cylindrical shell is 3 m long and is having 1 m internal diameter and 15 mm thickness. Calculate the maximum intensity of shear stress induced and also the changes in the dimensions of the shell, if it is subjected to an internal fluid pressure of 1.5 N/mm^2.	12	L3	CO5
		OR			
Q.10	a.	Derive Lame's equation for radial and hoop stress for thick cylinder subjected to internal and external fluid pressure.	10	L3	CO5
	b.	The direct stresses acting at a point in a strained material are shown in Fig.Q.10(b). Find the normal, tangential and resultant stresses on plane 30° to the plane of major principal stress. Find the obliquity of the resultant stress also.  Fig.Q.10(b)	10	L3	CO5

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CBCS SCHEME

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BCV302

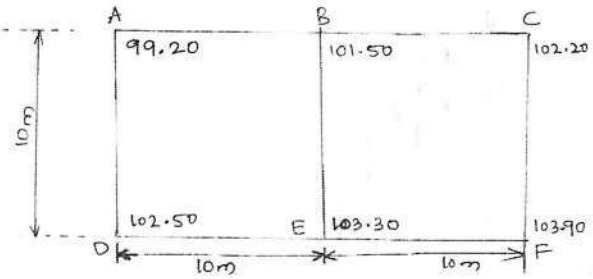
Third Semester B.E/B.Tech. Degree Examination, Dec.2024/Jan.2025
Engineering Survey

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions, choosing ONE full question from each module.*
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
1	a.	What is Surveying? Explain the principles of surveying.	8	L2	CO1
	b.	Compare between : i) True and magnetic bearing ii) Plane and geodetic surveying iii) Cadastral and hydrographic surveying.	6	L1	CO1
	c.	Write the advantages and disadvantages of plane table surveying.	6	L1	CO1
		OR			
2	a.	Discuss on importance of surveying in civil engineering.	6	L2	CO1
	b.	Explain the different methods of measuring distances with examples.	6	L2	CO1
	c.	Differentiate between : i) Chain and chainage ii) Laser distance meter and distance measuring wheel iii) EDM and GPS iv) Topographical and construction survey.	8	L1	CO1
		Module – 2			
3	a.	The following consecutive readings were taken with a level and a 4m staff on a continuously sloping ground at a common interval of 20m : 0.780, 1.535, 1.955, 2.430, 2.985, 3.480, 1.155, 1.960, 2.365, 3.640, 0.935, 1.045, 1.630 and 2.545. The RL of first point A was 180.750m. Rule out a page of level field book and enter the above readings. Compute the RL's by HI method. Also calculate the gradient of the line joining the first and last points.	10	L3	CO2
	b.	List the salient features of total station.	6	L2	CO2
	c.	Why fly and flyback leveling is required?	4	L2	CO2
		OR			
4	a.	Explain the temporary adjustments of dumpy level.	6	L2	CO2
	b.	Explain the method of measuring horizontal angle by repetition method along with the tabular column.	10	L3	CO2
	c.	Discuss on different fundamental measurements of total station.	4	L1	CO2
		Module – 3			
5	a.	What are contours? Explain the characteristics of contours with neat sketches.	10	L3	CO3
	b.	Brief on longitudinal and cross-sectioning with typical sketches.	8	L2	CO3
	c.	What are the input data required while creating job file in total station?	2	L1	CO3

OR

6	a.	Plot the contours of RL 100.00, 101.00, 102.00, and 103.00 in the given square blocks of 10 m × 10 m. The reduced levels of guide points are given in Fig.Q6(a).  Fig.Q6(a)	10	L3	CO3
	b.	Explain the following related to total station : i) Back sight data ii) Coordinates data iii)Command to plot contours in auto CAD. iv) Data transferring.	4	L2	CO3
	c.	Explain the procedure and select the contour internal.	6	L2	CO3

Module – 4

7	a.	Calculate the necessary data for setting out simple curve of radius 300m with the deflection angle of 50° 30′. The two tangents intersect at a chainage of 1192.00m. Take peg interval as 20m and tabulate the results using Rankine's method.	6	L3	CO4
	b.	List the different types of curves.	4	L1	CO4
	c.	The following perpendicular offsets were taken from chain line to an irregular boundary. Calculate the area enclosed by trapezoidal rule. Chainage (m): 0, 30, 60, 90, 120, 150, 180, 210 Offset (m): 0, 2.65, 3.80, 3.75, 4.65, 3.60, 5.0, 5.80	10	L2	CO4

OR

8	a.	A railway embankment is 10m wide with side slopes 1.5 to 1.0. Assuming ground to be level in a direction transverse to center line, calculate the volume contained in a length of 120 meters, the centre heights at 20m intervals being are 2.2, 3.7, 3.8, 4.0, 3.8, 2.8 and 2.5m. Use both trapezoidal and prismoidal method.	10	L3	CO4
	b.	Sketch out a compound curve and show the elements of it.	4	L2	CO4
	c.	Define the following related to setting out works : i) Stake ii) Post iii) Batter – board iv) Sight rail.	6	L1	CO4

Module – 5

9	a.	Discuss on the various segments of GPS.	8	L2	CO5
	b.	List the applications of RS and GIS in civil engineering.	6	L1	CO5
	c.	List out the steps in drone surveying.	6	L1	CO5

OR

10	a.	Discuss on GPS receivers.	8	L2	CO5
	b.	List the features and applications of drone surveying.	8	L1	CO5
	c.	Name the type of sensors used in drone surveying.	4	L1	CO5

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BCV303

Third Semester B.E/B.Tech. Degree Examination, Dec.2024/Jan.2025
Engineering Geology

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions, choosing ONE full question from each module.*
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
1	a.	Explain importance of geology in Civil Engineering.	5	L2	CO1
	b.	Describe internal structure of earth with labelled sketch.	10	L2	CO1
	c.	What is land slide? Explain causes at landslides.	5	L1	CO1
		OR			
2	a.	Discuss causes and effect of earthquake.	7	L2	CO2
	b.	What is Tsunami? Add a note on mitigation of Tsunami.	7	L3	CO3
	c.	Explain causes and types of volcanoes.	6	L2	CO2
		Module – 2			
3	a.	What is mineral? Explain properties of mineral.	8	L2	CO2
	b.	Explain different types of igneous rocks.	6	L2	CO2
	c.	What is metamorphism? Discuss types of metamorphism.	6	L2	CO2
		OR			
4	a.	Describe properties of following minerals : i) Orthoclase ii) Biotite iii) Haematite.	6	L2	CO2
	b.	Enumerate stages of development of sedimentary rock.	7	L2	CO2
	c.	Discuss important uses of different rock type.	7	L2	CO2
		Module – 3			
5	a.	With a neat sketch explain soil profile.	7	L2	CO3
	b.	What is weathering? Explain types of weathering.	8	L2	CO3
	c.	Discuss classification of different soil type.	5	L2	CO3
		OR			
6	a.	Explain classification of soil based on grain size.	7	L2	CO3
	b.	Discuss the effect of weathering on monumental rock.	7	L2	CO3
	c.	Write a note on : i) Drifted soil ii) Laterite soil.	6	L1	CO3

		Module – 4			
7	a.	Explain different rock deformation and causes.	8	L2	CO4
	b.	A bed of lime stone is dip 25° East and it has width of outcrop – 160 m. Determine true and vertical thickness.	6	L3	CO4
	c.	What is fault? Explain type of fault.	6	L2	CO4
		OR			
8	a.	Discuss feasibility of Dam site in folded and faulted region.	7	L2	CO4
	b.	A bed of shale is dipping maximum of 45° along S 60°E. Determine the amount and apparent dip along S 70°E.	6	L2	CO4
	c.	Write a note on : i) Dip and strike ii) Out crip.	7	L2	CO4
		Module – 5			
9	a.	Explain different water bearing formations.	8	L2	CO5
	b.	What an Aquifer? Discuss types of aquifer.	8	L2	CO5
	c.	Write a note on co-efficient of permeability.	4	L1	CO5
		OR			
10	a.	Explain electrical resistivity survey method in ground water exploration.	12	L2	CO5
	b.	Discuss factors affecting on permeability of rocks.	8	L2	CO5

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BCV304

Third Semester B.E/B.Tech. Degree Examination, Dec.2024/Jan.2025
Water Supply and Wastewater Engineering

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions, choosing ONE full question from each module.*
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
1	a.	Briefly explain the need and importance of protected water supply system.	6	L2	CO1
	b.	Explain the various types of water demand.	8	L2	CO1
	c.	Describe the incremental method of estimating the population of a locality.	6	L2	CO1
		OR			
2	a.	What is meant by per capita demand? Mention the factors that affect per capita demand.	6	L1	CO1
	b.	Give the drinking water standards for the following parameters. Discuss their effect when theory exceed their limits : i) Turbidity ii) Hardness iii) Fluoride iv) Nitrate.	8	L2	CO2
	c.	The population data of a town are given below : Year: 1990 | 2000 | 2010 | 2020 | 2030 Population: 90,000 | 1,20,000 | 1,60,000 | 2,50,000 | 2,60,000 Estimate the expected population in the year 2050 by geometric increase method.	6	L3	CO1
		Module – 2			
3	a.	Briefly explain the unit treatment processes of a water treatment plant with flow chart.	10	L2	CO3
	b.	The maximum daily demand at a water purification plant has been estimated as 12 million liter per day. Design a rectangular sedimentation tank (fitted with mechanical sludge removal arrangements) for the raw supplies, assuming a detention period of 6 hours and the velocity of flow as 20 cm per minute.	5	L3	CO3
	c.	Explain theory of filtration.	5	L3	CO3
		OR			
4	a.	What is meant by aeration? Explain the different types of aerators.	6	L1	CO3
	b.	What is coagulation? List the different types of coagulants used in water treatment plant.	4	L1	CO3
	c.	Explain the construction and working of a rapid gravity sand filter with a neat sketch.	10	L2	CO3
		Module – 3			
5	a.	List the minor methods of disinfection and explain any two methods in detail.	8	L1	CO3
	b.	Explain the need for sanitation. Define the following terms : i) Sullage ii) Sewage.	6	L2	CO4
	c.	Define sampling of water or wastewater. Explain the different methods of sampling.	6	L2	CO4

		OR			
6	a.	What is softening of water? List the methods used to remove hardness of water. Explain any one method in detail.	6	L2	CO3
	b.	Define disinfection. Explain break point chlorination.	4	L2	CO3
	c.	List the different types of sewerage systems with their advantages and disadvantages.	10	L2	CO4
		Module – 4			
7	a.	Explain with a neat flow diagram the various treatment unit operations and process used in municipal wastewater treatment.	10	L2	CO4
	b.	What is meant by activated sludge process? Describe with sketch, the treatment of sewage by activated sludge process.	10	L2	CO4
		OR			
8	a.	Discuss briefly with a neat sketch grit chamber and oil an grease removal tank.	10	L2	CO4
	b.	An average operating data for conventional activated sludge treatment plant is as follows : i) Wastewater flow = 35000 m^3/d ii) Volume of aeration tank = 10900 m^3 iii) Influent BOD = 250 mg/L iv) Effluent BOD = 20 mg/L v) Mixed liquor suspended solids (MLSS) = 2500 mg/L vi) Effluent suspended solids = 30 mg/L vii) Waste sludge suspended solids = 9700 mg/L viii) Quality of waste sludge = 220 m^3/d Based on the given information, Determine : i) Aeration period (hrs) ii) F/M ratio iii) Percentage efficiency of BOD removal iv) Sludge age (days).	10	L3	CO4
		Module – 5			
9	a.	Explain with a neat sketch the construction and operation of a trickling filter.	10	L2	CO4
	b.	Explain the following : i) Rotating biological contactors ii) Aerobic and anaerobic process.	10	L2	CO5
		OR			
10	a.	Determine the volume depth and efficiency of a building filter unit for influent sewage of 4.5 MLD, BOD_5 of the influent is 160 mg/L. The organic loading is to be 160 gm/m^3/day and surface loading is 2000 l/m^2/day.	10	L3	CO4
	b.	Explain the following : i) Oxidation pond ii) Stages in sludge digestion process.	10	L2	CO5

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BCV306D

Third Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
Fire Safety in Buildings

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

			M	L	C
		Module – 1			
Q.1	**a.**	Explain basic concepts of Fire Protection.	**10**	**L2**	**CO1**
	b.	Explain Fire as a process of combustion.	**10**	**L2**	**CO1**
		OR			
Q.2	**a.**	Write a short note on fire resistance.	**10**	**L2**	**CO1**
	b.	Explain effect of fire on construction materials.	**10**	**L2**	**CO1**
		Module – 2			
Q.3	**a.**	Explain street planning in Urban areas.	**10**	**L2**	**CO2**
	b.	Explain concept of internal planning.	**10**	**L2**	**CO2**
		OR			
Q.4	**a.**	Explain briefly about sprinkler systems.	**10**	**L2**	**CO2**
	b.	Explain in short Round trip time in the design of lift system.	**10**	**L2**	**CO2**
		Module – 3			
Q.5	**a.**	Explain diversity factor concept in detail.	**10**	**L2**	**CO2**
	b.	Explain control systems flow in pipe network.	**10**	**L2**	**CO2**
		OR			
Q.6	**a.**	Explain types of flow in pipe networks and fixture units.	**10**	**L2**	**CO3**
	b.	Explain types of water supply distribution systems for continuous demand in multistorey buildings.	**10**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	Explain HVAC system.	**10**	**L2**	**CO4**
	b.	Explain in detail Psychometric chart and its applications.	**10**	**L2**	**CO4**
		OR			
Q.8	**a.**	Explain salient features of Intelligent building.	**10**	**L2**	**CO4**
	b.	Explain different stages of maintenance management.	**10**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	Explain steps involved in condition survey of buildings.	**10**	**L2**	**CO4**
	b.	Explain effect of corrosion and alkali aggregate reaction.	**10**	**L2**	**CO5**
		OR			
Q.10	**a.**	Explain non-destructive testing methods.	**10**	**L2**	**CO5**
	b.	Write a short note on carbonation and steps in chloride measurement.	**10**	**L2**	**CO5**

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BCV401

Fourth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
Analysis of Structures

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Differentiate between statically determinate and indeterminate beams with an example for each.	08	L1	CO1
	b.	Determine the forces in all the members of the truss as shown in Fig.Q1(b). Use the method of joints.	12	L3	CO1

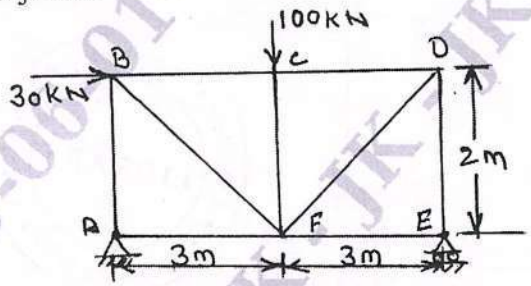

Fig.Q1(b)

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OR

Q.2	a.	Define equilibrium and compatibility conditions.	03	L1	CO1
	b.	Determine static and kinematic indeterminacy for the following shown in Fig.Q2(b).	08	L2	CO1

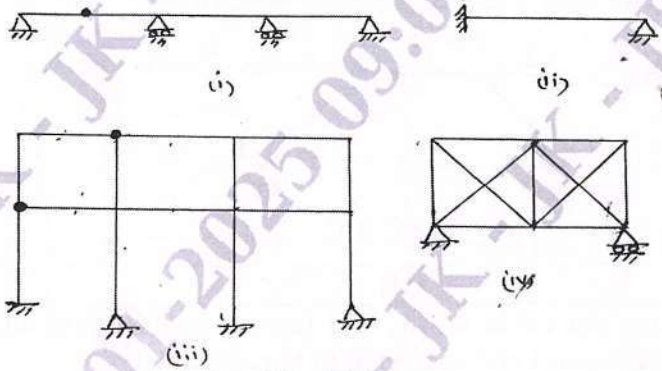


Fig.Q2(b)

	c.	Determine the support reactions and the forces in members EF, BC and BF for the truss shown in Fig.Q2(c) by method of section.	09	L3	CO1

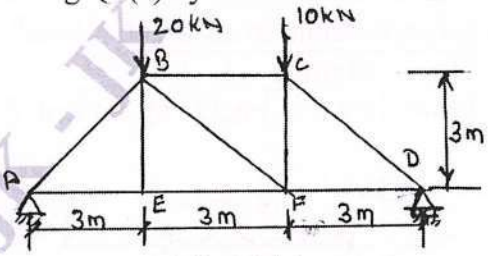
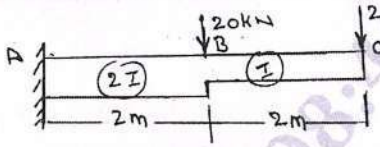
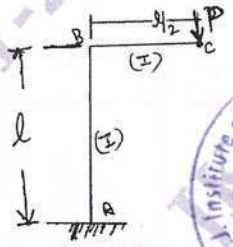
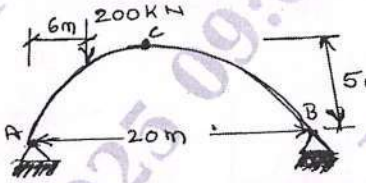
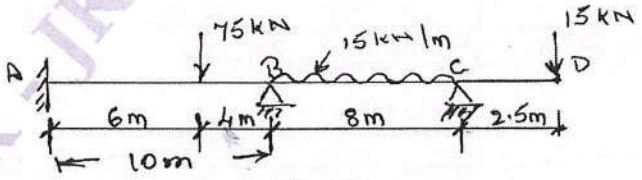
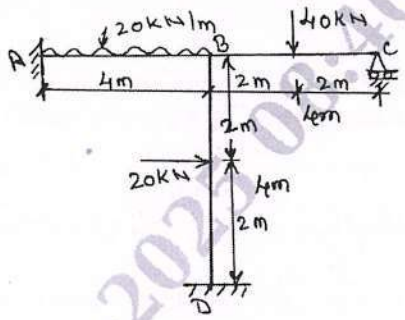
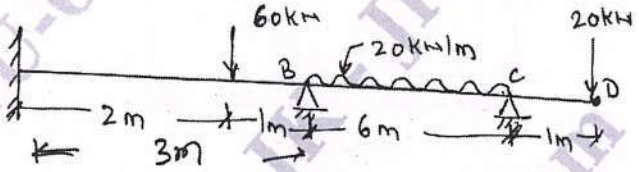
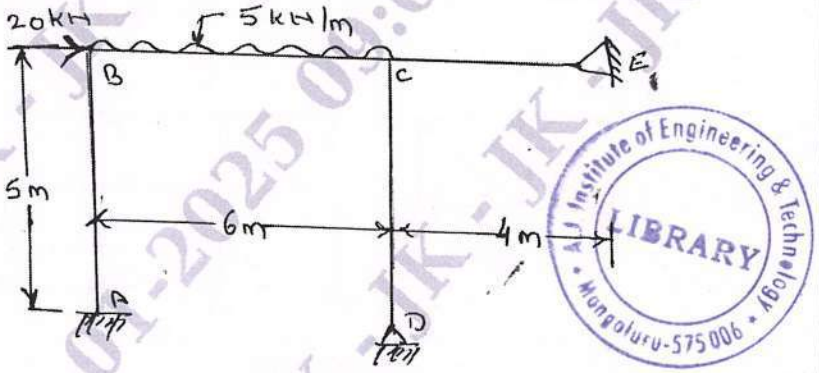


Fig.Q2(c)

		Module – 2			
Q.3	**a.**	State and explain Mohr's theorems.	**06**	**L1**	**CO2**
	b.	Determine the slope and deflection at free end of cantilever by using moment area method. [Refer Fig.Q3(b)]  Fig.Q3(b)	**14**	**L3**	**CO2**
		OR			
Q.4	**a.**	Derive the expression for strain energy due to bending.	**08**	**L1**	**CO2**
	b.	Determine the horizontal and vertical deflection at the free end of bracket shown in Fig.Q4(b).  Fig.Q4(b)	**12**	**L3**	**CO2**
		Module – 3			
Q.5	**a.**	Show that the parabolic shape is a funicular shape for a three hinged arch subjected to UDL over its entire span.	**08**	**L2**	**CO3**
	b.	A three hinged parabolic arch of span 20 m and a central rise of 5 m carry a point load of 200 kN at 6 m from the left support. Find the support reactions at A and B. Calculate normal thrust and radial shear at 6 m from the left support. Also draw the BMD. Refer Fig.Q5(b).  Fig.Q5(b)	**12**	**L3**	**CO3**
		OR			
Q.6	**a.**	Derive the equation for cable profile and tension in the cable when it is supported at the same level and subjected to horizontal UDL.	**08**	**L2**	**CO3**
	b.	A cable of span 120 m and central dip 4 m carries a UDL of 20 kN/m. Determine (i) The maximum and minimum tension in the cable and its inclination (ii) Length of cable (iii) The size of cable if the permissible stress is 200 N/mm^2.	**12**	**L3**	**CO3**
		Module – 4			
Q.7		Analyze the continuous beam shown in Fig.Q7 by slope deflection method. Draw BMD and SFD.  Fig.Q7	**20**	**L2**	**CO1**

		OR			
Q.8	**a.**	Explain fixed end moments for different loading and support conditions with relevant diagrams.	**05**	**L1**	**CO4**
	b.	Analyse the given frame as shown in Fig.Q8(b) by slope deflection method. EI is constant for all the members. Draw BMD and Elastic curve.  Fig.Q8(b)	**15**	**L4**	**CO4**
		Module – 5			
Q.9		Analyse the continuous beam as shown in Fig.Q9 by moment distribution method and draw the BM diagram. The support B sinks by 9 mm. Take EI = 1×10^{12} N-mm^2.  Fig.Q9	**20**	**L4**	**CO5**
		OR			
Q.10		Analyse the frame shown in Fig.Q10 by moment distribution method and draw the BMD. Assume EI constant.  Fig.Q10	**20**	**L4**	**CO5**

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BCV402

Fourth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
Fluid Mechanics and Hydraulics

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

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		Module – 1	M	L	C
Q.1	a.	Define the following terms along with symbols and units: (i) Compressibility (ii) Mass density (iii) Specific weight (iv) Relative density (v) Surface tension	10	L1	CO1
	b.	A differential manometer is connected at the two points A and B of two pipes. The centre of pipe A is 3 m above centre of pipe B. Pipe 'A' contains liquid of specific gravity 1.5, while pipe B contains a liquid of specific gravity 0.9. The manometric liquid mercury is 5m below the centre of pipe A. The pressure at A and B are 1 kgf/cm^2 and 1.8 kgf/cm^2 respectively. Find the difference in mercury level in the differential manometer.	10	L4	CO1
		OR			
Q.2	a.	Derive an expression for total pressure and centre of pressure for a vertical plane surface submerged in liquid.	08	L2	CO2
	b.	What is the bulk modulus of elasticity of a liquid which is compressed in a cylinder from a volume of 0.0125 m^3 at 80 N/cm^2 pressure to a volume of 0.0124 m^3 at 150 N/cm^2 pressure?	06	L3	CO2
	c.	An equilateral triangular plate of 5m side length is immersed in water with its base and apex at 2 m and 6 m below the free surface of water respectively. Calculate the total force and position of centre of pressure.	06	L4	CO2
		Module – 2			
Q.3	a.	Distinguish between : (i) Steady and unsteady flow (ii) Uniform and non-uniform flow (iii) Laminar and turbulent flow	06	L1	CO2
	b.	Derive an expression for continuity equation for a three dimensional flow in Cartesian coordinate.	08	L2	CO2
	c.	In a 2D incompressible flow, the fluid velocity components are given by $u = x - 4y$ and $v = -y - 4x$. Show that velocity potential exists.	06	L3	CO2
		OR			
Q.4	a.	State the assumptions and derive Bernoulli's equation of energy along a streamline.	10	L2	CO2
	b.	The following are the data given for laying water supply pipeline. The change in diameter is gradual from 20 cm at 'A' to 50 cm at B. Pressure at A and B is 80 kN/m^2 and 60 kN/m^2 respectively. The end B is 3m higher than A. If the flow in the pipe is 200 LPS, find: (i) Direction of flow (ii) Head loss between A and B.	10	L4	CO2
		Module – 3			
Q.5	a.	Derive an expression for the discharge over a triangular notch.	08	L2	CO3
	b.	Distinguish between pipes in series and pipes in parallel.	04	L1	CO3
	c.	A 0.5 m diameter and 100 m long pipeline carrying 0.5 m^3/sec of water is fitted with valve at the downstream end. Calculate the rise of pressure caused within the pipe due to valve closure. If: (i) Instantaneously (ii) In one second. Assume sonic velocity as 1430 m/s.	08	L4	CO3

		OR			
Q.6	**a.**	Derive Darcy-Weisback equation for head loss due to friction with assumptions.	**08**	**L2**	**CO3**
	b.	Water flows over a rectangular weir 1 m wide at a depth of 150 mm and afterwards passes through a triangular right angled weir. Take C_d for rectangular weir as 0.62 and for triangular weir as 0.59. Find the depth over triangular weir.	**08**	**L3**	**CO3**
	c.	Explain Water Hammer phenomenon.	**04**	**L1**	**CO3**
		Module – 4			
Q.7	**a.**	With neat sketches, differentiate between flow through pipes and flow through open channels with examples.	**06**	**L2**	**CO4**
	b.	What is meant by economical section of a channel? Derive the condition for the most economical rectangular section.	**08**	**L1**	**CO4**
	c.	A discharge of 18 m^3/sec flows through a rectangular channel 6m wide at a depth of 1.6 m. Find: (i) Specific energy (ii) Critical depth (iii) State weather the flow is subcritical or supercritical	**06**	**L4**	**CO4**
		OR			
Q.8	**a.**	Explain the term hydraulic jump. Derive an expression for the depth of hydraulic jump.	**10**	**L2**	**CO4**
	b.	A sluice gate discharges water into a horizontal rectangular channel with a velocity of 6 m/sec and depth of flow is 0.4 m. The width of the channel is 8m. Determine whether a hydraulic jump will occur or not, if occur find its height and loss of energy per kg of water. Also determine the power lost in the hydraulic jump.	**10**	**L4**	**CO4**
		Module – 5			
Q.9	**a.**	Explain impulse momentum principle.	**02**	**L2**	**CO5**
	b.	Explain concept of velocity triangles. Also obtain an expression for work done per second by jet striking unsymmetrical moving vane tangentially at one end of the tips.	**08**	**L3**	**CO5**
	c.	Design a pelton wheel turbine required to develop shaft power of 95.6475 KW working under a head of 60 m at a speed of 200 rpm. The overall efficiency may be taken as 85%. Take C_v = 0.98 and velocity of the buckets = 0.45 times the velocity of the jet.	**10**	**L4**	**CO5**
		OR			
Q.10	**a.**	Draw a neat sketch of the hydro electric power plant. Mention the functions of each component.	**08**	**L2**	**CO5**
	b.	A centrifugal pump is to discharge 0.118 m^3/sec at a speed of 1450 rpm against a head of 25 m. The impeller diameter is 250 mm, its width at outlet is 50 mm and manometric efficiency is 75%. Determine the vane angle at the outer periphery of the impeller.	**08**	**L4**	**CO5**
	c.	Distinguish between turbine and pump.	**04**	**L1**	**CO5**

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BCV403

Fourth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
Transportation Engineering

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Briefly explain characteristics of road transport and Jayakar committee recommendations.	10	L1	CO1
	b.	With a neat sketches, explain various tractors affecting alignment.	10	L2	CO1
		OR			
Q.2	a.	Briefly explain about attainment of super elevation.	10	L1	CO1
	b.	Calculate length of transition curve for design speed 65 kmph, radius of curve 220 m, pavement width including extra widening 7.5 m. Allowable rate of introduction of super elevation 1in/so (pavement rotated about centre line).	10	L3	CO1
		Module – 2			
Q.3	a.	What are properties of Bituminous mixes? Explain briefly.	8	L2	CO2
	b.	With a neat sketch, briefly explain different types of rigid pavement joints.	12	L1	CO2
		OR			
Q.4	a.	Briefly explain about various functions of components of flexible pavement.	10	L1	CO2
	b.	Briefly explain importance and requirements of Highway Drainage system.	10	L2	CO2
		Module – 3			
Q.5	a.	Briefly explain about Road user and vehicular characteristics.	10	L2	CO3
	b.	Spot speed studies were conducted out at a certain stretch of a highway with mixed traffic flow and consolidated data collected are given below. Determine: i) Upper and lower values of speed limits. ii) Design speed.	10	L4	CO3

Speed range kmph	No of vehicles observed	Speed range kmph	No of vehicles observed
0-10	12	50-60	255
10-20	18	60-70	119
20-30	68	70-80	43
30-40	89	80-90	33
40-50	204	90-100	9

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		OR			
Q.6	**a.**	Explain O and D studies objectives and methods of data collections.	**12**	**L3**	**CO3**
	b.	Explain the steps involved in the IRC method of signal design.	**8**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	With neat sketch, explain permanent way and its requirements.	**10**	**L1**	**CO4**
	b.	Estimate the quantities of materials required to construct 1 km long B.G. track with sleeper density.	**10**	**L3**	**CO4**
		OR			
Q.8	**a.**	Briefly explain the functions and requirements of sleeper and ballast.	**10**	**L1**	**CO4**
	b.	Define station yards. Explain different types of station yards.	**10**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	Explain the characteristics of an aircraft which affects the planning and design of air ports.	**10**	**L2**	**CO4**
	b.	Write the comparison between runway of highway.	**10**	**L1**	**CO4**
		OR			
Q.10	**a.**	Draw a neat sketch of layout of an airport and explain the functions of various components ports.	**10**	**L2**	**CO4**
	b.	The length of runway under standard conditions is 1700 m. The airport site is at an elevation of 260 m. Its reference temperature 32°C. If the runway is to constructed with an effective gradient of 0.2%. Determine corrected runway length.	**10**	**L3**	**CO4**

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BCV501

Fifth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025

Construction Management and Entrepreneurship

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Explain in detail construction project formulation.	10	L2	CO1
	b.	The activity data of a project is given below: (see table below) Draw the network diagram, identify the critical path, project duration and free float.	10	L3	CO1

Activity	Preceding activity	Duration (Days)
A	-	05
B	-	15
C	-	09
D	A	06
E	C	04

OR

			M	L	C
Q.2	a.	What is Work Breakdown Structure (WBS)? Mention its significance in construction project.	10	L2	CO1
	b.	Below given table pertains to the list of activities and their time estimates of a job: (see table below) Draw the network and critical path. What is the expected completion time with the probability of 85%? (Take probability factor Z = 1.038)	10	L3	CO1

Activity	Event	Optimistic time (days)	Most likely time (days)	Pessimistic time (days)
A	1 – 2	3	7	10
B	1 – 3	4	8	13
C	2 – 4	2	2	07
D	3 – 4	5	8	10

		Module – 2	M	L	C
Q.3	a.	Discuss on Class of Labour. What are the key factors of minimum wages act 1948?	10	L2	CO2
	b.	List the factors affecting Labour productivity? Briefly discuss any three factors.	10	L2	CO2
		OR			
Q.4	a.	Enumerate the factors to be considered for selection of Construction Equipment.	10	L2	CO2
	b.	Explain material management and inventory management.	10	L2	CO2
		Module – 3			
Q.5	a.	Explain types of procurement and procurement planning.	10	L2	CO3
	b.	Explain the sustainable procurement management.	10	L2	CO3
		OR			
Q.6	a.	Explain the different types of construction contracts.	10	L2	CO3
	b.	Define contractor and subcontractor. Explain the effective sub contractor management.	10	L2	CO3

		Module – 4			
Q.7	a.	Explain the process of construction project quality management.	10	L2	CO4
	b.	Explain the safety measures adopted during construction.	10	L2	CO4
		OR			
Q.8	a.	Explain Safety Management and Risk Management.	10	L2	CO4
	b.	Explain the terms: i) Facilities Management ii) Occupancy certificate	10	L2	CO4
		Module – 5			
Q.9	a.	Explain the different characteristics of a Successful Entrepreneur.	10	L2	CO5
	b.	Explain 5M model and communication skills.	10	L2	CO5
		OR			
Q.10	a.	Explain the Business Planning process, Marketing Plan and Financial Plan.	10	L2	CO5
	b.	Explain the role and significance of venture capital.	10	L2	CO5

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BCV503

Fifth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
Concrete Technology

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use IS : 456-2000, IS 10262 : 2019 are permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Explain the chemical composition of ordinary Portland cement.	10	L2	CO1
	b.	Describe : i) Rapid Hardening Cement (RHC) ii) Sulphate Resisting Cement (SRC)	10	L2	CO1
		OR			
Q.2	a.	Describe briefly the classification of Aggregates.	10	L2	CO1
	b.	Explain the effects of fly ash and silica fresh concrete.	10	L2	CO1
		Module – 2			
Q.3	a.	Briefly explain which are the factors affecting workability.	10	L2	CO2
	b.	Briefly, explain any 2 lab test to measure the workability of fresh concrete.	10	L2	CO2
		OR			
Q.4	a.	Briefly explain the necessity of compaction of concrete. Also explain different methods such as Hand Compaction and compaction by needle vibrator.	10	L2	CO2
	b.	Explain the need for curing of concrete. Also what is water curing and membrane curing?	10	L2	CO2
		Module – 3			
Q.5	a.	Explain creep of concrete and factors affecting creep of concrete.	10	L2	CO3
	b.	Explain Shrinkage of concrete. Also explain plastic shrinkage and drying shrinkage of concrete.	10	L2	CO3
		OR			
Q.6	a.	Describe Sulphate attack and Chloride attack on Hardened concrete.	10	L2	CO3
	b.	Explain : i) Rebound Hammer test ii) Ultrasonic pulse velocity.	10	L2	CO3
		Module – 4			
Q.7		Explain Significance of concrete mix design and write the steps involved in concrete mix design as per IS code and also discuss the variables in proportioning of concrete.	20	L2	CO4

		OR			
Q.8		Design a concrete mix for grade M_{25} a) Grade designation → M-25 b) Type of cement → OPC 53 grade c) Maximum nominal Aggregate size → 20mm d) Minimum cement content → 310 Kg/m^3 e) Maximum water cement ratio → 0.45 f) Workability → 50-75 mm (Slump) g) Exposure condition → Normal h) Degree of supervision → Good i) Type of aggregate → Crushed angular aggregate j) Maximum cement content → 540 Kg/m^3 k) Chemical admixture type → Super plasticizer l) Specific gravity of cement → 3.15 m) Specific gravity of water → 1.0 n) Specific gravity of C.A → 2.882 o) Water absorption of C.A → 1% p) Free surface moisture : NiL q) Specific gravity of fine aggregate : 2.605 r) Water absorption of fine aggregate : 1.23% s) Free surface moisture of F.A : Nil.	**20**	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	Explain the manufacturing process of Ready mix concrete.	**10**	**L2**	**CO5**
	b.	Explain the concept of Self Compacting Concrete (SCC). And its advantages and disadvantages of SCC.	**10**	**L2**	**CO5**
		OR			
Q.10	**a.**	What is light weight concrete? Explain different materials used in light weight concrete.	**10**	**L2**	**CO5**
	b.	Explain : i) High strength concrete ii) High performance concrete.	**10**	**L2**	**CO5**

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BCV515D

Fifth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
Remote Sensing and GIS

Time: 3 hrs. Max. Marks: 100

Note: 1. *Answer any FIVE full questions, choosing ONE full question from each module.*
2. *M : Marks , L: Bloom's level , C: Course outcomes.*

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		Module – 1	M	L	C
Q.1	a.	What is Remote Sensing? Explain types of Remote sensing.	6	L1	CO1
	b.	Explain interaction of Electromagnetic Radiation with Earth surface.	7	L1	CO1
	c	Discuss different types of platforms used in Remote sensing.	7	L1	CO1
		OR			
Q.2	a.	Describe stages (components) of Remote sensing.	7	L2	CO1
	b.	What are sensors? Discuss Resolution of sensing.	6	L2	CO1
	c.	Explain key elements of visual interpretation.	7	L2	CO1
		Module – 2			
Q.3	a.	Define photogrammetry? Explain the field of application of photogrametry	8	L2	CO2
	b.	Discuss advantages and disadvantages of phogrammetry.	6	L2	CO2
	c.	Write a note on Digital photogrametry.	6	L2	CO2
		OR			
Q.4	a.	What is Aerial phtogrammetry? Discuss its importance.	7	L2	CO2
	b.	Write a note on : i) Geometry of vertical photogrametry ii) Relief displacement.	7	L2	CO2
	c.	Discuss scale ground co-ordinators.	6	L2	CO2
		Module – 3			
Q.5	a.	Define GIS? Explain components of GIS.	10	L2	CO3
	b.	Explain different data modules of GIS.	10	L2	CO3
		OR			
Q.6	a.	Explain Functions of GIS.	8	L2	CO3
	b.	Discuss importance of Topologies in GIS.	6	L2	CO3
	c.	Enumerate Advantages/Disadvantages of Vector Data.	6	L2	CO3

		Module – 4			
Q.7	**a.**	Explain the application of Remote Sensing (RS) in water resource management.	7	L3	CO4
	b.	Explain importance of Remote sensing in natural Resource management.	6	L3	CO4
	c.	What are the criteria considered during highway alignment using Remote sensing?	7	L3	CO4
		OR			
Q.8	**a.**	Explain the application of RS and GIS on Accidental analysis and Traffic management.	8	L3	CO4
	b.	Write a note GIS and GPS.	6	L2	CO4
	c.	Discuss importance of GPS in Remote Sensing image interpretation.	6	L2	CO4
		Module – 5			
Q.9	**a.**	Explain the application of Remote sensing and GIS in urban planning and Forestry.	7	L3	CO5
	b.	How Remote sensing and GIS is using in change detection study.	6	L3	CO5
	c.	Discuss application of Remote sensing and GIS in Agriculture.	7	L3	CO5
		OR			
Q.10	**a.**	How the disaster management study analysed by using RS and GIS.	8	L3	CO5
	b.	Write a note on i) Urban sprawl ii) Circular system	6	L3	CO5
	c.	Explain the application of Remote sensing and GIS in urban area development and layout planning.	6	L3	CO5

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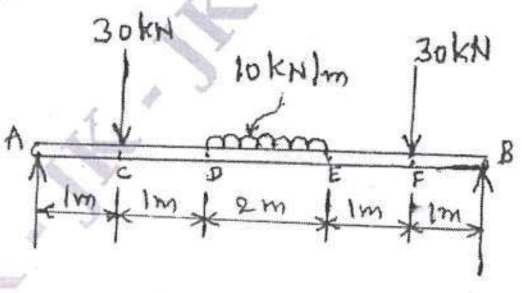
BCV301

Third Semester B.E./B.Tech. Degree Examination, June/July 2025
Strength of Materials

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Define the following : i) Stress ii) Poisson's Ratio iii) Volumetric strain iv) Bulk Modulus	06	L1	CO1
	b.	Derive the relation between modulus of rigidity and Young's modulus of elasticity.	06	L3	CO1
	c.	Calculate the modulus of rigidity and bulk modulus of a cylindrical bar of diameter 25 mm and of length 1.2 m, if the longitudinal stream in the bar during a tensile test is four times the lateral strain. Also find the change in volume when the bar is subjected to a hydrostatic pressure of 120 N/mm^2. Take $E = 1.2 \times 10^5$ MPa.	08	L3	CO1
		OR			
Q.2	a.	Derive an expression for the deformation of a rectangular tapering bar of uniform thickness subjected to an uniaxial load 'P'.	06	L3	CO1
	b.	Draw stress – strain diagram for structural steel subjected to axial ensile force and explain the salient points.	06	L2	CO1
	c.	A concrete column with square section with side 250 mm is reinforced with Four steel bars of 15 mm diameter (each). Determine the stresses induced in concrete and steel bars, when the column is subjected to a load of 300 KN. Take E_{steel} = 200 GPa and $E_{concrete}$ = 14 GPa.	08	L3	CO1
		Module – 2			
Q.3	a.	Define i) Shear Force ii) Bending Moment iii) Point of contraflexture	06	L1	CO2
	b.	Derive the relation between rate of loading, shear force and bending moment.	06	L3	CO2
	c.	Draw the shear force diagram and bending moment diagram for a simply supported beam subjected to the loads as shown in fig. Q.3 (c)  Fig. Q.3 (c)	08	L4	CO2

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OR

Q.4	**a.**	With help of neat sketches, explain different types of beams and different types of loadings.	**06**	**L2**	**CO2**
	b.	Draw shear force and bending moment diagrams for a cantilever beam subjected to uniformly distributed load of intensity WKN/m on its entire length.	**06**	**L3**	**CO2**
	c.	Draw the shear force and bending moment diagrams for a cantilever subjected to Forces as shown in fig. Q.4 (c)	**08**	**L4**	**CO2**

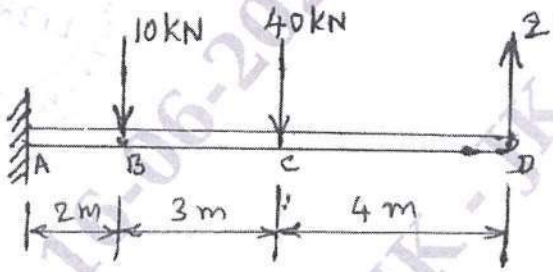

Fig. Q.4 (c)

Module – 3

Q.5	**a.**	Define i) neutral axis ii) Section Modules iii) Moment of resistance.	**06**	**L1**	**CO3**
	b.	Derive the simple bending equation in the form $\frac{M}{I}=\frac{f}{y}=\frac{E}{R}$ with usual notations.	**06**	**L3**	**CO3**
	c.	A beam is simply supported and carries a uniformly distributed load of 40 kN/m over the entre span. The section of the beam is rectangular having depth as 500 mm. If the maximum stress in the material of the beam is 120 N/ mm^2 and moment of inertia of the section is $7x10^8$ mm^4, find the span of the beam.	**08**	**L3**	**CO3**

OR

Q.6	**a.**	List the assumptions made in the theory of pure torsion.	**06**	**L1**	**CO3**
	b.	With usual notations derive the torsion equation $\frac{T}{J}=\frac{\tau}{R}=\frac{G\theta}{L}$	**06**	**L3**	**CO3**
	c.	A solid shaft rotating at 500 rpm transmits 30 kw. Maximum torque is 20% more than the mean torque. Material of shaft has the allowable shear stress 65 MP_a and modules of rigidity 81 GP_a . Angle of twist in the shaft should not exceed 1° in 1 meter length. Determine the diameter of shaft.	**08**	**L3**	**CO3**

Module – 4

Q.7	**a.**	Define i) slope ii) deflection iii) Elastic curve	**06**	**L1**	**CO4**
	b.	Derive the deflection equation $EI\frac{d^2y}{dx^2}=M$	**06**	**L3**	**CO4**
	c.	Derive expressions for maximum slope and deflection in a simply supported beam subjected to point load 'w' at mid point.	**08**	**L3**	**CO4**

		OR			
Q.8	**a.**	Define i) slenderness ratio ii) long column iii) short column	**06**	**L1**	**CO4**
	b.	Using Euler's theory, derive an equation for the crippling load of a long column pinned at both ends.	**06**	**L3**	**CO4**
	c.	A hallow circular column is used to carry an automobile of weight 20 KN. Length of the column is 3 meters. Material of column has an yield stress of 330 MPa. Outer diameter of the column is 100 mm and thickness of wall is 5 mm. one end of the column is fixed and other end is free. Taking E = 200GPa , determine : i) Factor of safety ii) ii) Ratio of yield stress to crippling stress.	**08**	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	Define i) Principal stresses ii) Principal planes	**06**	**L1**	**CO5**
	b.	An uniform bar is subjected to axial tensile stress of 100 N/mm^2. Determine i) Stress acting on a plane which is at an angle of 60° with reference to 100 N/mm^2 stress plane ii) Magnitudes of maximum and minimum stresses induced and position of their planes iii) Magnitude of normal stress on the plane of maximum shear stress.	**06**	**L3**	**CO5**
	c.	A point in a machine member is subjected to principal stresses of magnitudes 30 MPa in tension and 100 MPa in compression. Determine i) Stresses acting on an element whose normal to one of its faces is oriented at an angle of 120° with reference to x – axis ii) Maximum and minimum shear stresses and their orientations. iii) Normal stresses acting on maximum and minimum shear stress planes.	**08**	**L3**	**CO5**
		OR			
Q.10	**a.**	Define : i) Thin cylinder ii) Thick cylinder iii) Hoop stress	**06**	**L1**	**CO5**
	b.	Derive Lame's equation for the redial and hoop stresses for thick cylinder subjected to internal and external fluid pressure.	**06**	**L3**	**CO5**
	c.	A thick walled cylindrical pressure vessel has inner radius of 150 mm and outer radius of 185 mm. Draw a sketch showing the radial pressure and hoop stress distribution in the section of the cylinder wall, when an internal pressure of 10 MPa is applied.	**08**	**L3**	**CO5**

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BCV302

Third Semester B.E./B.Tech. Degree Examination, June/July 2025
Engineering Survey

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

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		Module – 1	M	L	C
Q.1	a.	Briefly explain classification of survey based on object of survey.	8	L1	CO1
	b.	Explain briefly plane table survey and cadastral survey.	8	L2	CO1
	c.	Explain briefly concept of electronic distance measurement.	4	L1	CO1
		OR			
Q.2	a.	What is surveying? Briefly explain classification of survey based on nature survey.	8	L2	CO1
	b.	Explain topographical survey and cadastral survey.	8	L2	CO1
	c.	Explain various types of tapes.	4	L1	CO1
		Module – 2			
Q.3	a.	Explain the measurement of horizontal angle by repetition method with necessary standard tabular format.	8	L2	CO2
	b.	In running fly levels from a benchmark of RL 384.705, the following readings were obtained : Back sight : 3.215, 1.030, 1.295 and 1.885 Fore sight : 1.225, 3.290, 2.085 From the last position of the instrument six pegs at 25 m intervals are to be set out on a uniformly falling of 1 in 100, the first peg is to bare RL of 384.500. Work out the staff readings required for setting the tops of the pegs on the given gradient.	12	L3	CO2
		OR			
Q.4	a.	Explain the following Bench Mark mean sea level, datum, elevation.	8	L2	CO2
	b.	The following consecutive reading were taken with a level and 3 metre leveling staff on a continuously sloping ground at a common interval of 20 meter 0.602, 1.234, 1.860, 2.574, 0.238, 0.914 1.936, 2.872, 0.568, 1.824, 2.722 RL of first point was 192.122. Rule out page of a level field book and enter the above reading. Calculate the reduced levels of the points and also the gradient of the line joining the first and the last point?	12	L3	CO2
		Module – 3			
Q.5	a.	Explain user of contour map.	4	L1	CO3
	b.	Explain characteristics of contours.	8	L2	CO3
	c.	What do you mean by contour? Explain the factors governing the choice of proper contour interval.	8	L2	CO3
		OR			
Q.6	a.	Explain the following station, turning point, fore sight and back sight.	8	L2	CO3
	b.	Explain the procedure for measurements of coordinator using total station.	8	L2	CO3
	c.	With a neat sketch explain profile leveling.	4	L2	CO3

Module – 4					
Q.7	**a.**	A railway embankment is 10 m wide with side scope 1.5 to 1. Assuming the ground to belevel in a direction transverse to the centre line, calculate the volume by prismoidal and trapezoidal formula contained in length of 120 m, the centre heights at 20 m intervals being in meters 2.2, 3.7, 3.8, 4.0, 3.8, 2.8, 2.5	**10**	**L3**	**CO4**
	b.	The following perpendiculars offsets were taken from a chain line to a curved boundary line at intervals of 15 m in the following order : 0, 2.65, 3.80, 3.75, 4.65, 3.60, 4.95, 5.85 m Compute the area between the chain, the curved boundary and the end offsets by trapezoid and Simpson's rule.	**10**	**L3**	**CO4**
OR					
Q.8	**a.**	With a neat sketch derive an expression for simple curve by Rrankine's method.	**10**	**L2**	**CO4**
	b.	Two tangents interest at a chainage of 1190 m, the deflection angle 36°. Compute all the data necessary to set out a curve of radius 300 m by deflection angle method. The peg interval is 30 m. Tabulate the results.	**10**	**L3**	**CO4**
Module – 5					
Q.9	**a.**	Explain sources of errors in GPS.	**10**	**L2**	**CO5**
	b.	Explain any two applications and uses of remote sensing and GIS in civil engineering surveying.	**10**	**L2**	**CO5**
OR					
Q.10	**a.**	Explain application and advantages of Drone in surveying.	**10**	**L2**	**CO5**
	b.	Explain Drone surveying requirements.	**10**	**L2**	**CO5**

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BCV303

Third Semester B.E./B.Tech. Degree Examination, June/July 2025
Engineering Geology

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Explain briefly the internal structure of earth.	8	L2	CO1
	b.	Explain the role of geology in field of civil engineering.	6	L2	CO1
	c.	What are landslides? Describe the causes and control measures.	6	L2	CO1
		OR			
Q.2	a.	What is an Earthquake? What are the causes and effects of earthquake?	10	L1	CO1
	b.	Write a short note on: i) Tsunami ii) Cyclones	10	L2	CO1
		Module – 2			
Q.3	a.	What are the requirements of good building stones?	10	L1	CO2
	b.	What is mineral? Define, describe the different physical properties which helps in the identification of minerals.	10	L2	CO2
		OR			
Q.4	a.	Describe the following with mineral examples: i) Luster and its types ii) Fracture and its types iii) Hardness iv) Structure	10	L2	CO2
	b.	Describe any two of following minerals: i) Quartz ii) Hematite iii) Pyrite iv) Mica	10	L2	CO2
		Module – 3			
Q.5	a.	What is Weathering? Explain causes and types of weathering.	8	L1	CO3
	b.	What is Soil? Explain soil profile.	6	L2	CO3
	c.	Explain soil Horizon with neat sketch.	6	L2	CO3

		OR			
Q.6	**a.**	Explain the effects of weathering on monumental rocks.	**10**	**L1**	**CO3**
	b.	What are the different types of soil? Differentiate between black cotton soil and lateritic soil.	**10**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	Define the terms, i) Dip ii) Strike and iii) Outcrop	**8**	**L1**	**CO4**
	b.	What is fold? With a neat diagram, describe the different parts of fold.	**6**	**L2**	**CO4**
	c.	What is fault? With a neat diagram, describe the different parts of fault.	**6**	**L2**	**CO4**
		OR			
Q.8	**a.**	What is Unconformity? Explain the types of unconformity.	**10**	**L1**	**CO4**
	b.	Name different types of faults. What are the engineering considerations of faults in civil engineering projects?	**10**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	What is Igneous Rock? Give the classification of Igneous Rocks based on origin.	**10**	**L1**	**CO5**
	b.	Explain the primary structures in sedimentary rocks.	**10**	**L2**	**CO5**
		OR			
Q.10	**a.**	Explain with a neat sketch, ground water investigation by electrical resistivity method.	**10**	**L1**	**CO5**
	b.	What are the factors affecting permeability?	**10**	**L2**	**CO5**

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CBCS SCHEME

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BCV304

Third Semester B.E/B.Tech. Degree Examination, June/July 2025

Water Supply and Waste Water Engineering

Time: 3 hrs. Max. Marks: 100

Note: *1. Answer any FIVE full questions, choosing ONE full question from each module.*
2. M : Marks , L: Bloom's level , C: Course outcomes.
3. Missing data, if any, may be suitably assumed.

		Module – 1	M	L	C
1	a.	What is meant by per capita demand? What are the different types of water demand? Explain any two water demand in detail.	6	L2	CO1
	b.	The population data for a certain town is given below. Find out the population in the year 2011 and 2021 by incremental increase method. Year: 1961, 1971, 1981, 1991, 2001 Population: 75,000, 1,10,000, 1,50,000, 2,00,000, 2,42,000	10	L3	CO1
	c.	Write drinking water standards along with the units for the following parameters : i) pH ii) Turbidity iii) Chloride iv) Iron.	4	L2	CO1
		OR			
2	a.	What is design period? Briefly explain any four factors governing design period.	6	L2	CO1
	b.	In two periods of each of 20 years, a city has grown from 30,000 to 1,70,000 and then to 3,00,000. Determine : i) The saturation population ii) The equation of the logistic curve iii) The expected population after next 20 years.	10	L3	CO1
	c.	List the physical and chemical water quality parameters.	4	L1	CO2
		Module – 2			
3	a.	What is Aeration? List the different types of aerators and explain any one aerator in detail.	4	L1	CO3
	b.	The maximum daily demand at a water purification plant has been estimated as 12 million liters per day. Design the dimensions of a suitable sedimentation tank (fitted with mechanical sludge removal arrangements) for the raw supplies, assuming a detention period of 6 hours and the velocity of flow as 20 cm per minute. Assume water depth in the tank as 4 m.	10	L3	CO3
	c.	How is coagulation carried out with alum? Explain with the help of chemical reaction.	6	L2	CO3

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		OR			
4	a.	With the help of a neat sketch, explain briefly on filter backwashing process of rapid sand filter.	10	L2	CO3
	b.	Design the approximate dimensions of a set of rapid gravity filters for treating water required for a population of 50,000, the rate of supply being 180 liters per day per person. The filters are rated to work 5000 liters per hour per square meter. Assume two units to be designed and maximum demand is 1.8 time the average daily demand. Take length as 1.5 times the breadth.	10	L3	CO3
		Module – 3			
5	a.	List minor methods of disinfection and explain any two methods in detail.	6	L1	CO3
	b.	Describe types of sewerage system with their advantages and disadvantages.	6	L2	CO
	c.	The BOD of a sewage incubated for one day at 30°C has been found to be 110 mg/ℓ. What will be the 5-day 20°C BOD? Assume $K_1 = 0.1$ at 20°C.	8	L3	CO4
		OR			
6	a.	With the chemical equations, explain how hardness is reduced from water by lime-soda process.	8	L2	CO3
	b.	The following observations were made on a 3% dilution of wastewater. Dissolved Oxygen (DO) of aerated water used for dilution = 3 mg/ℓ Dissolved Oxygen (DO) of diluted sample after 5 days incubation = 0.8 mg/ℓ Dissolved Oxygen (DO) of original sample = 0.6 mg/ℓ Calculate the BOD of 5 days and ultimate BOD of the sample assuming that the deoxygenating coefficient at test temperature is 0.1.	12	L3	CO4
		Module – 4			
7	a.	Write the flow diagram employed for municipal wastewater treatment plant. Explain each unit with its importance in flow diagram.	8	L2	CO
	b.	An average operating data for conventional activated sludge treatment plant is as follows : i) Wastewater flow = 35,000 m^3/d ii) Volume of aeration tank = 10900 m^3 iii) Influent BOD = 250 mg/ℓ iv) Effluent BOD = 20 mg/ℓ v) Mixed liquor suspended solids (MLSS) = 2500 mg/ℓ vi) Effluent suspended solids = 30 mg/ℓ vii) Waste sludge suspended solids = 9700 mg/ℓ viii) Quantity of waste sludge = 220 m^3/d Based on the information above, determine : i) Aeration period (hours) ii) Food to microorganism ratio (F/m) (kg BOD per day / kg MLSS) iii) Percentage efficiency of BOD removal iv) Sludge age (days).	12	L3	CO4

		OR			
8	a.	What do you mean by unit operation and unit process in waste water treatment plant? Give examples.	6	L1	CO4
	b.	Explain the different types of screens.	6	L2	CO4
	c.	With the neat sketch, explain how oil and grease is removed from wastewater.	8	L2	CO4
		Module – 5			
9	a.	Determine the size of a high rate trickling filter for the following data : Sewage flow = 5 MLD Recirculation ratio = 1.5 BOD of raw sewage = 230 mg/ℓ BOD removal in primary clarifier = 30% Final effluent BOD desired = 25 mg/ℓ Depth of the filter = 1.8 m.	10	L3	CO4
	b.	With the neat sketch, explain the algae bacteria symbiosis in stabilization pond.	6	L2	CO5
	c.	Write a short note on Rotating Biological Contractor (RBC).	4	L1	CO4
		OR			
10	a.	A single stage filter is to treat a flow of 3.79 MLD of raw sewage with BOD of 240 mg/ℓ. It is to be designed or a loading of 11,086 kg of BOD in raw sewage per hector meter and the recirculation ratio is to be 1. What will be the strength of the effluent, according to the recommendation of the national research council of USA?	10	L3	CO4
	b.	Write a neat sketch, explain the constructional details of sludge digestion tank.	6	L2	CO4
	c.	Write short notes on sludge drying beds.	4	L1	CO5

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CBCS SCHEME

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BCV306D

Third Semester B.E./B.Tech. Degree Examination, June/July 2025
Fire Safety in Buildings

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	With neat sketch explain the concept of fire triangle.	06	L2	CO1
	b.	Explain the various principles involved in the fire extinguishing.	08	L2	CO1
	c.	With time-temperature curve briefly explain the various stages of fire.	06	L2	CO1
		OR			
Q.2	a.	Briefly explain the design consideration for fire safety in concrete and steel structures.	10	L2	CO1
	b.	Briefly explain the effect of fire on the following construction materials: i) Concrete ii) Steel iii)Timber iv) Stone	10	L2	CO1
		Module – 2			
Q.3	a.	Briefly explain about various fire suppression systems.	10	L2	CO2
	b.	What is Refuge Area? Mention the rules for Refuge area as per NBC code.	10	L2	CO2
		OR			
Q.4	a.	What are the assumption to be made in the lift design?	10	L2	CO2
	b.	Consider a building with 16 floors having population of 1000. The details of lift are given below; Car capacity = 16 Door closing time = 2.5 sec. Door opening time = 1.5 sec. No. of lifts = 05 Single floor flight time = 5 sec. Single floor transit time = 1 sec. Passenger transfer time = 1.2 sec. Calculate : i) Round trip time (RTT) ii) Average number of stops iii) Time consumed when stopping iv) Up peak Interval v) Up peak handling capacity.	10	L3	CO2
		Module – 3			
Q.5	a.	What is fixture unit? Mention the essential requirements of plumbing fixtures.	10	L2	CO3
	b.	Enumerate the steps involved in the design of water supply distribution system.	10	L2	CO3

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OR

Q.6 Find the pipe size required to provide water supply for a 4 storey (G + 4) building with each storey height of 3m. A water tank is supported over the terrace on columns of height 3m. The fixture in each apartment consists of following: (Elevation of highest fixture = 1.95m) — **20 | L4 | CO4**

Room	Type of Fixture	Fixture unit value
Kitchen	Kitchen sink Kitchen tap	02 02
Water closet (W.C) Room	Ablution tap Supply to over head flush tank	01 01
Bath Room	Shower Tap Wash Basin Supply to Geyser	02 02 01 02

Assume loss of head in a 25mm size meter in 4.5m.

Module – 4

Q.7	**a.**	Explain the role of maintenance management in overall building construction activity.	**10**	**L2**	**CO4**
	b.	Write short notes on : i) Intelligent Buildings ii) Psychrometric chart	**10**	**L2**	**CO4**

OR

Q.8	**a.**	Following data are available for air conditioned restaurant: Outside design condition : Dry Bulb Temperature = 41.9°C Wet Bulb Temperature = 27.1°C Inside design condition : Temperature = 26°C Relative Humidity = 50% Size of Restaurant = 20m ×15m×4m No. of Air changes / hour = 2 Opening and closing of door per hour = 3 Use factor = 3 Air ventilation required /person = 0.48m^3/person Humidity ratio for outside and inside are 16.6 and 11.1 respectively. Maximum capacity of Restaurant = 100 persons. Calculate: i) Total Infiltration in m^3/min. ii) Ventilation required in m^3/min and iii) Total load due to outside air.	**12**	**L3**	**CO4**
	b.	Mention the governing equations with notations for i) Sensible Heating and Cooling ii) Heating and Humidification.	**05**	**L2**	**CO4**
	c.	What is life cycle cost? How it is determined for a building?	**03**	**L2**	**CO4**

Module – 5

Q.9	**a.**	Enumerate the points to be considered while carrying out diagnosis of building by visual survey.	**10**	**L2**	**CO5**
	b.	Explain the procedure for carrying out the following tests. i) Pulse velocity method ii) Rebound Hammer test	**10**	**L2**	**CO5**

OR

Q.10	**a.**	Explain the effects of corrosion of steel in concrete.	**10**	**L2**	**CO5**
	b.	Write short note on : i) Carbonation in concrete ii) RCPT Test.	**10**	**L2**	**CO5**

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CBCS SCHEME

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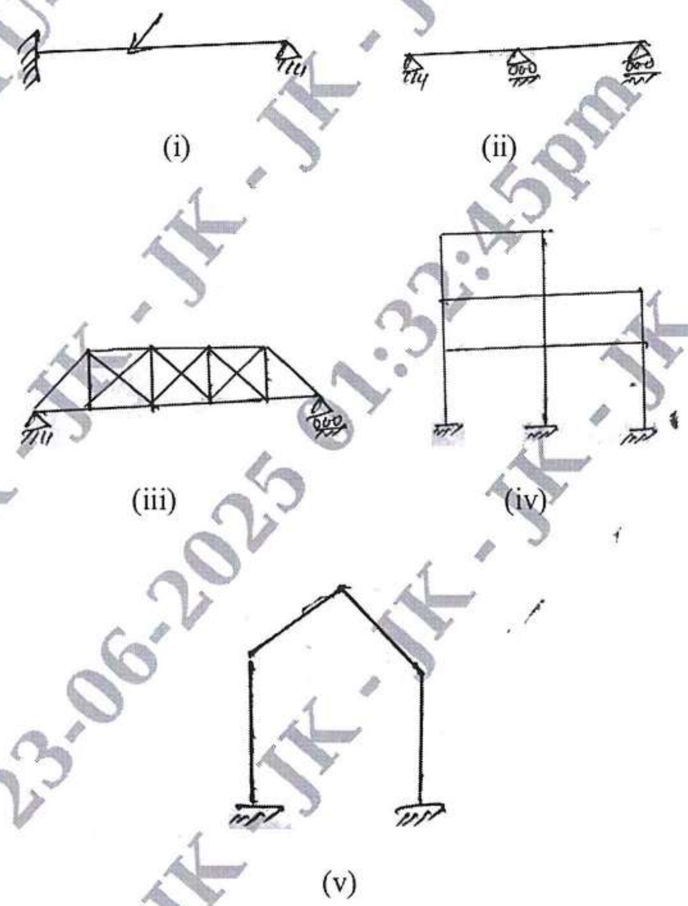
BCV401

Fourth Semester B.E./B.Tech. Degree Examination, June/July 2025
Analysis of Structures

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Difference between statically determinate and indeterminate beams with example.	6	L1, L2	CO1
	b.	Define degree of freedom. What is the degree of freedom for a i) Fixed support ii) Hinged support.	4	L1, L2	CO1
	c.	Determine static and kinematic indeterminacy for the following shown in Fig.Q.1(c).  Fig.Q.1(c)	10	L3	CO1

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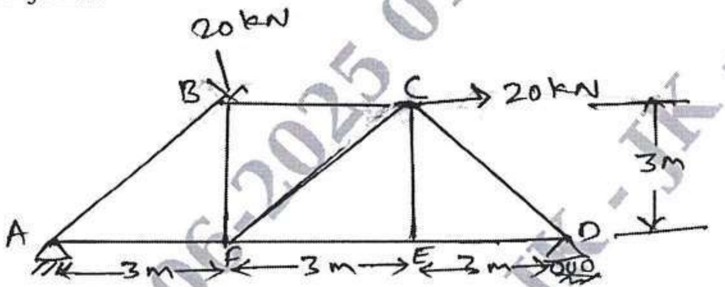
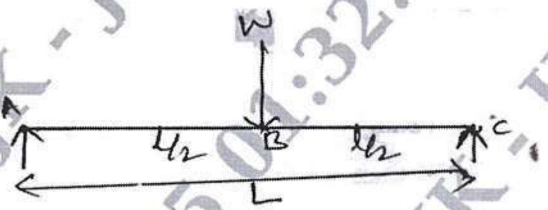
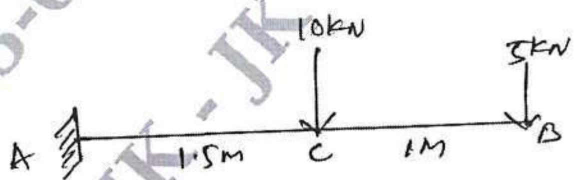
		OR			
Q.2	**a.**	Difference between linear and non linear system.	3	L1, L2	CO1
	b.	What are the assumptions in the analysis of trusses?	5	L1, L2	CO1
	c.	Determine the forces in all the members of the truss shown in Fig.Q.2(c) by method of joints.  Fig.Q.2(c)	12	L3	CO1
		Module – 2			
Q.3	**a.**	Derive the expression for strain energy stored in an prismatic element subjected to pure bending.	6	L3	CO2
	b.	Determine slope and deflection for the simply supported beam subjected to point load at mid span shown in Fig.Q.3(b) by moment area method.  Fig.Q.3(b)	7	L3	CO2
	c.	Determine the slope and deflection at the free end of a cantilever beam as shown in Fig.Q.3(c) by moment area method (Take EI = 4000 kNm^2).  Fig.Q.3(c)	7	L3	CO2

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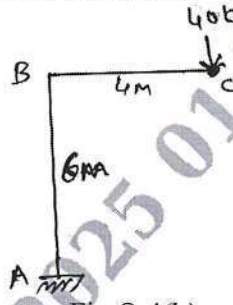
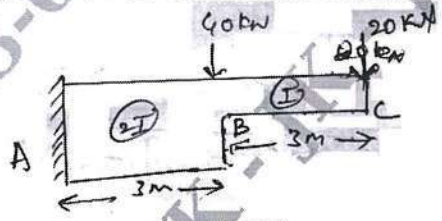
		OR			
Q.4	**a.**	Derive an expression for strain energy due to shear force.	**6**	**L3**	**CO2**
	b.	Determine the vertical deflection at point 'C' for the frame shown in Fig.Q.4(b) using Castigliano's theorem. EI = 16×10^4 kN-m^2.  Fig.Q.4(b)	**7**	**L3**	**CO2**
	c.	Determine slope and deflection at the free end of a cantilever beam as shown in Fig.Q.4(c) EI = 4×10^5 kN-m^2. Use moment area method.  Fig.Q.4(c)	**7**	**L3**	**CO2**
		Module – 3			
Q.5	**a.**	Show that the bending moment at any section as a three hinged parabolic arch of span 'l' and rise 'h' carrying udl of w/m over the entire span is zero.	**6**	**L3**	**CO3**
	b.	A three hinged parabolic arch of 20 m span and rise 5 m, carries a UDL of 40 kN/m on the entire span and a point load of 200 kN at 5 m from right end. Determine reaction, also determine BM, normal thrust and radial shear at 5 m from left support.	**14**	**L3**	**CO3**
		OR			
Q.6	**a.**	A cable of span 20 m and dip 4 m carries a UDL of 20 kN/m over the entire span. Find: i) Maximum tension in the cable ii) Minimum tension in the cable iii) Length of cable.	**10**	**L3**	**CO3**
	b.	A three hinged parabolic arch of span 20 m and rise 4 m carries a UDL of 20 kN/m over the left half of span. Find the maximum BM for the arch and also determine normal thrust and radial shear at a point 5 m from left support.	**10**	**L3**	**CO3**

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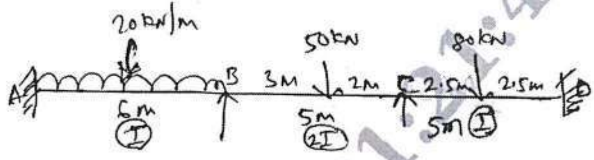
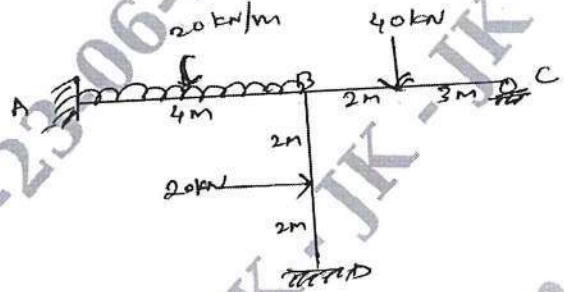
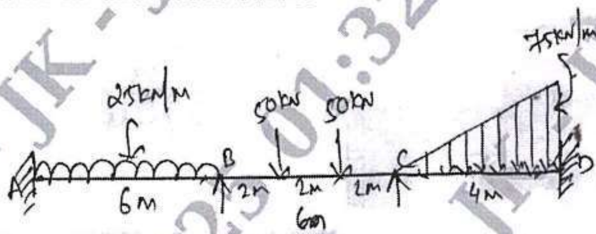
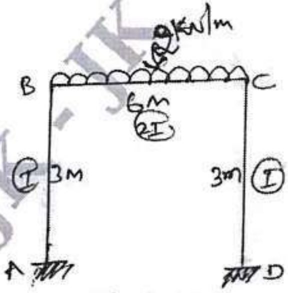
		Module – 4			
Q.7		Analyze the continuous beam shown in Fig.Q.7 by using slope deflection method. Draw BMD, SFD and elastic curve.  Fig.Q.7	20	L4	CO4
		OR			
Q.8		Analyze the portal frame shown in Fig.Q.8 by slope deflection method, draw BMD and elastic curve.  Fig.Q.8	20	L4	CO4
		Module – 5			
Q.9		Analyze the continuous beam shown in Fig.Q.9 by moment distribution method. Draw BMD and elastic curve.  Fig.Q.9	20	L4	CO5
		OR			
Q.10		Analyze the portal frame as shown in Fig.Q.10 by moment distribution method and draw BMD.  Fig.Q.10	20	L4	CO5

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BCV402

Fourth Semester B.E./B.Tech. Degree Examination, June/July 2025
Fluid Mechanics and Hydraulics

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Define the following and mention their units: i) Capillarity ii) Surface tension (iii) Viscosity	06	L2	CO1
	b.	Calculate the density, specific weight and weight of one litre of petrol of specify gravity = 0.7	06	L3	CO1
	c.	The space between two square flat parallel plates is filled with oil. Each side of the plate is 60 cm. The thickness of the oil film is 12.5 mm. The upper plate, which moves at 2.5 meter per sec requires a force of 98.1 N to maintain the speed. Determine (i) The dynamic viscosity of the oil in poise (ii) The kinematic viscosity of the oil in stokes if the specific gravity of the oil is 0.95.	08	L3	CO1
		OR			
Q.2	a.	State and prove Pascal's law.	06	L2	CO1
	b.	An open tank contains water upto a depth of 2 m and above if an oil of sp. gr. 0.9 for a depth of 1 m. Find the pressure intensity (i) at the interface of the two liquids (ii) at the bottom of the tank.	06	L3	CO1
	c.	A differential manometer is connected the two points A and B of two pipes as shown in Fig.Q2(c). The pipe A contains a liquid of sp.gr. = 1.5. While pipe B contains a liquid of sp. gr. = 0.9. The pressure at A and B are 1 kgf/cm^2 and 1.80 kgf/cm^2 respectively. Find the difference in mercury level in the differential manometer.	08	L3	CO1

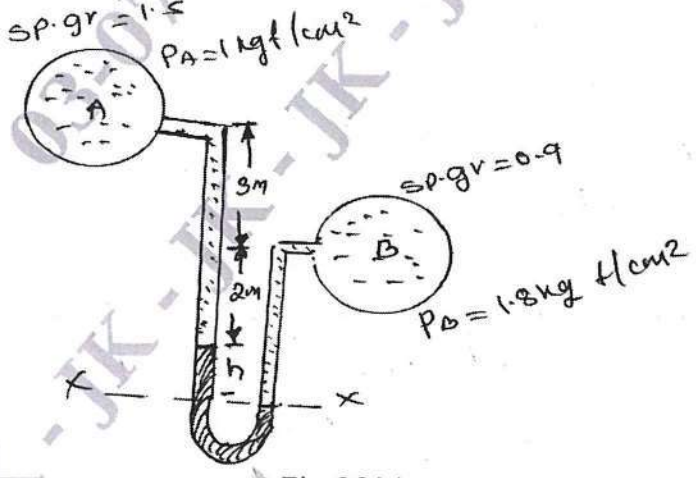

Fig.Q2(c)

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		Module – 2			
Q.3	**a.**	Derive the expression for Euler's equation of motion.	**08**	**L2**	**CO2**
	b.	Water is flowing through a pipe having diameter 300 mm and 200 mm at the bottom and upper end respectively. The intensity of pressure at the bottom end is 24.525 N/cm^2 and pressure at the upper end is 9.81 N/cm^2. Determine the difference in datum head if the rate of flow through pipe is 40 lt/s.	**08**	**L4**	**CO2**
	c.	List the assumption made in the derivation of Bernoulli's equation.	**04**	**L2**	**CO2**
		OR			
Q.4	**a.**	Derive the equation for discharge through venturimeter. Explain with neat sketch.	**08**	**L2**	**CO2**
	b.	An orifice meter with orifie diameter 10 cm is inserted in a pipe of 20 cm diameter. The pressure gauge fitted upstream and downstream of the orifice meter gives reading of 19.62 N/cm^2 and 9.81 N/cm^2 respectively. Coefficient of discharge for the meter is given as 0.6. Find the discharge of water through pipe.	**06**	**L4**	**CO2**
	c.	A pitot-static tube placed in the centre of a 300 mm pipeline has one orifice pointing upstream and other perpendicular to it. The mean velocity in the pipe is 0.80 of the central velocity. Find the discharge through the pipe if the pressure difference between the two orifices is 60 mm of water. Take the coefficient of pitot tube as $C_v = 0.98$.	**06**	**L4**	**CO2**
		Module – 3			
Q.5	**a.**	Define hydraulic coefficients for an orifice and give the relation between them.	**06**	**L2**	**CO3**
	b.	Find the discharge from a 100 mm diameter external mouth piece, fitted to a side of a large vessel if the head over the mouth piece is 4 meters.	**06**	**L4**	**CO3**
	c.	Derive the expression for discharge through a triangular notch.	**08**	**L2**	**CO3**
		OR			
Q.6	**a.**	Derive Darcy – Weisbach equation for head loss due to friction in a pipe.	**08**	**L2**	**CO3**
	b.	List the any four minor losses in a pipe flow with expression.	**06**	**L2**	**CO3**
	c.	Write the short notes on the following : i) Pipes in series ii) Equivalent pipe iii) Pipes in parallel	**06**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	Distinguish between (i) Gradually varied flow and rapidly varied flow (ii) Total energy and specific energy (iii) Subcritical and super critical flow	**06**	**L2**	**CO4**

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Q.7	b.	A rectangular channel is 2.5 m wide and has a uniform bed slope of 1 in 500. If the depth of flow is constant 1.7 m. Calculate (i) The hydraulic mean depth (ii) The velocity of flow (iii) The volume rate of flow Assume that the value of the coefficient C in Chezy's formula is 50.	06	L3	CO4
	c.	Determine the most efficient section of a trapezoidal channel with side slope of 1 vertical to 2 horizontal. The channel carries a discharge of 11.25 m^3/s with a velocity of 0.75 m/s. What should be the bed slope of the channel? Take Mannings n = 0.025 .	08	L3	CO4
		OR			
Q.8	a.	Derive Chezy's equation for uniform rate of flow in a channel.	08	L2	CO4
	b.	For most economical rectangular channel prove that half of the width equal to depth of flow in channel.	06	L3	CO4
	c.	Explain critical depth and critical velocity.	06	L2	CO4
		Module – 5			
Q.9	a.	State Impulse - Momentum equation. Give its application.	06	L2	CO5
	b.	A 75 mm diameter water jet having a velocity of 30 m/s strikes a flat plate, the normal of which is inclined at 45° to the axis of the jet. Find the normal pressure on the plate, when the plate is moving with a velocity of 15 m/s and away from the jet, the normal force on the plate.	06	L4	CO5
	c.	A jet of water of diameter 7.5 cm strikes a curved plate at its centre with a velocity of 20 m/s. The curved plate is moving with a velocity of 8 m/s in the direction of jet. The jet is deflected through an angle of 165°. Assuming the plate smooth find: (i) Force exerted on the plate in the direction of jet. (ii) Power of the jet (iii) Efficiency of the jet	08	L4	CO5
		OR			
Q.10	a.	Explain various efficiency of centrifugal pump.	06	L2	CO5
	b.	List the difference between Impulse and Reaction turbine.	06	L2	CO5
	c.	Explain classification and types of turbines.	08	L2	CO5

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BCV403

Fourth Semester B.E./B.Tech. Degree Examination, June/July 2025
Transportation Engineering

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Explain the role of transportation in social and economic development of country.	10	L2	CO1
	b.	Enumerate the steps for practical design of super elevation considering mixed traffic as per IRC guidelines.	10	L2	CO1
		OR			
Q.2	a.	Explain the factor affecting geometric design of highways.	10	L2	CO1
	b.	Calculate the safe stopping sight distance for design speed of 50 Kmph for i) Two way traffic on two lane road ii) Two way traffic on a single lane road Assume f = 0.37 and reaction time t = 2.5 Sec.	10	L3	CO1
		Module – 2			
Q.3	a.	Explain the desirable properties of road aggregates. List the various tests to access these properties.	10	L2	CO2
	b.	Explain the factors controlling design of flexible highway pavement.	10	L2	CO2
		OR			
Q.4	a.	With neat sketches, explain the following types of joints in CC pavement. i) Expansion Joint ii) Contraction Joint	10	L2	CO2
	b.	With neat sketches, explain the different methods of providing subsurface drainage system.	10	L2	CO2
		Module – 3			
Q.5	a.	What are the various road user characteristics? Explain any two characteristics.	10	L2	CO3
	b.	What are the different traffic engineering studies carried out for collecting traffic data? Explain any two methods.	10	L2	CO3

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OR

Q.6	**a.**	What are the various methods of conducting speed and delay survey? Explain the floating car method of survey.	**10**	**L2**	**CO3**
	b.	Spot speed studies are carried out at a certain stretch of a highway with mixed flow and the consolidated data collected are given below :	**10**	**L3**	**CO3**

Speed rang Kmph	No. of vehicles observed	Speed range Kmph	No. of vehicles observed.
0 to 10	12	50 to 60	255
10 to 20	18	60 to 70	119
20 to 30	68	70 to 80	43
30 to 40	89	80 to 90	33
40 to 50	204	90 to 100	9

Determine :

i) Upper and lower speed limits for regulations.

ii) Design speed for checking the geometric design elements of the highway.

Module – 4

Q.7	**a.**	What do you understand by a permanent way? Mention the requirement of an ideal permanent way.	**10**	**L2**	**CO4**
	b.	What are the functions and requirements of rails?	**10**	**L2**	**CO4**

OR

Q.8	**a.**	What are the functions and requirements of sleepers?	**10**	**L2**	**CO4**
	b.	What are the functions and requirements of ballast?	**10**	**L2**	**CO4**

Module – 5

Q.9	**a.**	What are the various factors considered in the selection of suitable site for airport?	**10**	**L2**	**CO5**
	b.	An airport is planned at an elevation of 380 m above MSL. The monthly mean of maximum and average daily temperature for the hottest month at the site are 40°C and 28°C respectively. The effective gradient is 0.18 percent. Determine the length of runway required at the proposed site if the basic runway length is 1900 m.	**10**	**L3**	**CO5**

OR

Q.10	**a.**	List and explain aircraft characteristics which affect planning and design of airport.	**10**	**L2**	**CO5**
	b.	What is wind rose diagram? Explain any one method of orientation of runway with wind rose diagram.	**10**	**L2**	**CO5**

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Fourth Semester B.E./B.Tech. Degree Examination, June/July 2025
Construction Equipment, Plants and Machinery

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Draw and explain four and two stroke engine.	10	L2	CO1
	b.	Explain components of automobiles with neat diagram.	10	L2	CO1
		OR			
Q.2	a.	Explain basic layout of hydraulic system with neat sketch.	10	L2	CO1
	b.	Explain Strand Jack Operation and write the application of Hydraulics.	10	L2	CO1
		Module – 2			
Q.3	a.	Explain concreting and road making.	10	L2	CO2
	b.	Draw line diagram of bulldozer and write its components.	10	L2	CO2
		OR			
Q.4	a.	Explain Excavator with line diagram.	10	L2	CO2
	b.	Explain Motor Grader and classification of Motor grader.	10	L2	CO2
		Module – 3			
Q.5	a.	Explain equipment life cycle management.	10	L2	CO3
	b.	Explain equipment performance parameter.	10	L2	CO3
		OR			
Q.6	a.	Explain types of Maintenance.	10	L2	CO3
	b.	Explain Maintenance Practices.	10	L2	CO3
		Module – 4			
Q.7	a.	Explain the operation of hard rock.	10	L2	CO4
	b.	Explain earth pressure balance.	10	L2	CO4
		OR			
Q.8	a.	Explain operation of slurry by TBM.	10	L2	CO4
	b.	Explain Hydraulic grabs and piling Rig.	10	L2	CO4
		Module – 5			
Q.9	a.	Explain importance of digital analytic.	10	L2	CO5
	b.	Explain railway track construction.	10	L2	CO5
		OR			
Q.10	a.	Explain 3D concrete printer in construction field.	10	L2	CO5
	b.	Explain safety of men and machines at work.	10	L2	CO5

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BCV502

Fifth Semester B.E./B.Tech. Degree Examination, June/July 2025
Geotechnical Engineering

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	With the help of 3-phase diagram, Explain voids ratio, specific gravity, water content and degree of saturation.	8	L2	CO1
	b.	With usual notations, derive the relationship. $Y_d = \frac{(1-n_a)G \cdot Y_w}{1+WG}$	6	L2	CO1
	c.	With the help of particle size distribution curve, explain well graded soil, uniformly graded soil and gap grade soil.	6	L3	CO1
		OR			
Q.2	a.	Explain determination of In-Situ density of soil by sand replacement method.	8	L2	CO1
	b.	Define Stoke's law. What are its assumptions and limitations?	6	L2	CO1
	c.	Define liquid limit, plastic limit and shrinkage limit.	6	L2	CO1
		Module – 2			
Q.3	a.	Explain with neat sketches the various soil structures.	6	L2	CO1
	b.	Explain any two clay minerals with the help of neat sketches.	8	L2	CO2
	c.	List and explain factors affecting compaction.	6	L2	CO1
		OR			
Q.4	a.	What are the differences between standard and modified Proctor's compaction test methods?	6	L2	CO2
	b.	Explain electrical diffused double layer and adsorbed water.	6	L2	CO2
	c.	A soil in the borrow pit is at a dry density of 16.67 kN/m^3 with water content of 12%. If the soil of 2000 m^3 is excavated from it and compacted in an embankment with porosity of 0.32. Calculate the volume of embankment which can be constructed out of this material. Take G = 2.70.	8	L3	CO2
		Module – 3			
Q.5	a.	Derive the equation for average co-efficient of permeability's in vertical and horizontal directions.	8	L2	CO3

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	b.	Explain with a neat sketch the method of locating the phreatic line in a homogeneous earth dam with horizontal filter.	6	L2	CO3
	c.	If during a variable head permeability test on a soil sample, equal time intervals are noted for drops of head from h_1 to h_2 and again from h_2 to h_3. Find the relationship between h_1, h_2 and h_3.	6	L2	CO3
		OR			
Q.6	a.	State the characteristics and uses of flownets.	6	L2	CO1
	b.	Explain the terms: i) Total stress ii) Effective stress iii) Neutral stress.	6	L2	CO1
	c.	Compute the quantity of water seeping under a weir per day for which the flow net has been satisfactorily constructed, the coefficient of permeability is 2×10^{-2} mm/s, $n_f = 5$ and $n_d = 18$. The difference in water level between upstream and downstream is 3.0 m. The length of the weir is 60 m.	8	L3	CO1
		Module – 4			
Q.7	a.	Explain Mohr-Coulomb theory of shear strength.	6	L2	CO1
	b.	What are the advantages and disadvantages of direct shear test and over triaxial test?	6	L2	CO1
	c.	A direct stress test was carried out on a cohensive soil sample and following results were obtained: Normal stress (kN/m^2) 150 250 Shear stress (kN/m^2) 110 160 A triaxial test is carried out on the same soil with cell pressure of 150 kN/m^2. What would be the deviator stress @ failure?	8	L3	CO2
		OR			
Q.8	a.	What are the factors affecting the shear strength of soil?	6	L2	CO1
	b.	A cylindrical specimen of saturated clay 40 mm in diameter and 80 mm in length is tested in an unconfined compression test. Find shear strength of clay, if the specimen fails under an axial load of 360 N. The change in length of the specimen @ failure is 8 mm. Also find the shear parameters if the angle made by the failure plane with horizontal is 50°.	8	L3	CO1
	c.	What are the advantages of triaxial shear test over direct shear test?	6	L2	CO1
		Module – 5			
Q.9	a.	Enamurate the assumptions and limitations of Terzaghi's consolidation theory.	6	L2	CO1

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	b.	Briefly explain: i) Normally consolidated ii) Under consolidated iii) Over consolidated soils.	**6**	**L2**	**CO1**
	c.	A soil sample 20 mm thick takes 20 minutes to reach 20% consolidation. Find the time taken for a clay layer 6 mm thick to reach 40% consolidation. Assume double drainage in both cases.	**8**	**L3**	**CO1**
		OR			
Q.10	**a.**	Explain square root of time fitting method.	**6**	**L2**	**CO1**
	b.	Explain mass spring analogy.	**6**	**L2**	**CO1**
	c.	A 20 mm thick isotropic clay layer overlies on impervious rock. The coefficient of consolidation of soil is 50×10^{-2} mm^2/sec. Find the time required for 50% and 90% consolidation. Time factor are 0.2 and 0.85 for 50% and 90% consolidation, respectively.	**8**	**L3**	**CO2**

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BCV503

Fifth Semester B.E./B.Tech. Degree Examination, June/July 2025
Concrete Technology

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.
3. Use of IS 456 : 2000, IS 10262 : 2019 is permitted.

		Module – 1	M	L	C
Q.1	a.	Explain briefly the different types of cement.	10	L2	CO1
	b.	Explain briefly the properties of fine aggregate and coarse aggregate.	10	L2	CO1
		OR			
Q.2	a.	Briefly explain the tests on properties of cement.	7	L2	CO1
	b.	What is meant by admixture and what are the benefits of admixtures?	7	L2	CO1
	c.	Explain : i) Accelerating admixture ii) Retarding admixtures iii) Water reducing admixtures.	6	L2	CO1
		Module – 2			
Q.3	a.	What are the factors affecting workability? Explain briefly the measurement of workability.	10	L2	CO2
	b.	Explain segregation of concrete and bleeding in concrete.	10	L2	CO2
		OR			
Q.4	a.	Explain the process of manufacture of concrete.	10	L2	CO2
	b.	What is curing? Explain : i) Water curing ii) Membrane curing iii) Steam curing iv) Accelerated curing.	10	L2	CO2
		Module – 3			
Q.5	a.	What are the factors influencing strength of concrete? Explain.	10	L2	CO2
	b.	Explain maturity concept and testing of hardened concrete.	10	L2	CO2
		OR			
Q.6	a.	Explain shrinkage and creep of concrete. What are the factors affecting shrinkage and creep of concrete.	7	L2	CO2
	b.	Define durability. Explain the significance of durability and what are the factors affecting durability.	7	L3	CO2
	c.	Explain : i) Rebound hammer test ii) Penetration resistance test iii) Pull out test iv) Ultrasonic pulse velocity test.	6	L3	CO2
		Module – 4			
Q.7	a.	What are the objectives of mix design? Explain the factors to be considered for mix design.	10	L3	CO2
	b.	Explain the selection criteria of ingredients used for mix design. What is the procedure of mix proportioning?	10	L3	CO2

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		OR			
Q.8		Design a concrete mix of M30 Grade as per IS 10262-2019 with the following conditions : i) Grade designation – M30 ii) Type of cement – OPC 53 grade iii) Max. Nominal size of aggregate – 20 mm down iv) Min. Cement content – 300 kg/m^3 v) Workability : Slump – 75 mm vi) Exposure condition – moderate vii) Method of concrete placing – manual viii) Max. cement content – 450 kg/m^3 ix) Chemical admixture – 2% by mass of cement x) Fine aggregate zone – zone II xi) Specific gravity of cement – 3.12 xii) Specific gravity of coarse aggregate – 2.72 xiii) Water absorption – 1% xiv) Free surface moisture – Nil xv) Specific gravity of fine aggregate – 2.64 xvi) Water absorption – 2% xvii) Free surface moisture contact – 2%.	**20**	**L4**	**CO3**
		Module – 5			
Q.9	**a.**	What is Ready Mixed Concrete (RMC)?	**2**	**L3**	**CO4**
	b.	Explain the manufacture, requirements, properties, advantages and disadvantages of RMC.	**9**	**L3**	**CO4**
	c.	Explain briefly Self-Compacting Concrete (SCC). What is the concept of SCC, materials, tests, properties and applications of SCC?	**9**	L3	**CO4**
		OR			
Q.10	**a.**	Explain Fiber Reinforced Concrete (FRC), types of fibers, properties and applications of FRC.	**6**	**L3**	**CO4**
	b.	Explain light weight concrete. What are the materials, properties, types and applications of light weight concrete?	**6**	**L3**	**CO4**
	c.	Explain briefly Geopolymer concrete. Distinguish between high performance concrete and high strength concrete.	**8**	**L3**	**CO4**

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BCV515D

Fifth Semester B.E./B.Tech. Degree Examination, June/July 2025
Remote Sensing and GIS

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Define Remote Sensing? Explain the components and working principle of Remote sensing with a neat sketch.	10	L1	CO1
	b.	Briefly discuss the key elements of visual interpretation.	10	L1	CO1
		OR			
Q.2	a.	What is Spectral Reflectance curve? Indicate the spectral reflectances for water, soil and green leaves explaining its significance.	10	L2	CO2
	b.	With a neat diagram discuss electromagnetic spectrum. Explain atmospheric windows and their significance in Remote sensing.	10	L2	CO2
		Module – 2			
Q.3	a.	What is photogrammetry? List the different types of photogrammetry with an example each with reference to civil engineering.	10	L1	CO1
	b.	Compare advantages of aerial photogrammetry over traditional ground surveying techniques.	10	L1	CO1
		OR			
Q.4	a.	Discuss the applications of photogrammetry in civil engineering projects.	10	L2	CO2
	b.	What is flight planning in photogrammetry? Describe the key elements involved in flight planning.	10	L2	CO2
		Module – 3			
Q.5	a.	What are the major functions of a Geographic Information System (GIS) and how these functions are helpful in decision making process? Give examples to justify your answer.	10	L3	CO3
	b.	What are the advantages of GIS (Geographic Information System). Explain with real world applications.	10	L3	CO3
		OR			
Q.6	a.	What is Spatial Data Analysis? With examples explain overlay analysis and network analysis.	10	L3	CO3
	b.	Explain how outputs are generated in GIS and discuss about map outputs and its advantages.	10	L2	CO2

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		Module – 4			
Q.7		Explain how GIS, Remote sensing and GPS technologies can be used to prioritize river basin for watershed management in a drought prone region. Describe the data collection, spatial analysis and GIS integration processes involved in this.	**20**	**L3**	**CO3**
		OR			
Q.8		A city is experiencing increased traffic congestion and accidents along its main routes. As a transportation planner outline how using GIS, Remote sensing and GPS techniques to analyze and optimize the routes/transportation network in the city.	**20**	**L3**	**CO3**
		Module – 5			
Q.9		Explain how GIS, Remote sensing and GPS techniques help in mapping forest fire extent by highlighting the usage of these techniques in disaster response.	**20**	**L3**	**CO3**
		OR			
Q.10		Outline the approach to plan for sustainable urban growth using GIS, GPS and RS. Use and list the data required (spatial) land use analysis and traffic management techniques.	**20**	**L3**	**CO4**

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BCV601

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Design of RCC Structures

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of IS456:2000, SP- 16 is permitted
3. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Compare Working Stree method and limit state method of design.	08	L2	CO1
	b.	Explain the stress block parameters with a neat sketch and derive the expression	12	L2	CO1
		OR			
Q.2	a.	Explain the terms: i) under reinforced section ii) balanced section ii) Over reinforced section	06	L2	CO1
	b.	A simply supported beam has a rectangular section and carries a uniformly distributed load of 20KN/m over a clear span of 5m. The cross – section is 300mm x 650mm and is reinforced with 4 numbers of 20mm diameter bar. Assume cover = 25mm and bearing = 300mm. Assuming M20 grade concrete and Fe415 steel, compute short and long term deflection of the beam.	14	L3	CO1
		Module – 2			
Q.3		Determine the moment of resistance of T section having the following section properties: Width of flange = 2500mm, Depth of flange =150mm, Width of rib = 300mm, Effective depth = 800mm, Area of steel = 8 bars of 25 mm diameter. Use M20 concrete and Fe415 HYSD bar.	20	L3	CO2
		OR			
Q.4		A doubly reinforced concrete beam having a rectangular section 250mm width and 540mm overall depth is reinforced with a 2 bars of 12mm diameter in the compression side and 4bars of 20mm diameter in the tension side. The effective cover to bars is 40mm. Using M20 grade concrete and Fe415 HYSD bars, estimate the flexural strength of the section using IS456:2000 code recommendations.	20	L3	CO2
		Module – 3			
Q.5		Design a rectangular beam of section 230mm x 600mm of effective span 6m and effect cover for reinforcement = 50mm. Imposed load on the beam is 40KN/m. Use M20 concrete and Fe415 steel.	20	L4	CO2
		OR			
Q.6		Design a simply supported beam of span 5m carries a characteristic live load of 12 KN/m. Use M20 grade of concrete and Fe 415 steel.	20	L4	CO2
		Module – 4			
Q.7	a.	Explain one way and two way slab with examples.	04	L2	CO3,4
	b.	Design a slab over a room of internal dimension 4m x 5m on 230mm thick brick wall. All edges are simply supported (corner of the slab are held down). Use live load 3KN/m^2, floor finish 1KN/ m^2. Use M20 and Fe415. Apply check for deflection with the reinforcement details.	16	L4	CO3,4

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		OR			
Q.8		Design a dog legged staircase for an office building in a room measuring 2.8m x 5.8m clear. Vertical distance between the floors is 3.6m. width of flight is 1.25 m. Allow a live load of 3KN/ m^2, sketch the reinforcement details. Use M20 and Fe415. Assume the stairsare supported on 230mm wall at the end of outer edges of landing slabs.	**20**	**L4**	**CO3,4**
		Module – 5			
Q.9		Design a square footing for a short axially loaded column of size 300mm x 300mm carrying 600 KN load. Use M20 concrete and Fe415 steel. SBC of soil is 180 KN/ m^2. Sketch the details of reinforcement.	**20**	**L4**	**CO1**
		OR			
Q.10		Design a isolated footing for a rectangular column of 300mm x 500mm supporting an axial load of 1000 KN factored. Assume SBC of soil as 1KN/ m^2. Use M20 and Fe415. Sketch the reinforcement and perform the necessary checks	**20**	**L4**	**CO3,4**

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BCV602

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Irrigation Engineering And Hydraulic Structures

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Define irrigation. Write the benefits and ill effects of irrigation.	10	L1	CO2
	b.	The base period, intensity of irrigation and duty of various crops under a canal system are given in the table below. Find the reservoir capacity if the canal losses are 20% and the reservoir losses are 15%.	10	L3	CO2

Crop	Base Period (days)	Area (hect)	Duty (hect/cumecs)
Wheat	120	4800	1800
Sugar-Cane	360	5600	800
Cotton	200	2400	1400
Rice	120	3200	900
Vegetables	120	1400	700

OR

			M	L	C
Q.2	a.	Write a note on i) Bandhara irrigation ii)Frequency of irrigation.	10	L2	CO2
	b.	Define duty, delta and Base period and derive relationship between them.	05	L2	CO2
	c.	A canal has a discharge of 20 cumecs. It irrigates 25,920 hectare of land during a base period of 120 days. Find the duty and delta of the canal.	05	L3	CO3

		Module – 2	M	L	C
Q.3	a.	Define canal and explain classification of canal based on canal alignment.	10	L2	CO3
	b.	Design an irrigation channel in alluvial soil from following data using Lacey's Theory. Discharge = $18 m^3/Sec$. Lacey's silt factor = 1 Side slope = ½ :1.	10	L4	CO3

OR

			M	L	C
Q.4	a.	Define reservoir and what are the investigations for the selection of a reservoir site.	10	L1	CO3
	b.	Design an irrigation channel on Kennedy's Theory to carry a discharge of $45 m^3/sec$. Take N = 0.0225 and m=1.05. The channel has a bed slope of 1 in 5000. Assume Trail depth 2m, side slope 0.5:1.	10	L4	CO3

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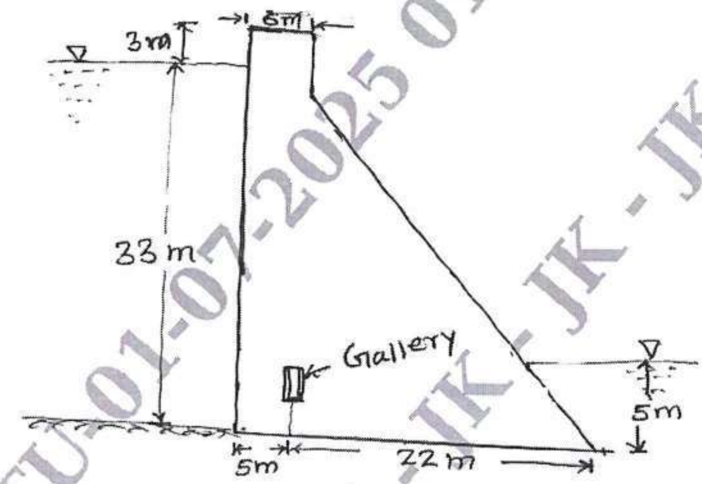
		Module – 3			
Q.5	**a.**	Define gravity dam and briefly explain the forces acting on a gravity dam.	**10**	**L2**	**CO1**
	b.	Determine the uplift force at the base of a gravity dam as shown in Fig.Q.5(b) for the following Three cases. a) No drains b) with drain and grout curtain at a distance of 5 m from U/S end c) Tension cracks upto 2 m from U/S end.	**10**	**L3**	**CO1**
		 Fig. Q.5(b) Cross section of gravity dam			
		OR			
Q.6	**a.**	Write a note on : i) Practical Profile of a gravity dam ii) Drainage and inspection galleries.	**10**	**L2**	**CO1**
	b.	Following data were obtained from the stability analysis of concrete gravity dam : i) Total overturning moment about toe = 1.5×10^6 KN – m ii) Total resisting moment about toe = 2.5×10^6 KN – m iii) Total vertical force above base = 60,000 KN iv) Base width of the dam = 48 m v) Slope of D/S face = 0.8(H) : 1(V). Calculate the maximum and minimum vertical stress to which the foundation will be subjected to, what is the maximum principal stress at toe ? Assume there is no tail water.	**10**	**L4**	**CO1**
		Module – 4			
Q.7	**a.**	Explain the causes of failure of earthen dams.	**10**	**L2**	**CO1**
	b.	Briefly explain the methods of seepage control through foundation and body of earthen dams.	**10**	**L2**	**CO1**
		OR			
Q.8	**a.**	Define earthen dam and explain the design criteria for earthen dams.	**10**	**L2**	**CO1**
	b.	Write a note on : i) Ogee spillways ii) Stilling Basins.	**10**	**L2**	**CO1**

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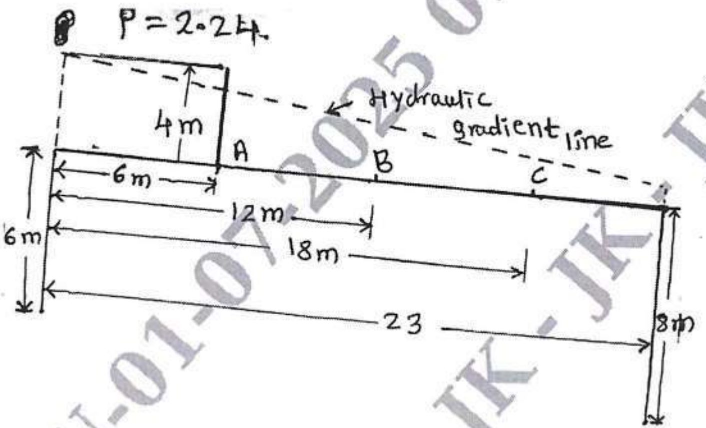
		Module – 5			
Q.9	**a.**	Explain the types of diversion head works and causes of their failure.	**10**	**L2**	**CO1**
	b.	Fig.Q.9(b), shows the section of hydraulic structure founded on sand. Calculate the average hydraulic gradient. Also find the uplift pressure at point 6,12 and 18 m from the U/S ends of the floor and find the thickness of the floor at these points taking P = 2.24.  Fig. Q.9(b) Hydraulic Structure	**10**	**L3**	**CO1**
		OR			
Q.10	**a.**	Describe with neat sketches, the working of a silt excluders and silt ejectors.	**10**	**L2**	**CO1**
	b.	Explain the following : i) Draw a layout of headwork, label the component and describe the function of each component. ii) Explain the Lane's weighted creep theory.	**10**	**L2**	**CO1**

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CBCS SCHEME

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BCV613C

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Applied Geotechnical Engineering

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	What is subsoil exploration? Mention its objectives.	6	L1	CO1
	b.	Briefly explain the stages of site investigation.	6	L2	CO1
	c.	Explain the wash boring techniques with a neat sketch.	8	L2	CO1
		OR			
Q.2	a.	What is Bore log? Briefly explain with a typical sample.	6	L2	CO1
	b.	With a neat sketch, explain split spoon samplers.	6	L2	CO1
	c.	Determine the area ratio of the sampling tube of having 51 MM external diameter and internal diameter of 48 mm.	8	L3	CO1
		Module – 2			
Q.3	a.	What is dewatering? Mention its objectives.	6	L1	CO2
	b.	What is flow net? Mention the properties of flownets.	6	L2	CO2
	c.	Define phreatic lines, equipotential lines, flow lines and Hvorslev's depth estimation of GWT.	8	L3	CO2
		OR			
Q.4	a.	Establish the location of ground water in a clayey strata, water in a bore hole was bailed out to a depth of 1067 cm below ground surface and rise in water level was recorded at 24 hours intervals as follows: $h_1 = 64$ cm, $h_2 = 57.20$ cm, $h_3 = 51.8$ cm	10	L3	CO2
	b.	In a site investigation to be determined the depth of ground water table, the water in a bore hole was bailed out to a depth of 8 mt below ground level and recorded rise in water table in the bore hole are as follows: $h_1 = 50$ cm in the first 24 hours $h_2 = 30$ cm in the second 24 hours $h_3 = 20$ cm in the third 24 hours using Hvorslev's method compute the depth of ground water table.	10	L3	CO2
		Module – 3			
Q.5	a.	Define active earth pressure with neat sketch.	6	L2	CO3
	b.	Mention the assumptions and limitations of Rankines theory.	6	L2	CO3

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	c.	A cantilever retaining wall of 7 mt height retains 5 and 1 the properties of the sand are e = 0.5, $\phi = 30°$ and G = 2.7. Using Rankines theory, determine the active earth pressure at the base when the backfill is i) Dry ii) Saturated iii) Submerged, and also the resultant active force in each case. In addition determine the total water pressure under the submerged condition.	8	L2	CO3
		OR			
Q.6	a.	Explain in detail, the geotechnical design of gravity and cantilever retaining wall.	10	L4	CO3
	b.	A retaining wall with a vertical back of height 7.32 mt supports a cohesionless soil of unit weight 17.3 kN/m^3 and an angle of shearing resistance $\phi = 30°$. The surface of the soil is horizontal. Determine the magnitude and direction of the active thrust per meter of a wall using Rankines Theory.	10	L3	CO3
		Module – 4			
Q.7	a.	With a neat sketch, explain different types of slope failures.	10	L2	CO4
	b.	Explain Fellineous method for critical slip circle.	10	L2	CO4
		OR			
Q.8	a.	Find the factor of slope (safety) of infinite extent having a slope angle 25°. The slope is made of cohesionless soil with $\phi = 30°$. Also analyze the slope, if it is made of clay having c^1 = 30 kN/m^2, $\phi = 20°$, e = 0.65 and G = 2.7 and under the following conditions, i) When the soil is dry ii) When water seeps parallel to the surface and slope iii) When the slope is submerged.	10	L3	CO4
	b.	Explain the Swedish slip circle method for 'C' and C - ϕ soils in detail.	10	L2	CO4
		Module – 5			
Q.9	a.	Explain : i) Pressure bulb ii) Isobar iii) Pressure distribution on horizontal plane iv) Pressure distribution on vertical plane v) Newmarks chart.	10	L2	CO5
	b.	Explain the Bossiness's theory in detail.	10	L2	CO5
		OR			
Q.10	a.	What are the different types settlements? Explain.	10	L1	CO2
	b.	A concentrated load of 1000 kN is applied at the ground surface, compute the vertical pressure: i) At a depth of 4 mt below the load ii) At a distance of 3 mt at the same depth, use Boussiness's equation.	10	L3	CO5

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BCV654B

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Geographic Information System

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Explain the components of GIS.	10	L3	CO1
	b.	Differentiate between spatial data and attribute data with suitable examples.	10	L2	CO1
		OR			
Q.2	a.	Explain the different types of GIS software with a comparison of proprietary and open source software.	8	L8	CO1
	b.	Discuss the evolution and history of GIS.	4	L3	CO1
	c.	What are coordinate systems? Describe their importance in GIS.	8	L1	CO1
		Module – 2			
Q.3	a.	Differentiate between raster and vector data models.	10	L2	CO2
	b.	Explain the structure of spatial database using ER diagrams.	10	L3	CO2
		OR			
Q.4	a.	Compare and contract conceptual, logical and physical data models in GIS.	10	L2	CO2
	b.	Describe raster data structure and technique used for raster data compression.	10	L2	CO2
		Module – 3			
Q.5	a.	Define Digitizer. List the different types of digitizer.	10	L1	CO3
	b.	How GPS data integrated into a GIS? Discuss with a flow chart.	10	L3	CO3
		OR			
Q.6	a.	Explain the various methods and importance of coordinate transformation system.	10	L3	CO3
	b.	Enumerate the difference between connectivity and containment.	10	L2	CO3
		Module – 4			
Q.7	a.	Define Spatial Data Infrastructure (SDI) and its significance.	10	L1	CO4
	b.	What is GIS standards? Why is interoperability important in GIS system?	10	L1	CO4

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		OR			
Q.8	**a.**	Explain open geospatial consortium.	**10**	**L3**	**CO4**
	b.	Explain the concept of metadata and its role in data documentation.	**10**	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	What are the functions of data management in GIS?	**10**	**L1**	**CO5**
	b.	Explain the process of converting raster to vector and vice versa.	**10**	**L3**	**CO5**
		OR			
Q.10	**a.**	Describe steps involved in map compilation and layout design.	**10**	**L3**	**CO5**
	b.	Differentiate between enterprise and Desktop GIS.	**10**	**L2**	**CO5**

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BCV301

Third Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Strength of Materials

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Draw Stress-Strain diagram for structural steel subjected to axial tensile force and explain the salient points.	06	L2	CO1
	b.	Define the following: i) Poisson's Ratio ii) Modulus of Rigidity iii) Modulus of Elasticity iv) Bulk Modulus	04	L1	CO1
	c.	Calculate the modulus of rigidity and bulk modulus of a cylindrical bar of diameter 25 mm and of length 1.2 m, if the longitudinal strain in the bar during a tensile test is four times the lateral strain. Also find the change in volume when the bar is subjected to a hydrostatic pressure of 120 N/mm^2 . Take $E = 1.2 \times 10^5$ N/mm^2.	10	L3	CO1
		OR			
Q.2	a.	State and explain Hook's Law.	04	L2	CO1
	b.	Derive an expression for relation between modulus of elasticity and modulus of rigidity.	06	L3	CO1
	c.	A weight of 390 kN is supported by a short column of 250 mm square in section. The column is reinforced with 8 steel bars of cross-sectional area 2500 mm^2. Find the stresses in steel and concrete if $E_{st} = 15\ E_{con}$. If stress in concrete must not exceed 4.5 N/mm^2, what area of steel is required in order that column may support a load of 480 kN?	10	L3	CO1
		Module – 2			
Q.3	a.	Define Shear Force and Bending Moment at a section and state relation between them.	04	L1	CO2
	b.	Draw SFD and BMD for a cantilever subjected UDL of W N/m over entire length. Length of cantilever is L m.	06	L3	CO2
	c.	Draw the shear force and bending moment diagrams for a cantilever subjected forces as shown in Fig.Q.3(c).	10	L3	CO2

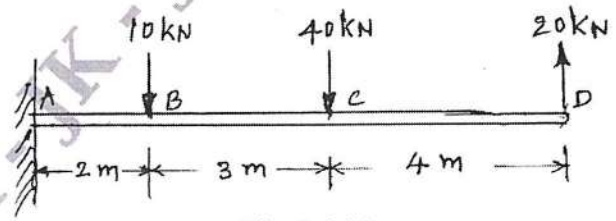

Fig.Q.3(c)

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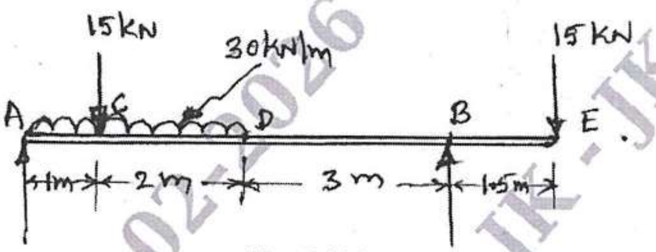
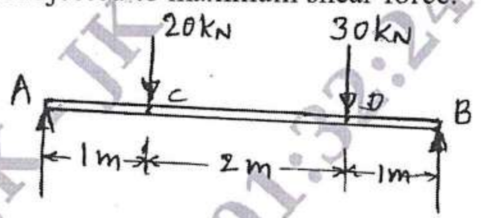
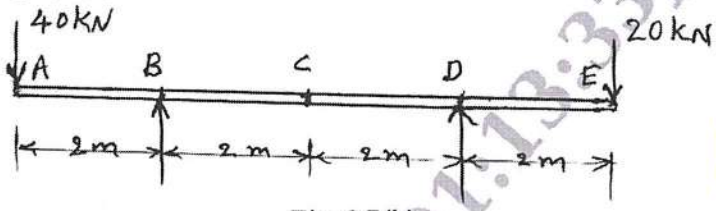
		OR			
Q.4	**a.**	Define Point of Contraflexture and explain how to calculate point of contraflexure.	**04**	**L1**	**CO2**
	b.	Derive the relation between rate of loading, shear force and bending moment.	**06**	**L3**	**CO2**
	c.	Draw SFD and BMD for the beam loaded as shown in Fig.Q4(c). Also locate the point of contraflexure.  Fig.Q4(c)	**10**	**L3**	**CO2**
		Module – 3			
Q.5	**a.**	With usual notations, derive Bernoulli – Euler bending equation. Also mention the assumptions made in derivation of bending equation.	**08**	**L3**	**CO3**
	b.	A simply supported beam with 'T' section is subjected to the force as shown in Fig.Q5(b). Determine the shear stress distribution along depth of the section of beam subjected to maximum shear force.  Fig.Q5(b)	**12**	**L4**	**CO3**
		OR			
Q.6	**a.**	List the assumption made in the theory of torsion. Also derive the torsion equation $\frac{T}{J}=\frac{G\theta}{L}=\frac{\tau}{R}$	**10**	**L3**	**CO3**
	b.	A solid shaft is of 50 mm diameter. Determine the diameters of a hollow shaft such that its area of cross-section is same as that of solid shaft. the inner diameter of hollow shaft is 0.8 times outer diameter. Compare the torsional strengths and torsional stiffness of the hollow and solid shafts, the length , material being same in both cases.	**10**	**L4**	**CO3**
		Module – 4			
Q.7	**a.**	Derive deflection equation $EI\frac{d^2y}{dx^2}=M$	**06**	**L3**	**CO4**

Q.7	b.	Calculate slope at 'B' and deflection at 'C' for the overhanging beam shown in Fig.Q7(b). Take E = 200 GPa and I = 50×10^6 mm^4.  Fig.Q7(b)	14	L4	CO4
		OR			
Q.8	a.	Differentiate between Short and Long column and what are the limitations of Euler's theory.	06	L3	CO4
	b.	A 2 meters long column has a square cross-section of side 40mm. Taking the factor of safety as 4, determine the safe load for the end conditions, (i) both ends are hinged (ii) one end is fixed and other end is free (iii) Both ends are fixed (iv) One end is fixed and other end is hinged. Take E = 210GPa.	14	L4	CO4
		Module – 5			
Q.9	a.	Define Principal Stresses and Principal Planes.	04	L1	CO5
	b.	Derive expression for normal stress and tangential stress for a member subjected to uniaxial loading.	06	L3	CO5
	c.	A point in a strained member is subjected to biaxial stresses 85 MPa (tensile) and 60 MPa (comp). The point is also subjected to a shear stress 45 MPa such that shear force on vertical faces gives rise to clockwise couple. Determine : i) Stress acting on a plane whose normal is at an angle of 40° with reference to 85 MPa stress direction. ii) Magnitudes of Principal stresses and maximum and minimum shear stresses iii) Orientation of the Principal planes and maximum and minimum shear stress planes.	10	L4	CO5
		OR			
Q.10	a.	List the differences between thick and thin cylinders.	04	L1	CO5
	b.	Derive Lame's equation for the radial and hoop stress for thick cylinder subjected to internal and external fluid pressure.	08	L3	CO5
	c.	A cylindrical pressure vessel with inner and outer diameters 180 mm and 220 mm respectively is subjected to an internal pressure 10 MPa. Taking the circumferential stress at the inner wall as 25 MPa (tension). Determine (i) maximum value of external pressure that can be applied (ii) circumferential stress on the outer surface.	08	L4	CO5

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BCV302

Third Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Engineering Survey

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	What is Surveying? List the different types of surveying.	8	L1	CO1
	b.	List the advantages and disadvantages of plane table surveying.	6	L1	CO1
	c.	Discuss on different types of tapes.	6	L2	CO1
		OR			
Q.2	a.	With the neat sketch, discuss the use of distance measuring wheel for interior and exterior of buildings.	8	L3	CO1
	b.	Differentiate between plane and geodetic surveying.	6	L2	CO1
	c.	What is compass surveying? List the limitations of it.	6	L1	CO1
		Module – 2			
Q.3	a.	Explain reiteration method of measuring horizontal angle with the neat tabular column.	8	L2	CO2
	b.	Define the following terms: datum, mean sea level, level line, bench mark.	6	L1	CO2
	c.	The following staff readings were taken with a level and 4 m staff on a continuously sloping ground: 0.850, 1.250, 2.500, 3.750, 0.890, 2.100, 3.125 and 3.900. The first reading is taken on a BM of RL 420.000 m. Using HI method, calculate RL of other points.	6	L3	CO2
		OR			
Q.4	a.	The following staff readings were taken with a leveling instrument, and the instrument is being shifted after fifth and eighth readings. The readings are : 2.350, 1.650, 0.850, 1.500, 0.500, 0.625, 1.900, 2.750, 3.500 and 3.950. The RL of first point is 625.000 m. Use rise and fall method to calculate RL of other points. Carry out Arithmetic check.	8	L3	CO2
	b.	Define the terms: transiting, swinging, line of sight, trunnion axis.	6	L2	CO2
	c.	With the neat sketch, explain the fundamental measurements of total station.	6	L2	CO2
		Module – 3			
Q.5	a.	Explain the characteristics of contours.	8	L2	CO3
	b.	Explain the procedure of coordinate measurements in total station.	6	L2	CO3
	c.	List the applications of coordinate survey in total station.	6	L1	CO3

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		OR			
Q.6	**a.**	Discuss on profile and cross-sectioning with typical sketches.	**8**	**L2**	**CO3**
	b.	Define the following with typical sketches: contour internal, horizontal equivalent and ridge line.	**6**	**L1**	**CO3**
	c.	Explain : i) Importance of back sight data ii) Tools to plot in CAD in total station.	**6**	**L1**	**CO3**
		Module – 4			
Q.7	**a.**	A road embankment is 8 m wide and 200 m in length, at the formation level, with a side slope of 1.5:1. The embankment has a rising gradient of 1 in 100 m. The ground levels at every 50 m along the centre line are as follows: Distance (m): 0, 50, 100, 150, 200 RL (m): 164.5, 165.2, 166.8, 167, 167.2 The formation level of zero chainage is 166.0 m. Calculate the volume of earthwork by trapezoidal and prismoidal rule.	**10**	**L3**	**CO4**
	b.	Define: point of curve, midordinate and tangent length with a neat sketch.	**6**	**L1**	**CO4**
	c.	List the different types of vertical curves.	**4**	**L1**	**CO4**
		OR			
Q.8	**a.**	Two tangents intersect at a chainage of 1192.00 m, the deflection angle being 50°00′. Calculate the necessary data for setting out a curve of 300 m radius to connect the two tangents if it is intended to set out by Rankine's method. Take peg interval as 30 m.	**10**	**L3**	**CO4**
	b.	With the neat sketch, show the different parts of compound curve.	**6**	**L1**	**CO4**
	c.	How total station is useful in setting out work?	**4**	**L1**	**CO4**
		Module – 5			
Q.9	**a.**	Discuss the different types of GPS receivers and their applications.	**8**	**L2**	**CO5**
	b.	Explain how remote sensing is applied in civil and environmental engineering.	**6**	**L2**	**CO5**
	c.	What are different types of sensors used in drone surveying?	**6**	**L1**	**CO5**
		OR			
Q.10	**a.**	List and explain the main requirements for drone surveying.	**8**	**L1**	**CO5**
	b.	Describe the main components of GPS system.	**6**	**L2**	**CO5**
	c.	Different between two positioning methods in GPS.	**6**	**L1**	**CO5**

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CBCS SCHEME

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Third Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026

Engineering Geology

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Based on Seismological evidence explain the internal structure of Earth with appropriate sketch. Also explain its composition, temperature and distance.	10	L2	CO1
	b.	Explain causes of Landslides. Also explain the prevention and control of landslide.	10	L3	CO1
		OR			
Q.2	a.	Explain causes of Earthquakes with Stress Vs Strain Curve.	10	L3	CO1
	b.	Explain Cyclones, causes and remedial measures for Cyclone management.	10	L3	CO1
		Module – 2			
Q.3	a.	With appropriate mineral example explain any two physical properties. i) Habit ii) Hardness iii) Diaphaneity.	8	L2	CO2
	b.	With appropriate sketch explain texture of Igneous Rocks.	8	L3	CO2
	c.	Define Mineral and Ore mineral with suitable example.	4	L1	CO2
		OR			
Q.4	a.	Explain the occurrence of Igneous Rocks.	6	L2	CO2
	b.	With neat sketch explain structure of sedimentary rocks.	8	L2	CO2
	c.	Write a note on formation of metamorphic rocks.	6	L2	CO2
		Module – 3			
Q.5	a.	Explain processes of weathering and also explain physical weathering of a rock.	8	L2	CO3
	b.	Define soil. With neat sketch explain soil profile and list the varieties of soil.	8	L3	CO3
	c.	Briefly write a note on soil types.	4	L2	CO3

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		OR			
Q.6	**a.**	Explain process of weathering and also explain chemical weathering of a rock.	**8**	**L2**	**CO3**
	b.	Differentiate Black Cotton Soil and Laterite Soil.	**8**	**L3**	**CO3**
	c.	Define Soil Mineralogy and Soil Structure.	**4**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	A sand stone formation dip 45° along S 50°E and 35° along S 40°W. Find the amount of true Dip.	**8**	**L3**	**CO4**
	b.	A bed of Chromite at Byrapur, Hassan district has a dip of 25° East, out crop is 160 M wide measured on level ground. Find true and vertical thickness (Graphical method) Scale : 1 cms = 40 mts.	**6**	**L3**	**CO4**
	c.	With sketch explain Anticline and Syncline fold.	**6**	**L2**	**CO4**
		OR			
Q.8	**a.**	With sketch explain Normal Fault and Reverse fault.	**6**	**L2**	**CO4**
	b.	A bed of sandstone have a dip of 40° and 20° slope (both west ward), the width of out crop is 200 m. Find true and vertical thickness. Scale : 1 cms = 50 Mts. (Graphical Method)	**6**	**L3**	**CO4**
	c.	P, Q and S are 3 boreholes sunk at the centers of square grid with sides measuring 60 mts, where 'P' is North of 'S' and 'Q' is East of 'P' the depth of shale bed is 3 mts at P, 13 mts at 'Q' and 18 m at 'S'. Determine another bore hole at vacant corner of square gird. Find the depth of shale bed 'R'. Horizontals scale 1 cms = 10 m Gradient scale 0.5 cms = 1 unit.	**8**	**L4**	**CO4**
		Module – 5			
Q.9	**a.**	Explain Electrical Resistivity method by Schlumberger method and also write types of curves based on Schlumberger method.	**10**	**L3**	**CO5**
	b.	What is Permeability of Rock? Also explain factors influencing permeability.	**10**	**L2**	**CO5**
		OR			
Q.10	**a.**	With neat sketch explain confined and unconfined aquifer and differentiate Aquifer and Aquifuge.	**10**	**L3**	**CO5**
	b.	Write a note on water bearing Properties of Igneous, Sedimentary and Metamorphic rocks.	**10**	**L2**	**CO5**

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BCV304

Third Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Water Supply and Waste Water Engineering

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Explain the diverse categories of water demand for community.	9	L2	CO1
	b.	List out the factors affecting per capita demand.	7	L1	CO1
	c.	Determine the five demands for a city with a population of 35000 using freeman's formula.	4	L2	CO1
		OR			
Q.2	a.	What is Design Period? What are the factors governing it?	6	L2	CO1
	b.	Enumerate and explain the characteristics of surface and ground water. State their environmental significance.	8	L2	CO1
	c.	Determine the future population of a satellite town by geometric increase method for the year 2030, 2040, 2050 with available census data :	6	L3	CO1
			Year	1990	2000	2010	2020		
			Population	93,000	1,11,000	1,32,000	1,61,000		
		Module – 2			
Q.3	a.	Explain with a neat sketch working and back working of rapid sand filter?	10	L2	CO2
	b.	Compute the dimension of continuous flow rectangular sedimentation tank for a population of 20,000 persons with a daily per capita demand 120 ℓtr. Assume detention period to be 6 hours.	10	L3	CO2
		OR			
Q.4	a.	With the help of neat sketch prepare water treatment plant.	8	L2	CO2
	b.	Differentiate between alum and Iron salts for use as a coagulant.	6	L2	CO2
	c.	Determine the quantity of copperas and the lime required per year to treat 4×10^6 ℓt/day. If 11 mg of copper as consumed with lime at a coagulation basin. Molecular weight Fe 55.85 S = 32, O = 16, H = 1, Ca = 40.	6	L3	CO2
		Module – 3			
Q.5	a.	List out the requirement of good disinfectant.	6	L1	CO3
	b.	Explain the zeolite process for the removal of permanent hardness from water?	8	L2	CO3
	c.	The water works of a town of population 25000 has to meet its water demand at the rate of 135 Lpcd. If the disinfection is to be done by the bleaching powder having 45% available chlorine determine the quantity of the bleaching powder required per year. The required dose of chlorine at the water works is 0.3 ppm for disinfection.	6	L3	CO3

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		OR			
Q.6	**a.**	Explain the types of sewerage system.	**9**	**L2**	**CO4**
	b.	List out the factors influencing the dry weather flow and explain.	**6**	**L2**	**CO4**
	c.	A city with a population of 1,00,000 has an area of 50 Km^2. Rate of water supply is 110 Lpcd of which 80% turns into sewer. The average runoff coefficient is 0.5 and intensity of rainfall is 14.5 mm/hr. Estimate the quantity of combined sewage. Take peak factor as 2.5.	**5**	**L3**	**CO3**
		Module – 4			
Q.7	**a.**	Examine the components and operational principles of an activated sludge process with neat sketch. Write its advantages and disadvantages.	**10**	**L2**	**CO4**
	b.	Design a rectangular sedimentation tank for treating 12 MLD of sewage adopting L : B ratio as 2.5 and overflow rate 40 m^3/m^2/day. Assume detection time as 2 hrs.	**10**	**L3**	**CO4**
		OR			
Q.8	**a.**	With the help of neat sketch prepare waste water treatment plant for a large community.	**8**	**L2**	**CO4**
	b.	Explain the importance of screens and types of screens in sewage treatment.	**6**	**L2**	**CO4**
	c.	Distinguish between grit chambers with plain sedimentation tank.	**6**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	List out the operational problem of standard rate trickling filters and their remedies.	**10**	**L2**	**CO5**
	b.	Explain with neat sketch, construction and working of a rotating Biological contractor.	**10**	**L2**	**CO5**
		OR			
Q.10	**a.**	Explain with a neat sketch, the details of oxidation pond.	**8**	**L2**	**CO5**
	b.	What is sludge digestion? What are the two basic types of sludge digestion units?	**6**	**L2**	**CO5**
	c.	Write a note on Sludge drying beds.	**6**	**L2**	**CO5**

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BCV306D

Third Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Fire Safety in Building

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Explain briefly basic concept of fire protection and characteristic of fire?	10	L2	CO1
	b.	Illustrate planning for fire protection and list out classes of fire?	10	L2	CO1
		OR			
Q.2	a.	Explain fire prevention and fire safety precaution in detail.	10	L2	CO1
	b.	Explain the process of ventilation and fuel controlled fire with the model graph?	10	L2	CO1
		Module – 2			
Q.3	a.	Explain briefly fire safety for urban planning?	10	L2	CO2
	b.	Explain the process of fire escape and fire refuge?	10	L2	CO2
		OR			
Q.4	a.	Explain different type of file detectors any three in detail?	10	L2	CO2
	b.	List out the difference between lift and escalators used for fire safety?	10	L2	CO2
		Module – 3			
Q.5	a.	Explain the process of flow system with neat sketch?	10	L2	CO3
	b.	Explain water supply requirements for firefighting and list out briefly any two fixed water system.	10	L2	CO3
		OR			
Q.6	a.	Explain the design components of water supply distribution system?	10	L2	CO3
	b.	Explain flow in pipe network and classify the types of pipe networks in brief.	10	L2	CO3
		Module – 4			
Q.7	a.	Explain the concept of HVAC along with governing equation.	10	L2	CO4
	b.	Illustrate the characteristic of intelligent building.	10	L2	CO4
		OR			
Q.8	a.	Explain the design of Electrical System for residential building.	10	L2	CO4
	b.	Illustrate the planned and Ad-hoc maintenance of building.	10	L2	CO4
		Module – 5			
Q.9	a.	Explain briefly the process and steps involved in conditioning survey.	10	L2	CO5
	b.	Explain the process of diagnosis of building by visual survey.	10	L2	CO5
		OR			
Q.10	a.	Explain any one Non Destructive test of building inspection in detail with neat sketch.	10	L2	CO5
	b.	Explain the effect of corrosion and Alkali Aggregate Reaction of building materials.	10	L2	CO5

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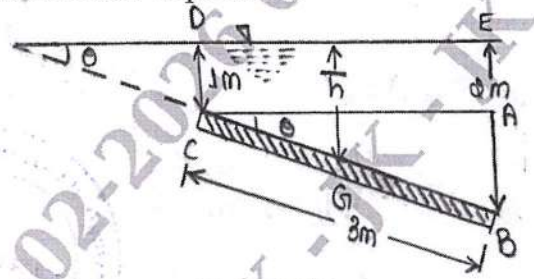
BCV402

Fourth Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Fluid Mechanics and Hydraulics

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	What is Surface Tension? Explain the phenomenon of surface tension with help of sketch.	6	L1	CO1
	b.	State and prove Pascal's law.	7	L1	CO1
	c.	A Utube manometer is used to measure the pressure of oil of specific gravity 0.85 flowing in a pipeline. Its left limb is connected to the pipe and the right limb is open to the atmosphere. The centre of pipe is 100 mm below the level of mercury (sp.gr = 13.6) in the right limb. If the difference of mercury levels in the right limb and the left limb is 160 mm. Determine the pressure of oil in the pipe.	7	L4	CO1
		OR			
Q.2	a.	Derive the expression for total pressure and centre of pressure on a vertical plane surface.	10	L3	CO1
	b.	A circular plate 3 meter diameter is submerged in water as shown in Fig.Q.2(b). Its greatest and least depths are below the surfaces being 2 m and 1 m respectively. Find : i) The total pressure on front face of the plate ii) The position of centre of pressure.  Fig.Q.2(b)	10	L4	CO1
		Module – 2			
Q.3	a.	Distinguish between : i) Steady flow and Unsteady flow ii) Uniform flow and Non uniform flow iii) Laminar flow and Turbulent flow	6	L1	CO2
	b.	Derive the 3 dimensional continuity equation in Cartesian co-ordinates for a steady incompressible flow.	7	L3	CO2

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	c.	A 300 mm × 150 mm venturimeter is provided in a vertical pipeline carrying oil of specific gravity 0.9, flow being upward. The difference in elevation of the throat section and entrance section of the venturimeter is 300 mm. The differential Utube mercury manometer shows a gauge deflection of 250 mm. Calculate: i) The discharge of oil ii) The pressure difference between the entrance section and the throat section Take the co-efficient of meter as 0.98 and specific gravity of mercury as 13.6.	7	L4	CO2
		OR			
Q.4	a.	Derive Bernoulli's equation from Eulers equation of fluid motion.	8	L2	CO2
	b.	The water is flowing through a taper pipe of length 100 m having diameter 600 mm at the upper end and 300 mm at the lower end, at the rate of 50 liters/s. The pipe has a slope of 1 in 30. Find the pressure at the lower end if the pressure at the higher level is 19.62 N/cm^2.	6	L4	CO2
	c.	A stream function is given by $\psi = 5x - 6y$. Calculate the velocity components and also magnitude and direction of resultant velocity at any point.	6	L4	CO2
		Module – 3			
Q.5	a.	Classify orifice (any three). Explain briefly.	6	L1	CO3
	b.	Derive an expression for discharge over a triangular notch.	7	L2	CO3
	c.	A valve is provided at the end of a cast iron pipe of diameter 150 mm and of thickness 10 mm. The water is flowing through the pipe, which is suddenly stopped by closing the valve. Find the maximum velocity of water, when the rise of pressure due to sudden closure of valve is 196.2 N/cm^2. Take K for water as 19.62×10^4 N/cm^2 and E for cast iron pipe as 11.772×10^6 N/cm^2.	7	L4	CO3
		OR			
Q.6	a.	Define the following hydraulic coefficients: i) Coefficient of velocity ii) Coefficient of discharge iii) Coefficient of contraction	6	L1	CO3
	b.	An oil of specific gravity 0.7 is flowing through a pipe of diameter 300 mm at the rate of 500 liters/s. Find the head lost due to friction and power required to maintain the flow for a length of 1000 m. Take $\nu = 0.29$ stokes.	6	L4	CO3
	c.	Three pipes of diameters 300 mm, 200 mm and 400 mm and lengths 450 m, 255 m and 315 m respectively are connected in series. The difference in water surface levels in two tanks is 18 m. Determine the rate of flow of water if co-efficients of friction are 0.0075, 0.0078 and 0.0072 respectively neglecting minor losses.	8	L4	CO3

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		Module – 4			
Q.7	**a.**	What is specific energy curve? With help of a neat sketch, explain the characteristics of specific energy curve.	**8**	**L1**	**CO4**
	b.	A rectangular channel carries water at the rate of 400 lit/s when bed slope is 1 in 2000. Find the most economical dimensions of the channel if C = 50.	**6**	**L3**	**CO4**
	c.	A concrete lined circular channel of diameter 3 m and has a bed slope of 1 in 500. Work out the velocity and flow rate for the maximum velocity conditions. Assume Chezy's constant C = 50.	**6**	**L4**	**CO4**
		OR			
Q.8	**a.**	Derive the conditions for most economical triangular channel section.	**8**	**L1**	**CO4**
	b.	The depth of flow of water, at a certain section of a rectangular channel of 2m wide is 0.3 m. The discharge through the channel is 1.5 m^3/s. Determine whether a hydraulic jump will occur and if so, find its height and loss of energy per kg of water.	**7**	**L4**	**CO4**
	c.	Find the critical depth and critical velocity of the water flowing through a rectangular channel of width 5 m, when discharge is 15 m^3/s.	**5**	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	State impulse momentum equation. Mention its applications.	**6**	**L1**	**CO5**
	b.	Explain the various heads and efficiencies of centrifugal pump.	**7**	**L2**	**CO5**
	c.	Show that the maximum efficiency of jet striking at the centre of series of symmetrical curve vanes is $\eta_{max} = \frac{1}{2}(1+\cos\theta)$	**7**	**L3**	**CO5**
		OR			
Q.10	**a.**	Draw a neat sketch of Francis Turbine and explain its components.	**7**	**L2**	**CO5**
	b.	Write a note on multistage centrifugal pumps for high discharge.	**6**	**L3**	**CO5**
	c.	A Pelton wheel is having a mean bucket diameter of 1 m and is running at 1000 rpm. The net head on the Pelton wheel is 700 m. If the side clearance angle is 15° and discharge through nozzle is 0.1 m^3/s, find : i) Power available at the nozzle ii) Hydraulic efficiency of the turbine.	**7**	**L4**	**CO5**

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BCV405B

Fourth Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Construction Equipment, Plants and Machinery

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Draw and explain four and two stoke engine and their components of construction equipment.	10	L2	CO1
	b.	Draw and explain basic layout of Hydraulic system.	10	L2	CO1
		OR			
Q.2	a.	Draw and explain components to automobilus and explain principles of Hydraulics.	10	L2	CO1
	b.	Explain calculation of pressure force and flow components of a Hydraulic system with neat diagram.	10	L2	CO1
		Module – 2			
Q.3	a.	Explain Backhole loader and its components.	10	L2	CO2
	b.	Explain motor grader and its components.	10	L2	CO2
		OR			
Q.4	a.	Explain Batching plant operation.	10	L2	CO2
	b.	Explain Hot mix plant process of asphalt Paver.	10	L1	CO2
		Module – 3			
Q.5	a.	Explain Life cycle of equipment.	10	L2	CO3
	b.	Explain performance parameters.	10	L2	CO3
		OR			
Q.6	a.	Explain the types of maintenance of construction equipment.	10	L1	CO3
	b.	Explain the maintenance practices of a construction equipment.	10	L2	CO3
		Module – 4			
Q.7	a.	Explain operation of slurry TBM and components.	10	L2	CO4
	b.	Explain operation of Earth pressure balance of TBM.	10	L2	CO4
		OR			
Q.8	a.	Explain Hydraulic Grab and Piling Rig.	10	L2	CO4

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	b.	Draw and explain TBM machines and its operations.	10	L2	CO4
Module – 5					
Q.9	a.	Explain Railway track construction with neat diagram.	10	L2	CO5
	b.	Explain digital solution in construction project.	10	L2	CO5
OR					
Q.10	a.	Explain 3D print concrete and its application.	10	L2	CO5
	b.	Explain safety of Men and Machines at work.	10	L2	CO5

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BCV501

Fifth Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Construction Management and Entrepreneurship

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

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		Module – 1	M	L	C
Q.1	a.	Define Management. Explain characteristics of Management.	10	L2	CO1
	b.	The activity data of a project is given in the table below :	10	L3	CO1

Activity	Predecessor	Duration (in days)
A	–	4
B	–	3
C	A, B	2
D	A, B	5
E	B	6
F	C	4
G	D	3
H	F, G	7
I	F, G	4
J	E, H	3

Draw the network diagram. Identify the critical path and project duration using CPM.

OR

Q.2	a.	List the statutory and regulatory requirements in construction. Explain any 2 [two] of them.	10	L2	CO1
	b.	Differentiate between CPM and PERT and mention its applications.	10	L3	CO1
		Module – 2			
Q.3	a.	List the factors affecting labour productivity. Briefly discuss any three factors.	8	L2	CO2
	b.	Estimate the hourly production in bulk volume (LCM) of a back hoe with bucket capacity of $1.14M^3$ that is employed on excavation of a foundation, which is 3m deep in hard digging soil. The excavated earth is to be loaded in waiting dump trucks, placed at a swing angle of 75°. The expected performance efficiency is 81% with the following data : i) Ideal output of loose soil in M^3 (LCM) = 180 LCM ii) Equipment conversion factor operating at optimum depth = 0.8 iii) Correction factors are : soil factor per hard digging = 0.67 Load factor for loading into vehicle = 0.8 Swing factor = 1.05.	8	L3	CO2
	c.	What is the purpose of having material management system in construction?	4	L2	CO2

		OR			
Q.4	**a.**	Enumerate the factors to be considered for selection of construction equipments.	**7**	**L2**	**CO2**
	b.	Explain different costs involved in owning and operating the equipments.	**8**	**L2**	**CO2**
	c.	The purchase value of a crawler tractor is Rs.30,00,000. Its assessed resale value after using for 5 years is 10% of the delivered price. The equipment is planned to operate 2000 hours per year. Calculate its annual and hourly depreciation.	**5**	**L3**	**CO2**
		Module – 3			
Q.5	**a.**	What is Procurement? Explain the types and stages involved in procurement.	**10**	**L2**	**CO3**
	b.	Explain different steps involved in procurement execution. Also mention the challenges in procurement execution.	**10**	**L2**	**CO3**
		OR			
Q.6	**a.**	List the different types of contracts and explain any three (3) of them.	**10**	**L2**	**CO3**
	b.	Explain the steps involved in Tender Evaluation.	**10**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	Explain different Quality Management Barriers.	**8**	**L2**	**CO4**
	b.	Describe few of the quality management tools.	**8**	**L2**	**CO4**
	c.	Write short notes on occupational health, safety and environment.	**4**	**L1**	**CO4**
		OR			
Q.8	**a.**	Briefly explain the Risk Management Process.	**8**	**L2**	**CO4**
	b.	Briefly explain the elements of Safety Management System.	**6**	**L2**	**CO4**
	c.	Write short notes on : i) Completion certificate ii) Occupancy certificate iii) Facilities management.	**6**	**L1**	**CO4**
		Module – 5			
Q.9	**a.**	List the characteristics of a successful entrepreneur and explain any 4[four] of them.	**10**	**L2**	**CO5**
	b.	Write short notes on : i) 5M model of entrepreneurship ii) Stages in entrepreneurial process.	**10**	**L1**	**CO5**
		OR			
Q.10	**a.**	Discuss in detail about the project report for starting a new venture.	**10**	**L2**	**CO5**
	b.	Write short notes on : i) Foreign Direct Investment ii) Venture capital.	**10**	**L1**	**CO5**

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BCV502

Fifth Semester B.E/B.Tech. Degree Examination, Dec.2025/Jan.2026
Geotechnical Engineering

Time: 3 hrs. Max. Marks: 100

Note: *1. Answer any FIVE full questions, choosing ONE full question from each module.*
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
1	a.	With the help of 3 phase diagram, explain void ratio, porosity and degree of saturation.	6	L2	CO1
	b.	Derive the relationship : $\gamma_d = \frac{\gamma}{1+w}$.	6	L2	CO1
	c.	A mass of soil coated with a thin layer of paraffin weighs 4.76×10^{-3} kN. When immersed in water it displaces 3.2×10^{-4} m^3 of water. The paraffin is peeled off and found to weigh 1.77×10^{-4} KN. The specific gravity of the soil particles is 2.7 and that of paraffin is 0.9. Determine the void ratio of the soil if its water content is 10%.	8	L3	CO1
		OR			
2	a.	With the help of particle size distribution curve define well graded, gap graded and poorly graded soil.	8	L3	CO1
	b.	With neat diagram explain different types of clay minerals.	6	L2	CO1
	c.	A soil sample consisting of particle size ranging from 0.5 mm to 0.01 mm, is put on the surface of still water tank 5mt deep. Calculate the time of settlement of the coarsest and finest particles of the sample, to the bottom of the tank. Assume average sp. Gravity of soil particles as 2.66 and viscosity of water as 0.01.	6	L2	CO1
		Module – 2			
3	a.	With a neat diagram explain the falling head permeability test.	6	L2	CO1
	b.	Explain the factors affecting permeability of soil.	6	L2	CO4
	c.	In a falling head permeability test, the initial head (t = 0) is 40 cm. The head drops by 5 cm in 10 minutes. Calculate the time required to run the test for the final head to be at 20 cm. If the sample is 6 cm in height and 50 cm^2 in cross sectional area, calculate the co-efficient of permeability taking area of sand pipe = 0.5 cm^2.	8	L3	CO4

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OR

4	a.	Explain total stress, neutral stress and effective stress.	6	L2	CO4
	b.	What is flow net? Mention its applications.	6	L2	CO4
	c.	A 10 mm thick bed of sand is underlain by a layer of clay of 6 m thickness. The water table which was originally at the ground surface is lowered by drainage to a depth of 4 m. Where upon the degree of saturation above the lowered water table reduces to 20%. Determine the increase in the magnitude of the vertical effective pressure at the middle of the clay layer due to lowering of water table. The saturated unit weights of sand and clay are respectively 20.6 kN/m^3 and 17.6 kN/m^3 and the dry unit weight of sand in 16.7 kN/m^3.	8	L3	CO4

Module – 3

5	a.	Differentiate between compaction and consolidation of soil.	8	L2	CO2
	b.	Explain Casagrande's graphical method to determine pre consolidation pressure.	6	L2	CO2
	c.	The following are the results of proctor compaction test. Mass of mould + wet soil (g): 2925, 3095, 3150, 3125, 3070 Water content (%): 10.0, 12.0, 14.3, 16.1, 18.2 Volume of mould = 1000 ml Mass of mould = 1000 gm, Sp gravity of solids = 2.70. i) Find the compaction curve showing the optimum moisture content and maximum dry density. ii) Plot the zero air void line iii) Determine the degree of saturation.	6	L2	CO3

OR

6	a.	With neat sketch explain mass spring analogy of consolidation theory.	8	L3	CO2
	b.	Explain preconsolidated, normally consolidated and under consolidated soil.	6	L2	CO2
	c.	The settlement analysis (based on the assumption of the clay layer draining from top and bottom surfaces) for a proposed structure shows 2.5 cm of settlement in 4 years and an ultimate settlement of 10 cm. However, detailed subsurface investigation reveals that there will be no drainage at the bottom. For this situation, determine the ultimate settlement and the time required for 2.5 cm settlement.	6	L2	CO2

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Module – 4

7	a.	Classify the shear tests based on drainage condition.	6	L2	CO3
	b.	Explain the advantages of triaxial shear test over direct shear test.	6	L2	CO3
	c.	A direct shear test was carried out on a cohesive soil sample and the following result were obtained. Normal stress (kN/m^2): 150, 250 Shear stress at failure (kN/m^2): 110, 120 What would be the deviator stress at failure if a triaxial test is carried out on the same soil with cell pressure of 150 kN/m^2?	8	L3	CO3

OR

8	a.	Explain Mohr – Coulomb theory.	6	L2	CO3
	b.	Explain the factors affecting shear strength of soil.	6	L2	CO3
	c.	A consolidated undrained test was conducted on a clay sample and following results were obtained. Cell pressure (kN/m^2): 200, 400, 600 Deviator stress at failure (kN/m^2): 118, 240, 352 Pure water P_r^2 at failure (kN/m^2): 110, 220, 320 Determine the shear strength parameters with respect to i) Total stress ii) Effective stress and plot Mohr circles.	8	L3	CO3

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Module – 5

9	a.	Briefly explain local shear failure, purchasing shear failure and general shear failure.	8	L2	CO4
	b.	Explain effect of water table on bearing capacity.	6	L2	CO4
	c.	A square footing 2.5 m × 2.5 m is built in a homogeneous bed of sand of unit weight 20 KN/m^3 and having an angle of shearing resistance of 36°. The depth of base footing is 1.5m below the ground surface. Calculate the safe load that can be carried by a footing with a factor of safety 3 against shear failure. Take N_c, N_q, N_r values are 65.4, 49.4, 54.	6	L3	CO4

OR

10	a.	Explain primary and secondary settlement.	6	L2	CO4
	b.	Explain assumptions of Terzaghi's bearing capacity theory.	6	L2	CO4
	c.	A saturated soil has a compression index of 0.283., The void ratio at a stress of 12 kN/m^2 in 2.05. Compute : i) Change in void ratio if the stress is increased to 21.6 kN/m^2 ii) The settlement if the soil stratum is 6 m thick.	8	L3	CO4

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BCV503

Fifth Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Concrete Technology

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.
3. IS 456:2000 and IS 10262 : 2019 are allowed.

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		Module – 1	M	L	C
Q.1	a.	With flow diagram, explain the dry manufacturing process of cement.	10	L2	CO1
	b.	What are Bouge's Compounds? Explain their role in setting and hardening process of cement.	10	L2	CO1
		OR			
Q.2	a.	Discuss the manufacturing process and applications of M-sand in the construction industry. Evaluate the advantages and disadvantages compared to Natural Sand.	10	L2	CO1
	b.	What is meant by grading of aggregates? Explain the importance of size, shape and texture with respect to the course aggregate.	10	L2	CO1
		Module – 2			
Q.3	a.	Explain the process of i) Batching ii) Mixing iii) Transportation iv) Placing in the manufacturing of concrete.	10	L2	CO2
	b.	Define the workability of concrete. What are the different test methods to determine the workability of concrete? Explain any two methods.	10	L2	CO2
		OR			
Q.4	a.	What is the necessity of curing the concrete? Explain the following of curing i) Membrane curing ii) Application of Heat	10	L2	CO2
	b.	Explain segregation and bleeding. What are the effects of segregation and bleeding? How segregation and bleeding can be reduced.	10	L2	CO2
		Module – 3			
Q.5	a.	Explain the maturity concept of concrete. What are its practical uses in the concrete industry?	10	L2	CO2
	b.	Define water to cement ratio. Explain how W/C ratio affect the strength of concrete.	5	L2	CO3
	c.	Discuss the concept of Gel/Space ratio. Explain the factors influencing the strength of concrete.	5	L2	CO3

		OR			
Q.6	**a.**	Explain the concept of carbonation in concrete and its potential effects on reinforced concrete structures. Discuss the factors that influence the rate of carbonation and the measures that can be taken to mitigate its harmful effects on concert structures.	**10**	**L2**	**CO3**
	b.	Discuss about the durability of concrete in Sea water.	**10**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	Explain the concept of mix design. Explain the different methods of mix proportioning.	**12**	**L2**	**CO3**
	b.	Explain the significance of concrete mix design in modern concrete industry.	**8**	**L2**	**CO3**
		OR			
Q.8		Discuss a concrete mix by IS method for M_{30} grade concrete as per IS – 10262 – 2019.	**20**	**L2**	**CO3**

a)	Grade	:	M_{30}
b)	Cement	:	OPC 53 Grade
c)	Maximum Nominal size of Aggregate	:	20 mm
d)	Minimum cement content	:	320 Kg/m^3
e)	Maximum W/C Ratio	:	0.45
f)	Workability	:	100mm slump
g)	Exposure condition	:	Severe (Reinforced concrete)
h)	Method of concrete placing	:	Pumping
i)	Degree of supervision	:	Good
j)	Type of Aggregate	:	Crushed Angular
k)	Maximum cement content	:	450 Kg/m^3
L)	Chemical admixture	:	Super plasticizer

Test Data for Materials :

i) Specific gravity of cement = 3.15
ii) Specific gravity of C.A = 2.74
iii) Specific gravity of F.A = 2.72
iv) Water absorption for 1) C.A = 0.5% 2) F.A : 1.5%
v) Free surface moisture 1) C.A = NIL 2) F.A : 2.0%
vi) Grading of fine Aggregate : Zone III

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		Module – 5			
Q.9	**a.**	Define RMC. What are the requirements of RMC? Briefly discuss the advantages and disadvantages of RMC.	**10**	**L3**	**CO4**
	b.	Define Self Compacting Concrete. Explain the properties of self compacting concrete and the need for self compacting concrete in the construction industry.	**10**	**L3**	**CO4**
		OR			
Q.10	**a.**	Explain the types of fibers used in fiber reinforced concrete and its applications.	**10**	**L3**	**CO4**
	b.	Explain the following types of special concrete characteristics and circumstances under which they are preferred. i) Geo Polymer Concrete ii) High Performance Concrete.	**10**	**L3**	**CO4**

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BCV601

Sixth Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Design of RCC Structures

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.
3. Use of IS 456 : 2000 Code is permitted.

		Module – 1	M	L	C
Q.1	a.	Compare working stress and limit state method.	08	L2	CO1
	b.	Explain : i) Partial safety factor for loads ii) Partial safety factor for materials iii) Characteristic loads iv) Characteristic strength.	12	L2	CO1
		OR			
Q.2	a.	Explain the terms: Balanced, Under reinforced and Over – reinforced sections.	06	L2	CO1
	b.	A simply supported beam of rectangular section 200 mm × 450 mm overall is reinforced with 3 no. of 16 mm diameter, having an effective span of 5 m. The beam supports a load of 10 KN/m. Determine the short term deflection using M20 grade concrete and Fe 415 grade steel.	14	L3	CO1
		Module – 2			
Q.3	a.	Derive from fundamentals the expression for the area of stress block 0.36 f_{ck} x_u	08	L4	CO2
	b.	A singly reinforced beam 250 mm × 500 mm in section is reinforced with 4 bars of 16 mm. diameter with an effective cover of 50 mm. The effective span of the beam is 6 m. Assuming M20 grade concrete and Fe – 250 grade steel, determine the central concentrated load "p" that can be carried by the beam in addition to its self weight.	12	L3	CO2
		OR			
Q.4	a.	Determine the MOR of the beam using the following data. i) Size of the beam = 300 mm × 550 mm ii) Effective Cover = 50 mm iii) Tension reinforcement = 2500 mm^2 iv) Compression reinforcement = 500 mm^2 Use M25 Grade concrete and Fe – 500 grade steel.	10	L2	CO2
	b.	A RCC beam 300 mm wide and 500 mm deep is reinforced with 4 bars of 16 mm diameter. It is freely supported on effective span of 6 m. Determine the maximum permissible imposed load. Assuming M20 Grade concrete and Fe – 500 grade steel.	10	L4	CO2
		Module – 3			
Q.5		Design a singly reinforced SSB of clear span 5 m to support a working live load of 15 KN/m run. Use M20 grade concrete and Fe 415 grade steel. Assume the support thickness is 230 mm.	20	L5	CO3

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		OR			
Q.6		A cantilever beam of 4 m span carries a load of 40 KN/m (Factored load). The width of beam is 230 mm. Design the beam for flexure and shear. Sketch the details of reinforcement. Use M20 concrete and Fe 415 grade steel.	**20**	**L5**	**CO3**
		Module – 4			
Q.7		Design a cantilever portion slab projecting 1.5 m from the beam supporting a live load of 3 KN/m^2. Adopt M20 grade concrete and Fe 415 grade steel.	**20**	**L5**	**CO3**
		OR			
Q.8		Design a dog-legged staircase of an office building in a room measuring 2.8 m × 5.8 m clear. The vertical distance between the floors is 3.6 m. The width of the flight is to be 1.25 m. Allow a live load of 3KN/m^2. Sketch the details of reinforcement. Use M20 grade concrete and Fe 415 grade steel. Assume the stairs are supported on 230 mm walls at the end of the outer edges of the landing slabs.	**20**	**L5**	**CO3**
		Module – 5			
Q.9		A column of size 300 mm × 400 mm has an effective length of 3.6 m and is subjected to P_u = 1100 KN and M_u = 150 KN – m about the major axis. Design the column using M25 grade concrete and Fe 415 grade steel. Providing the steel i) on two sides ii) On four sides Assume d' = 60 mm.	**20**	**L5**	**CO3**
		OR			
Q.10		Design a square footing to carry a column load of 1200 KN from a 400 mm square column. The SBC of soil is 120 KN/m^2. Use M20 grade concrete and Fe 415 grade steel.	**20**	**L3**	**CO3**

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BCV602

Sixth Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Irrigation Engineering and Hydraulic Structures

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

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		Module – 1	M	L	C
Q.1	a.	List various types of flow irrigation and explain any one type in detail.	06	L2	CO2
	b.	What is Bandhara Irrigation? What are the advantages and disadvantages.	06	L2	CO2
	c.	Define the term irrigation. List and explain various benefits and ill effects of Irrigation.	08	L2	CO2
		OR			
Q.2	a.	Find the depth of irrigation water required in order to ensure sufficient availability of moisture uniform growth of crop for the following data: permanent wilting coefficient = 20% ; Field capacity of soil = 36% ; Density of soil = 1.75 g / cc ; Effective depth of root zone = 800 mm ; Daily consumption use of water = 40 mm. Also determine frequency of watering. Assume OMC as 75% of available moisture.	08	L3	CO2
	b.	List and explain various factors affecting duty.	06	L2	CO2
	c.	Define Duty, Delta and Base period. Derive an expression to establish relation between Duty, Delta and Base period.	06	L2	CO2
		Module – 2			
Q.3	a.	With help of neat sketch, explain various storage zones of reservoir.	08	L2	CO2
	b.	Briefly explain the investigations to be carried out for reservoir planning.	06	L2	CO2
	c.	With aid of a neat sketch, explain how economical height of a dam is determined.	06	L2	CO2
		OR			
Q.4	a.	Enumerate the points that must be considered in aligning an irrigation canal.	06	L2	CO2
	b.	Write a detailed note on classification of canals.	06	L2	CO2
	c.	Explain stepwise Lacey's procedure for designing unlined canals.	08	L3	CO2
		Module – 3			
Q.5	a.	With help of neat sketch, explain different forces acting on Gravity Dam.	10	L2	CO1
	b.	Derive an expression for the limiting height of a Low Gravity Dam.	10	L3	CO1
		OR			
Q.6	a.	List and explain various advantages and disadvantages of gravity dams.	10	L2	CO1
	b.	Explain various modes of failure of gravity dam and mention their remedies.	10	L3	CO1
		Module – 4			
Q.7	a.	With aid of neat sketches, explain different causes of failure of earth dams.	10	L3	CO1
	b.	List different types of spillways and explain any one type of spillway in detail.	10	L3	CO1

		OR			
Q.8	**a.**	Describe the design principles that are involved in design of ogee spillway.	**10**	**L3**	**CO1**
	b.	With help of neat sketches, explain various types of earth dams.	**10**	**L3**	**CO1**
		Module – 5			
Q.9	**a.**	Write a detailed note on Bligh's creep theory. Also mention the limitations of this theory.	**10**	**L3**	**CO3**
	b.	Draw a neat sketch of layout of a diversion head work and indicate various components of the system. Also mention the function of each component.	**10**	**L3**	**CO3**
		OR			
Q.10	**a.**	Briefly outline Khosla's theory on the design of weirs on permeable foundation. Enumerate the various corrections that are needed in the application of this theory.	**10**	**L3**	**CO3**
	b.	Describe how does Khosla's theory differ from Bligh's theory with regard to design of weir on permeable foundation.	**10**	**L3**	**CO3**

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BCV613C

Sixth Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Applied Geotechnical Engineering

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

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		Module – 1	M	L	C
Q.1	a.	What is subsurface exploration? Explain and stages of subsurface exploration.	10	L2	CO1
	b.	List and explain various objectives of soil exploration.	10	L2	CO1
		OR			
Q.2	a.	Explain stabilization of borehole and sampling techniques.	10	L2	CO1
	b.	Define disturbed and undisturbed simples also list their features.	10	L1	CO1
		Module – 2			
Q.3	a.	With neat sketch, explain the properties of flow nets and its applications.	10	L2	CO2
	b.	A seepage occurring through an earthen dam is represented by a flownet comprising of 10 equipotential drops and 20 flow channels. The coefficient of permeability of soil is 3 mm/min and head loss is 5m. The rate of seepage through the earthen dam interms of cm^2/sec per m length dam.	10	L2	CO2
		OR			
Q.4	a.	List different methods of dewatering. Explain any two methods.	10	L2	CO2
	b.	Estimate the position of ground water table with following data by Hvorslev's Method. Depth upto which water is boiled out 10.5m, water rise is 1^{st} day = 0.63m : 2^{nd} day = 0.57 : 3^{rd} day = 0.51m.	10	L2	CO2
		Module – 3			
Q.5	a.	Explain with neat sketch At - rest, Active and Passive earth pressure.	10	L2	CO3
	b.	Explain Rankine's Theory and derive the expression for active earth pressure for c-ϕ soil.	10	L3	CO3
		OR			
Q.6	a.	Explain factors influencing to lateral earth pressure.	10	L2	CO3
	b.	Compute the active earth pressure of a retaining wall whose height 4.5m with an angle of friction 37° and dry density of 1.56 g/cc. Compute the active earth pressure if the water table is located at a depth of 1.5 m below the ground surface. Assume submerged density of soil as 0.985 g/cc.	10	L3	CO3

Module – 4					
Q.7	**a.**	Explain three basic modes of failure in finite slope.	**10**	**L2**	**CO4**
	b.	Explain Swedish slip circle method for cohesive soil.	**10**	**L2**	**CO4**
OR					
Q.8	**a.**	Explain causes for slope instability and also list the methods of stabilization of slopes.	**10**	**L2**	**CO4**
	b.	Explain Fellineous method for critical slip circle.	**10**	**L2**	**CO4**
Module – 5					
Q.9	**a.**	Derive an expression for Boussinesq's stress distribution equation in ground subjected to point load.	**10**	**L3**	**CO5**
	b.	Explain Newmark chart, contact pressure and pressure bulbs.	**10**	**L2**	**CO5**
OR					
Q.10	**a.**	Explain types of settlements with equations and its importance.	**10**	**L2**	**CO5**
	b.	What is the settlement of a raft (15×20)m resting on sand and carrying a net loading of 120 kN/m^2 at @ a depth of 13m, due to consolidation of an underlaying clay layer 2.0m thick and 15m below the surface? The clay has unit weight of 10 kN/m^3, water content (w) = 35% and liquid limit (w_2) = 50.	**10**	**L3**	**CO5**

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BCV701

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Design of Steel Structures

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.
3. Use of IS-800-2007 code and steel table is permitted.
4. Assume any missing data suitably.

		Module – 1	M	L	C
Q.1	a.	List out the advantages and disadvantages of steel structures.	10	L2	CO1
	b.	Explain the principles of limit state of design in steel structures.	10	L2	CO1
		OR			
Q.2	a.	State upper bound, lower bound and uniqueness theorems.	10	L2	CO1
	b.	A propped cantilever ABCD is loaded as shown in Fig.Q.2(b). Find the collapse load if the beam is of uniform cross section.	10	L2	CO1

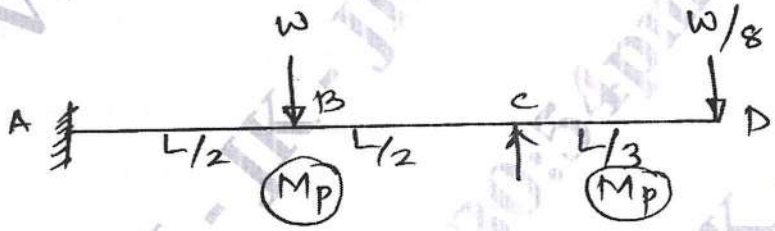

Fig.Q.2(b)

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		Module – 2			
Q.3	a.	Explain the different failure modes of a bolted joint with neat sketches.	8	L2	CO2
	b.	A double cover butt joint is used to connect two flats of 200 ISF10 with 8 mm cover plates. The two plates are connected by 9 bolts in chain bolting at a pitch of 60 mm and edge distance of 40 mm. The bolts are arranged in 3 rows with 3 bolts in each row as shown in Fig.Q.3(b). Determine the strength and efficiency of the joint. The diameter of the bolts used is 20 mm. Assume property class of bolt as 4.6.	12	L3	CO2

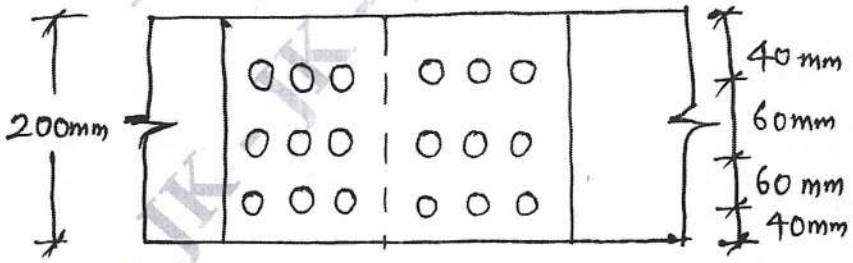
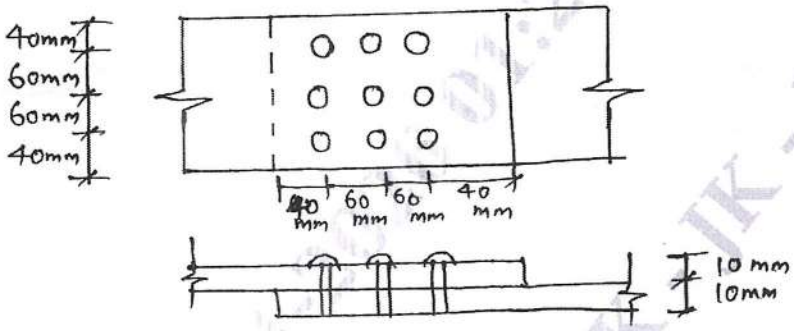
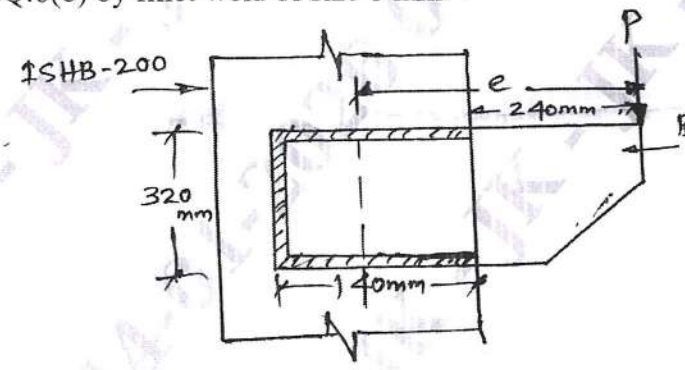


Fig.Q.3(b)

		OR			
Q.4	**a.**	List out the advantages and disadvantages of bolted connections.	**8**	**L2**	**CO2**
	b.	Find the efficiency of a lap joint as shown in Fig.Q.4(b). Assume M_{20} bolts of grade 4.6 and Fe-410 grade of steel plate.  Fig.Q.4(b)	**12**	**L3**	**CO2**
		Module – 3			
Q.5	**a.**	With neat sketches, explain types and properties of welds.	**6**	**L2**	**CO2**
	b.	A tie member of a roof truss consists of 2ISA (100 × 75 × 8) mm angles. The angles are connected to either side of a 10 mm thick gusset plate and the member is subjected to a working load of 300 kN. Design the welded connections and assume the connections are made in the workshop.	**14**	**L3**	**CO2**
		OR			
Q.6	**a.**	What are the advantages and disadvantages of welded connections?	**8**	**L2**	**CO2**
	b.	Determine the maximum load that can be resisted by the bracket as shown in Fig.Q.6(b) by fillet weld of size 6 mm.  Fig.Q.6(b)	**12**	**L3**	**CO2**
		Module – 4			
Q.7	**a.**	Explain the different modes of failure in tension member.	**8**	**L2**	**CO4**
	b.	Design a single angle section for a tension member of a roof truss to carry a factored load of 175 kN. The member is subjected to the possible reversal of stresses due to the action of wind. Use M_{20} black bolts of grade 4.6 for the connection and Fe410 grade steel. Draw the connection details.	**12**	**L4**	**CO4**

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		OR			
Q.8	**a.**	With neat sketches explain the different types of column bases.	**6**	**L2**	**CO4**
	b.	Design a suitable slab base for a column carrying an axial factored load of 1000 kN. The column section is of ISHB-250 @ 537 N/m. Use M_{20} grade concrete pedestal and 6 mm size of the weld. Also design concrete foundation using safe bearing capacity of soil as 200 kN/m^2.	**14**	**L4**	**CO4**
		Module – 5			
Q.9	**a.**	Determine the design axial load capacity of a column ISHB 300 @ 577 N/m, if the length of column is 3 m and its both ends are pinned.	**8**	**L3**	**CO5**
	b.	Design a single angle strut connected to the gusset plate to carry an axial factored load of 180 kN. The length of the strut between centre to centre intersection is 3 m.	**12**	**L4**	**CO5**
		OR			
Q.10		Design a built up column consisting of two channels placed back to back of length 10 m to carry an axial factored load of 1400 kN. The column may be assumed to have restrained in position but not in direction at both the ends.	**20**	**L4**	**CO5**

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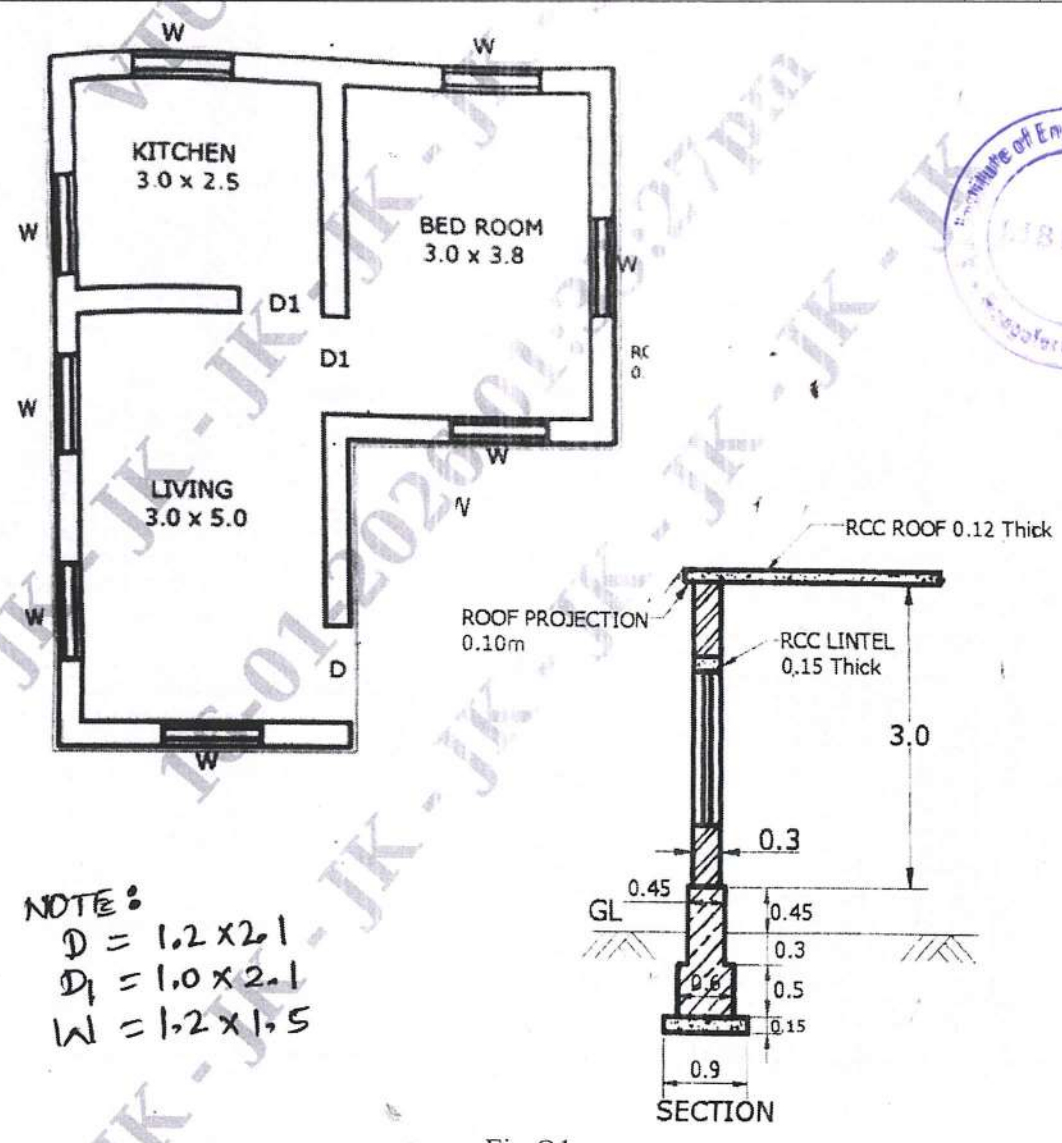
BCV702

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Estimation and Contract Management

Time: 3 hrs. Max. Marks:100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
1		The details of two room building is shown in Fig.Q1. Estimate the quantities and cost of the following items of work : i. Earthwork in excavation at 450 Rs/m^3 ii. UCR Masonry in CM 1 : 6 in foundation and plinth at 5000 Rs/m^3 iii. Brickwork in CM 1 : 5 in superstructure of 30 cm wall at 7000 Rs/m^3.	20	L3	CO1



NOTE:
D = 1.2 x 2.1
D_1 = 1.0 x 2.1
W = 1.2 x 1.5

Fig.Q1

OR

2		What are the different types of Estimate? Explain in detail, any four different types of estimates.	20	L2	CO1

Module – 2

3		The details of Manhole is given in Fig.Q.3. Estimate the quantities of the following items : i. Earthwork Excavation in foundation ii. PCC 1 : 4 : 8 for bed concrete iii. BBM in CM 1 : 4 for side walls iv. RCC 1 : 1½ : 3 for cover slab.	20	L3	CO2

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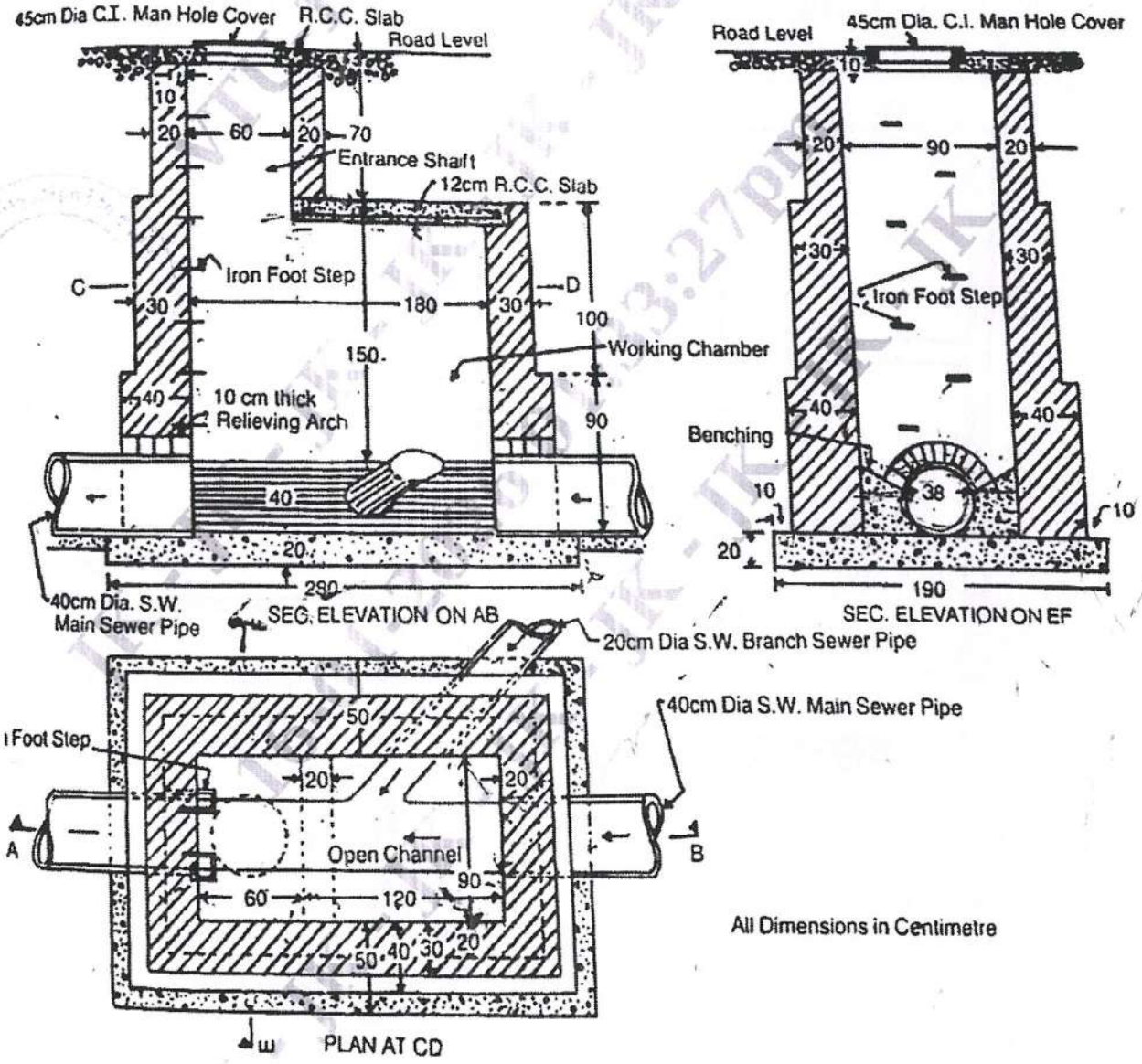

Fig.Q.3

OR

4		Estimate the cost of Earthwork for a portion of road for 400 m length from the following data : Formation width of the road is 10 m, Side slopes are 2 : 1 in banking 1½ : 1 in cutting.	20	L3	CO2

Station	Distance in meter	RL of Ground	RL of formation
25	1000	51.00	52.00
26	1040	50.90	
27	1080	50.50	
28	1120	50.80	
29	1160	50.60	Downward Gradient of 1 in 200
30	1200	50.70	
31	1240	51.20	
32	1280	51.40	
33	1320	51.30	
34	1360	51.00	
35	1400	50.60	

Module – 3

5		Write detailed specification for the following : i. Earthwork excavation for foundation ii. First class Brick work in CM 1 : 6 iii. Plastering work in CM 1 : 6, 12 mm thick iv. RCC 1 : 2 : 4 in roof slab.	20	L2	CO3

OR

6		Carryout the rate analysis for the following : i. CC 1 : 4 : 8 for foundation bed ii. First class brickwork in CM1 : 6 in superstructure iii. 12 mm thick cement plastering in CM 1 : 6 iv. RCC 1 : 2: 4 for roof slab.	20	L2	CO3

Module – 4

7		List the types of contract. Briefly explain any three types of contract.	20	L2	CO4

OR

8		Write short notes on : i. Administrative Approval ii. Tender documents iii. E-Tendering System iv. Turnkey Operation.	20	L2	CO4

Module – 5

9		Write short notes on : i. Liquidated Damages and Bonus ii. Measurement Book iii. Breach of Contract iv. Arbitration.	20	L2	CO5

OR

10	a.	Define the terms : i) Valuation ii) Book value iii) Depreciation iv) Sinking fund.	10	L2	CO5
	b.	The building fetches a gross income of Rs. 1500/- per month. Workout the capitalized value on the basis of 6% net yield, if all out going amount is equal to Rs.3000/- per annum.	10	L2	CO5

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BCV703

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Prestressed Concrete

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.
3. Use of IS:1343 is permitted.

		Module – 1	M	L	C
Q.1	a.	Define prestressed concrete. Mention it's applications.	07	L2	CO1
	b.	State the advantages and disadvantages of prestressed concrete.	08	L2	CO1
	c.	Explain the need for High strength concrete and High strength steel in PSC members.	05	L2	CO1
		OR			
Q.2	a.	Write a short note on the historical development of PSC.	08	L2	CO1
	b.	Write a short note on the different types of prestressing steel.	06	L2	CO1
	c.	Discuss the role of design codes in psc structures.	06	L2	CO1
		Module – 2			
Q.3	a.	List different types of losses in post tensioning system. Explain any two.	06	L2	CO2
	b.	A pre tensioned beam, 200 mm wide and 300 mm deep is prestressed by 10 wires of 7 mm diameter initially stressed to 1200 N/mm^2, with their centroids located 10 mm from the soffit. Find the maximum stress in concrete immediately after transfer, allowing only for elastic shortening of concrete. If concrete under grows a further shortening due to creep and shrinkage while there is a relaxation of 5% of steel stress, estimate final percentage loss of stresses using IS 1343 code and following data: $E_s = 210$ KN/mm^2, $E_c = 5000\sqrt{fck}$ fck = 42 N/mm^2, creep co-efficient (ϕ) = 1.6 Total residual shrinkage strain = 3×10^{-4}	14	L4	CO2
		OR			
Q.4	a.	Explain post tensioning anchorages devices and explain any one in details.	06	L2	CO2
	b.	Explain with sketch Hoyer's method of pretension system.	10	L2	CO2
	c.	Differentiate between mechanical, chemical and electrical prestressing methods.	04	L2	CO2
		Module – 3			
Q.5	a.	Discuss briefly load balancing concept in PSC design.	08	L2	CO3
	b.	A concrete beam of symmetrical "I" section spanning 8 m, the width and thickness of flanges are 220 mm and 60 mm respectively, the overall depth of beam is 410 mm, thickness of web is 80 mm, the beam is prestressed by a straight cable with an eccentricity of 150 mm with effective force of 150 KN, the live load on the beam is 2.5 KN/m. Draw the stress distribution diagram at central section for the loaded beam.	12	L4	CO3
		OR			
Q.6	a.	Explain stress distribution in End Block.	04	L2	CO3
	b.	Explain IS 1343 method for calculation of Bursting force.	04	L2	CO3
	c.	The end block of a post tensioned pre – stressed concrete beam 300 mm × 300 mm is subjected to a prestressing force 832.8 KN. Anchorage area 11720 mm^2. Design suitable anchorage reinforcement.	12	L4	CO3

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		Module – 4			
Q.7	**a.**	Explain the types of prestressed concrete pipes.	**10**	**L2**	**CO4**
	b.	How is prestressing used in flat slab structures.	**10**	**L2**	**CO4**
		OR			
Q.8	**a.**	Describe the design considerations for one way slabs and two way slabs.	**10**	**L2**	**CO4**
	b.	Define partial prestressing and explain it's influence on serviceability and economy.	**10**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	Explain concept of composite construction in PSC Bridges.	**10**	**L2**	**CO4**
	b.	Explain the principle of balanced cantilever construction.	**10**	**L2**	**CO4**
		OR			
Q.10	**a.**	Explain the design procedure of a prestressed concrete I – girder bridge with cast in situ slab.	**10**	**L2**	**CO4**
	b.	Write short notes on Viaducts and Balanced cantilever bridges.	**10**	**L2**	**CO4**

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BCV714A

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Intelligent Transportation System

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Define ITS and explain various applications of ITS in transportation.	10	L1	CO1
	b.	Describe rule and responsibilities of advanced traveller information system.	10	L2	CO1
		OR			
Q.2	a.	Explain the advantages of adopting ITS over the conventional transportation system.	10	L1	CO1
	b.	Explain Fleet Oriented ITS Service.	10	L2	CO1
		Module – 2			
Q.3	a.	Explain ITS architecture with the flow chart.	10	L1	CO2
	b.	List and explain the various hardware sensors used in ITS service.	10	L2	CO2
		OR			
Q.4	a.	Discuss dynamic message sign in the context of traffic management.	10	L1	CO2
	b.	Write a note on : i) GPRS ii) GPS.	10	L2	CO2
		Module – 3			
Q.5	a.	List and explain advantages and Automatic Numbers Plate Recognition [ANPR].	10	L2	CO2
	b.	Explain importance of control center in integrated traffic management system.	10	L3	CO2
		OR			
Q.6	a.	Describe the different types of information provided by ATIS to road users.	10	L2	CO2
	b.	"The accuracy of DTA outputs depends on the integration of its core components". Discuss this statement with suitable examples.	10	L3	CO2
		Module – 4			
Q.7	a.	Explain the difference between Pre Trip and En-route travel information with suitable example.	10	L2	CO3
	b.	Describe the basic components of ATIS and how they help travelers make informed decisions.	10	L3	CO3
		OR			
Q.8	a.	How does a smart route system function in providing real time guidance to road users?	10	L2	CO3
	b.	Describe the process of data collection processing and dissemination in travel information systems.	10	L3	CO3
		Module – 5			
Q.9	a.	What are Automated Highway System (AHS) and how do they function.	10	L2	CO3
	b.	What are the major challenges and opportunities for ITS implementation in developing countries?	10	L3	CO3
		OR			
Q.10	a.	What is vehicle, Platooning in AHS and what are its advantages.	10	L2	CO3
	b.	Provide an overview of ITS implementations in developed counties.	10	L3	CO3

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BCV755B

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Conservation of Natural Resources

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Discuss the ecological and economical importance of land as a natural resource.	10	L2	CO1
	b.	What are the objectives of conservation of land forms? Explain the strategies to conserve land forms.	10	L2	CO1
		OR			
Q.2	a.	Explain the indicators of soil health and discuss the strategies to improve soil health.	10	L2	CO1
	b.	Brief the causes and impact of deforestation on land resource.	10	L2	CO1
		Module – 2			
Q.3	a.	Discuss briefly on global water resource.	10	L2	CO2
	b.	Explain briefly inter basin water transfer and its importance in India.	10	L2	CO2
		OR			
Q.4	a.	Discuss about water deficit and water surplus basins of India.	10	L2	CO2
	b.	Write a note on sea water Ingress and list the methods used to reduce sea water ingress.	10	L2	CO2
		Module – 3			
Q.5	a.	Explain the sources and classification of air pollution.	10	L2	CO3
	b.	Explain the effect of air pollution on human health.	10	L2	CO3
		OR			
Q.6	a.	What is Ozone Depletion? Write its impact on human and nature.	10	L2	CO4
	b.	Explain briefly about National Ambient Air Quality Standards.	10	L2	CO4
		Module – 4			
Q.7	a.	Define Biodiversity. Explain the importance of biodiversity.	10	L2	CO3
	b.	What is habitat loss? Discuss the methods of conservation of biodiversity.	10	L2	CO3
		OR			
Q.8	a.	Discuss the various natural and anthropogenic agents which cause disturbance on climate.	10	L2	CO4
	b.	Write short notes on : i. Gene banks ii. Pollen culture iii. Social forestry iv. Zoological gardens.	10	L2	CO4
		Module – 5			
Q.9	a.	Define Global Warming. Explain the causes and effects of global warming.	10	L2	CO5
	b.	List and explain the projects which need environment clearance under EIA notifications.	10	L2	CO5
		OR			
Q.10	a.	Explain the importance of EIA in implementing projects like thermal power plant.	10	L2	CO5
	b.	What are the global efforts in conservation of biodiversity?	10	L2	CO5

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