AJ Institute of Engineering and Technology Mangaluru.

VTU Question Papers

BE- I & II

Physics & Chemistry Cycle

2025 SCHEME

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INDEX

CBCS SCHEME

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1BMATS101

First Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Calculus and Linear Algebra : CSE Stream

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. VTU Handbook is permitted.

		Module – 1	M	L	C
Q.1	a.	Find the total derivative when $u = x^3y^2 + x^2y^3$ where $x = at^2, y = 2at$	6	L2	CO1
	b.	If $u = \log(tanx + tany + tanz)$ then, show that $sin2x\frac{\partial u}{\partial x} + sin2y\frac{\partial u}{\partial y} + sin2z\frac{\partial u}{\partial z} = 2$	7	L2	CO1
	c.	Expand $e^x\ siny$ in the powers of x and y as far as terms of third term using Maclaurin's series.	7	L3	CO1
		OR			
Q.2	a.	If $u = x + y + z,\ v = x^2 + y^2 + z^2, w = xy + yz + zx$. Evaluate the Jacobian of (u, v, w) with respect to (x, y, z).	6	L2	CO1
	b.	If $u = f(\frac{x}{y}, \frac{y}{z}, \frac{z}{x})$ then prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} + z\frac{\partial u}{\partial z} = 0$	7	L2	CO1
	c.	Examine the function for the extreme values, given $f(x,y) = x^3 + 3xy^2 - 15x^2 - 15y^2 + 72x$	7	L3	CO1
		Module – 2			
Q.3	a.	Find the directional derivative of $\emptyset = x^2yz + 4xz^2$ at the point (1,-2,-1) in the direction $2\hat{\imath} - \hat{\jmath} - 2\hat{k}$.	6	L2	CO1
	b.	Show that $\vec{F} = (y+z)\hat{\imath} + (z+x)\hat{\jmath} + (x+y)\hat{k}$ is irrotational and find the scalar potential.	7	L2	CO1
	c.	With usual notation, Prove that cylindrical polar coordinate system is orthogonal.	7	L3	CO1
		OR			
Q.4	a.	Given $\vec{F} = \nabla(xy^3z^2)$, Find div$(\vec{F})$ and curl$(\vec{F})$ at (1,-1,1).	6	L2	CO1
	b.	Show that $\vec{F} = \frac{x\hat{\imath}+y\hat{\jmath}}{x^2+y^2}$ is both solenoidal and irrotaional.	7	L2	CO1
	c.	Express $2y\hat{\imath} - z\hat{\jmath} + 3x\hat{k}$ in terms of spherical polar coordinates.	7	L3	CO1

		Module – 3			
Q.5	**a.**	Find the rank of the matrix A= $\begin{bmatrix} 2 & 1 & -1 & 3 \\ 1 & 2 & 4 & 3 \\ 3 & 6 & 12 & 9 \\ 3 & 3 & 3 & 6 \end{bmatrix}$	**6**	**L2**	**CO2**
	b.	Using Gauss Jordan method, solve the system of equations $x + y + z = 9. x - 2y + 3z = 8, \quad 2x + y - z = 3.$	**7**	**L2**	**CO2**
	c.	Diagonalize the matrix $\begin{bmatrix} -1 & 3 \\ -2 & 4 \end{bmatrix}$.	**7**	**L3**	**CO2**
		OR			
Q.6	**a.**	Investigate the value of μ and λsuch that the equations, $x + y + z = 6, x + 2y + 3z = 10, x + 2y + \lambda z = \mu$. may have (i) unique solution (ii) infinite solution (iii) no solution	**6**	**L2**	**CO2**
	b.	Using Gauss Elimination method, solve the system of equations $x + 2y + z = 3 , 2x + 3y + 3z = 10, \quad 3x - y + 2z = 13$	**7**	**L2**	**CO2**
	c.	Find the eigen value and eigen vectors of the matrix A = $\begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$	**7**	**L3**	**CO2**
		Module – 4			
Q.7	**a.**	Determine whether the vectors (8,0,5) is a linear combination of the vectors (1,2,3), (0,1,4), (2, −1,1)	**6**	**L2**	**CO3**
	b.	Find the basis and dimension of the subspace spanned by the vectors (2,4,2), (1, −1,0), (1,2,1), (0,3,1) in $V_3(R)$.	**7**	**L2**	**CO3**
	c.	Find the basis and dimension of the row space, column space and null space of the matrix $\begin{bmatrix} 1 & -1 & 1 & 3 & 2 \\ 2 & -1 & 1 & 5 & 1 \\ 0 & 1 & -1 & -1 & -3 \end{bmatrix}$.	**7**	**L3**	**CO3**
		OR			
Q.8	**a.**	Find the coordinates of the vector v = (0,1,3) with respect to the basis B = {(1,1,0), (0,1,1), (1,0,1)}.	**6**	**L2**	**CO3**
	b.	Define inner product space. Given $u = (1,2,4), v = (2, -3,5), w =$ (4,2, −3)in R^3. Find (i) $\langle u, v \rangle$ (ii) $\langle v, w \rangle$ (iii) $\langle u, w \rangle$ (iv) $\|u\|$ (v)$\|v\|$	**7**	**L2**	**CO3**
	c.	What is a subspace? Prove that the subset W = {(x, y, z)/x − 3y + 4z = 0} of the vector space R^3 is a subspace.	**7**	**L3**	**CO3**
		Module – 5			
Q.9	**a.**	Show that the transformation $T: R^2 \rightarrow R^3$ defined by $T(x, y) = (x + y, \ x - y, \ y)$is a linear transformation.	**6**	**L2**	**CO3**

	b.	Prove that the transformation T: $R^2 \rightarrow R^2$ is singular and find its kernel, if the transformation is given by $T(x, y) = (2x + 4y, x + 2y)$.	**7**	**L2**	**CO3**
	c.	Verify Rank- Nullity theorem for the transformation $T: R^3 \rightarrow R^3$ defined by $T(x, y, z) = (x + 2y, y - z, x + 2z)$	**7**	**L3**	**CO3**
		OR			
Q.10	**a.**	Find the matrix representing the linear transformation $T: R^3 \rightarrow R^4$ defined by $T(x, y, z) = (x + y + z,\ 2x + z,\ 2y - z,\ 6y)$	**6**	**L2**	**CO3**
	b.	If $T: R^3 \rightarrow R^3$ is a linear transformation defined by $T(x, y) = (x + z, x - z, y)$Show that T in invertible and find T^{-1}	**7**	**L2**	**CO3**
	c.	Verify Rank- Nullity theorem for the transformation $T: R^3 \rightarrow R^2$ defined by $T(x, y, z) = (x + y, z)$	**7**	**L3**	**CO3**

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1BMATE101

First Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Differential Calculus and Linear Algebra : EEE Stream

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. VTU Handbook is permitted.

		Module – 1	M	L	C
Q.1	a.	With usual notations, prove that $tan\emptyset = r\frac{d\theta}{dr}$.	6	L2	CO1
	b.	Find angle between the following curves $r = a\log\theta$ & $r = \frac{a}{\log\theta}$.	7	L2	CO1
	c.	Show that the radius of curvature of the curve $r^n = a^n cosn\theta$ varies inversely as r^{n-1}.	7	L2	CO1
		OR			
Q.2	a.	Find the radius of curvature of the curve $x^3 + y^3 = 3axy$ at the point (3a/2,3a/2).	6	L2	CO1
	b.	Show that the following pair of curves cut orthogonally: $r = a(1+\sin\theta)$ & $r = a(1-\sin\theta)$	7	L2	CO1
	c.	Find the pedal equation $r^2 = a^2 sec2\theta$.	7	L2	CO1
		Module – 2			
Q.3	a.	Expand log(sec x) in powers of x up to the term containing x^4.	6	L2	CO1
	b.	Evaluate *i)* $\lim_{x\to 0}\left(\frac{a^x+b^x+c^x}{3}\right)^{1/x}$ *ii)* $\lim_{x\to\pi/2}(secx)^{cotx}$.	7	L2	CO1
	c.	Discuss the maxima and minima of the function $f(x,y) = x^3 + y^3 - 3x - 27y + 24$.	7	L3	CO1
		OR			
Q.4	a.	If $u = f\left(\frac{x}{y},\frac{y}{z},\frac{z}{x}\right)$, prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} + z\frac{\partial u}{\partial z} = 0$.	6	L2	CO1
	b.	If $u = x^2 + y^2 + z^2, v = xy + yz + zx, w = x + y + z$ evaluate Jacobian of u. v, w with respect to x, y, z.	7	L3	CO1
	c.	If $u = x^2 + y^2 + z^2$, $x = e^{2t}$, $y = cos3t$, $z = sin3t$. Find $\frac{du}{dt}$.	7	L2	CO1
		Module – 3			
Q.5	a.	Solve $(y\,cosx + siny + y)dx + (sinx + xcosy + x)dy = 0$.	6	L2	CO1
	b.	Find a solution for the non-linear differential equation $xyp^2 - (x^2 + y^2)p + xy = 0$.	7	L2	CO1
	c.	Solve $(px - y)(py + x) = 2p$ by reducing into Clairaut's form, taking the substitutions $x^2 = X$, $y^2 = Y$.	7	L2	CO1
		OR			
Q.6	a.	Solve $\frac{dy}{dx} + y\,tanx = y^3 secx$.	6	L2	CO1

	b.	Solve $(xy + y^2 + y)dx + (x^2 + 3xy + 2x)dy = 0.$	7	L2	CO1
	c.	Find the orthogonal trajectories of curve $r^n = a^n \sin n\theta$.	7	L3	CO1
		Module – 4			
Q.7	a.	Solve $\frac{d^3y}{dx^3} - \frac{d^2y}{dx^2} + 4\frac{dy}{dx} - 4y = 0.$	6	L2	CO1
	b.	Solve $x^2\frac{d^2y}{dx^2} - 2y = x^2 + \frac{1}{x}.$	7	L2	CO1
	c.	Solve by the method of variation of parameters $\frac{d^2y}{dx^2} + y = tanx.$	7	L2	CO1
		OR			
Q.8	a.	Solve $\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + 2y = 12x^2.$	6	L2	CO1
	b.	Solve $y'' - 6y' + 9y = 5e^{3x} - sin2x.$	7	L2	CO1
	c.	Solve $(3x + 2)^2y'' + 3(3x + 2)y' - 36y = 8x.$	7	L2	CO1
		Module – 5			
Q.9	a.	Determine the rank of the matrix $\begin{bmatrix} 1 & 2 & 3 & 2 \\ 2 & 3 & 5 & 1 \\ 1 & 3 & 4 & 5 \end{bmatrix}$	6	L2	CO2
	b.	Solve the following system of equations by Gauss seidal $10x + y + z = 12$, $x + 10y + z = 12$, $x + y + 10z = 12$, Carry out three iteration.	7	L2	CO2
	c.	Find the dominant eigen value and the corresponding eigen vector of the matrix $A = \begin{bmatrix} 2 & 0 & 1 \\ 0 & 2 & 0 \\ 1 & 0 & 2 \end{bmatrix}$ by power method. With initial Eigen vector $[1\ 0\ 0]'$. Carry out four iterations.	7	L3	CO2
		OR			
Q.10	a.	Solve by Gauss elimination method $x + y + z = 9$, $x - 2y + 3z = 8$, $2x + y - z = 3.$	6	L2	CO2
	b.	Investigate the values of λ and μ, such that the system of equations $x + y + z = 6$, $x + 2y + 3z = 10$, $x + 2y + \lambda z = \mu$ have i) Unique solution ii) No solution iii) Infinitely many solution.	7	L3	CO2
	c.	Find the Eigen values and Eigen vectors of the matrix $\begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$.	7	L2	CO2

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1BMATC101

First Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Differential Calculus and Linear Algebra : CV Stream

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. VTU Handbook is permitted.

		Module – 1	M	L	C
Q.1	a.	With usual notations, prove that $Tan\varphi = r\frac{d\theta}{dr}$.	6	L2	CO1
	b.	Find the angle of intersection of the curves $r^2\sin2\theta = 4$ and $r^2 = 16\sin2\theta$	7	L2	CO1
	c.	Show that for the curve $r(1-\cos\theta) = 2a$, ρ^2 varies as r^3.	7	L2	CO1
		OR			
Q.2	a.	With usual notations, prove that $\frac{1}{p^2} = \frac{1}{r^2} + \frac{1}{r^4}\left(\frac{dr}{d\theta}\right)^2$.	6	L2	CO1
	b.	Find the pedal equation of the polar curve $r^m = a^m(cosm\theta + sinm\theta)$	7	L2	CO1
	c.	Show that the radius of curvature at (a,0) on the curve $y^2 = \frac{4a^2(2a-x)}{x}$ is 'a'.	7	L2	CO1
		Module – 2			
Q.3	a.	Expand $\log(\sec x + \tan x)$ in powers of x as far as the term in x^5.	6	L2	CO1
	b.	If $u = f\{\frac{x}{y}, \frac{y}{z}, \frac{z}{x}\}$ then show that $\sum x\frac{\partial u}{\partial x} = 0$	7	L2	CO1
	c.	If $u = \frac{yz}{x}$, $v = \frac{xz}{y}$, $w = \frac{xy}{z}$, show that $J\frac{(u,v,w)}{(x,y,z)} = 4$.	7	L2	CO1
		OR			
Q.4	a.	Evaluate i) $\lim_{x\to0}[\frac{a^x+b^x+c^x}{3}]^{\frac{1}{x}}$ ii) $\lim_{x\to0}[\frac{\sin x}{x}]^{\frac{1}{x^2}}$	6	L2	CO1
	b.	If $u = f(y-z, z-x, x-y)$ then show that $\sum\frac{\partial u}{\partial x} = 0$	7	L2	CO1
	c.	Find the extreme valueof the function $f = x^4 + y^4 - 2(x-y)^2$	7	L2	CO1
		Module – 3			
Q.5	a.	Solve $\frac{dy}{dx} + \frac{ycosx+\sin y+y}{sinx+xcosy+x} = 0$	6	L2	CO1
	b.	$[4xy + 3y^2 - x)]dx + x(x+2y)dy = 0$	7	L2	CO1
	c.	Abacterial culture growing exponentially increases from 100 to 400 grams in 10 hours. How much was present after 1hour	7	L3	CO1

		OR			
Q.6	**a.**	Solve $xy(1+xy^2)\frac{dy}{dx} = 1$	**6**	**L2**	**CO1**
	b.	Find the Orthogonal trajectories of the family of curve $r = a(1+sin\theta)$	**7**	**L2**	**CO1**
	c.	In a certain chemical reaction the rate of conversion of a substance at time 't' is proportional to the quantity of the substance still untransformed at that instant. At end of 1hour 60grams remains and at the end of 4hours 21grams.how many grams of the first substance was there initially	**7**	**L3**	**CO1**
		Module – 4			
Q.7	**a.**	Solve $\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 25y = e^{2x} + sinx + x$	**6**	**L2**	**CO1**
	b.	Solve by variation of parameter method $\frac{d^2y}{dx^2} + 4y = tan2x$	**7**	**L2**	**CO1**
	c.	Solve $(x+1)^2\frac{d^2y}{dx^2} + (x+1)\frac{dy}{dx} + y = 2sin\{\log(1+x)\}$	**7**	**L2**	**CO1**
		OR			
Q.8	**a.**	Solve $\frac{d^3y}{dx^3} - 2\frac{d^2y}{dx^2} + 4\frac{dy}{dx} - 8y = 0$	**6**	**L2**	**CO1**
	b.	Solve $x^2\frac{d^2y}{dx^2} - 4x\frac{dy}{dx} + 6y = x$	**7**	**L2**	**CO1**
	c.	Solve by variation of parameter method $\frac{d^2y}{dx^2} + y = secx$	**7**	**L2**	**CO1**
		Module – 5			
Q.9	**a.**	Find the rank of the matrix $\begin{bmatrix} 4 & 0 & 2 & 1 \\ 2 & 1 & 3 & 4 \\ 2 & 3 & 4 & 7 \\ 2 & 3 & 1 & 4 \end{bmatrix}$.	**6**	**L2**	**CO2**
	b.	Solve the following system of equation by Gauss elimination method $x - 2y + 3z = 2,\ 3x - y + 4z = 4,\ 2x + y - 2z = 10.$	**7**	**L3**	**CO2**
	c.	Find the Eigen values and Eigen vectors of the following matrix by using Rayleigh's power method. A=$\begin{bmatrix} 4 & 1 & -1 \\ 2 & 3 & -1 \\ -2 & 1 & 5 \end{bmatrix}$	**7**	**L2**	**CO2**
		OR			
Q.10	**a.**	Investigate the values of λ and μ such that $2x + y + 4z = 12,\ x + 2y + 3z = 10,\ x + 2y + \lambda z = \mu.$ (i) Unique Solution (ii) Infinite Solution (iii) No Solution	**6**	**L3**	**CO2**
	b.	Solve by Gauss-seidel iteration method: $83x + 11y - 4z = 9,\ 3x + 8y + 29z = 71,\ 7x + 52y + 13z = 104$	**7**	**L3**	**CO2**
	c.	Find the eigen values and eigen vectors of the matrix A=$\begin{bmatrix} -19 & 7 \\ -42 & 16 \end{bmatrix}$	**7**	**L2**	**CO2**

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1BCHEE102

First Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Applied Chemistry for Emerging Electronics and Futuristic Devices (EEE, ECE)

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. VTU formula handbook is permitted.

		Module – 1	M	L	C
Q.1	a.	Distinguish between organic and inorganic semiconductors.	6	L3	CO1
	b.	Discuss construction and working principle of Poly (3-hexylthiophene) (P3HT) as a donor and Phenyl-C61-butyric acid methyl ester (PCBM) as an acceptor.	7	L2	CO1
	c.	Explain working principle and applications of Micro-electromechanical systems (MEMS)-based energy harvesters.	7	L2	CO1
		OR			
Q.2	a.	What is battery? Explain the battery characteristics: capacity, power density, shelf life & cycle life.	6	L2	CO1
	b.	Explain construction and working of ultra-small asymmetric super capacitor and its applications in IoT/wearable devices.	7	L2	CO1
	c.	Discuss construction, working principle and advantages of solar photovoltaic cell (PV cell).	7	L2	CO1
		Module – 2			
Q.3	a.	Explain the size dependent properties: catalytic, optical properties and electrical conductivity.	6	L2	CO2
	b.	Explain synthesis of silicon based Quantum Dots by sol gel method and Cd-Se Quantum Dots by hot injection method.	7	L2	CO2
	c.	Discuss synthesis and properties of chitosan-carbon quantum dots hydrogel and its applications in next-generation flexible and wearable electronics.	7	L2	CO2
		OR			
Q.4	a.	What are Quantum dots (QDs)? Explain optical and electronic properties of quantum dots (QDs).	6	L2	CO2
	b.	Explain synthesis of TiO_2 nano particles by sol-gel method and its uses in sensor applications.	7	L2	CO2
	c.	Discuss synthesis and properties of Graphene Quantum Dots using citric acid method and its applications in emerging electronics.	7	L2	CO2

		Module – 3			
Q.5	**a.**	Explain synthesis and conduction mechanism of polyaniline.	**6**	**L2**	**CO3**
	b.	A sample of polymer contains 20 molecules of molecular mass 3000, 30 molecules of molecular mass 5000 and the remaining molecules of molecular mass 7000.Calculate number average, weight average molecular mass and poly dispersity index.	**7**	**L3**	**CO3**
	c.	Discuss working principle of lithography for micro-patterned copper deposition.	**7**	**L2**	**CO3**
		OR			
Q.6	**a.**	What are polymer composite? Explain synthesis and properties of epoxy resin magnetite (Fe_3O_4) composite from ultra-sonication method.	**6**	**L2**	**CO3**
	b.	Discuss the synthesis and properties of Kevlar Fiber Reinforced Polymer (KFRP) for smart electronic devices applications.	**7**	**L2**	**CO3**
	c.	Explain the synthesis, properties of PDMS (Polydimethylsiloxane) and its uses in e-skin (electronic skin).	**7**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	Discuss types of electrodes with examples.	**6**	**L2**	**CO4**
	b.	Discuss instrumentation and application of potentiometric sensor for the estimation of iron in steel.	**7**	**L2**	**CO4**
	c.	What is concentration cell? A zinc concentration cell is obtained by combining two zinc electrodes of concentrations 0.2M and 0.4 M immersed in zinc sulphate solution at 298K. Write the cell reactions and calculate EMF of the cell.	**7**	**L3**	**CO4**
		OR			
Q.8	**a.**	Discuss construction and working of glass electrode.	**6**	**L2**	**CO4**
	b.	Describe instrumentation and application of colorimetric sensor in the estimation of copper in PCBs with diagram.	**7**	**L2**	**CO4**
	c.	Explain the principle and instrumentation of conductometric sensor and its application in the estimation of acid mixture.	**7**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	What is e-waste? explain the need for e-waste management.	**6**	**L2**	**CO4**
	b.	Apply the principles of electroplating to explain the process of chromium plating used for hard and decorative coatings.	**7**	**L2**	**CO4**
	c.	What is CPR? A thick steel sheet of area 80 $inch^2$ is exposed to moist air. After 6 months it was found to experience a weight loss of 340 g due to corrosion, if the density of the steel is 7.9 g/cm^3. Calculate the corrosion penetration rate in mpy and mmpy (Given K = 534 in mpy and 87.6 mmpy).	**7**	**L3**	**CO4**

		OR			
Q.10	a.	What is metal finishing? Explain technological importance of metal finishing.	6	L2	CO4
	b.	Discuss electrochemical theory of corrosion taking iron as an example.	7	L2	CO4
	c.	Apply the concept of galvanization to prevent corrosion in steel structures exposed to marine environments. Justify your choice with appropriate chemical reasoning.	7	L3	CO4

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1BCHES102

First Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Applied Chemistry for Smart Systems

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. VTU formula Handbook is permitted.
4. Missing data, if any, may be suitably assumed.

		Module – 1	M	L	C
Q.1	a.	Explain p type and n type semiconductors with an example.	6	L2	CO1
	b.	Explain the synthesis of TiO_2-RAM nano material by the sol–gel method and mention its properties and applications.	7	L2	CO1
	c.	Describe the construction, working principle and applications of Active-Matrix Organic Light Emitting Diodes (AMOLEDs).	7	L2	CO1
		OR			
Q.2	a.	Explain the construction, working and advantages of pentacene semiconductor chip.	6	L2	CO1
	b.	What are liquid crystals (LCs)? Explain their classifications.	7	L2	CO1
	c.	Explain the construction and working principle of Organic Light Emitting Diodes (OLEDs) and mention its applications in electronic displays.	7	L2	CO1
		Module – 2			
Q.3	a.	Explain the construction, working and the applications of Quantum dot sensitized solar cells (QDSSCs).	6	L2	CO2
	b.	What is a Polymer? Explain the synthesis, properties of Nylon 6,6 and mention its applications.	7	L2	CO2
	c.	A polymer sample containing 50, 100 and 150 molecules having molar mass 1000, 2000 and 3000 respectively. Calculate the number and weight average molecular weights of polymer.	7	L3	CO2
		OR			
Q.4	a.	Describe the following structure property relationship of the polymer. a) Crystallinity b) Strength c) Chemical resistivity.	6	L2	CO2
	b.	Explain the wet chemical synthesis of Cd–Se quantum dots and mention its application.	7	L2	CO2
	c.	Polymers are generally known for their insulating nature. Applying the knowledge of conduction mechanism, highlight and explain the conduction mechanism in Polyaniline polymer. Mention its engineering applications.	7	L3	CO2

		Module – 3			
Q.5	**a.**	Describe the construction and working of Lithium-ion Battery.	**6**	**L2**	**CO3**
	b.	Explain the production of green hydrogen using TiO_2 photocatalytic water splitting method.	**7**	**L2**	**CO3**
	c.	The emf of a cell Ag(s) /$AgNO_3$(0.02M) // $AgNO_3$(XM) / Ag(s) is found to be 0.084V at 298 K. Find the value of X and write the cell reactions.	**7**	**L3**	**CO3**
		OR			
Q.6	**a.**	A fuel cell is considered as an efficient energy conversion device to convert fuel energy into electricity operating at wide temperature range. Apply the concept of energy conversion and outline the characteristics, construction and working of solid oxide fuel cell.	**6**	**L3**	**CO3**
	b.	Explain the construction and working of Sodium ion Battery and mention its applications.	**7**	**L2**	**CO3**
	c.	What is a battery? Outline the classification of battery with suitable examples.	**7**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	Explain the mechanism of Pitting corrosion and Waterline corrosion with suitable examples.	**6**	**L2**	**CO4**
	b.	Explain the principle, construction and application of Electrochemical sensors in the detection of NOx and Sox.	**7**	**L2**	**CO4**
	c.	What is CPR? A thick sheet of area 93 inch 2 is exposed to air near the ocean. After 6 months it was found to experience a weight loss of 360 g due to corrosion, if the density of the steel is 7.9 g/cm^3. Calculate the corrosion penetration rate in mpy and mmpy (Given K = 534 in mpy and 87.6 mm/y).	**7**	**L3**	**CO4**
		OR			
Q.8	**a.**	What is corrosion? Explain electrochemical theory of corrosion by taking iron as an example.	**7**	**L2**	**CO4**
	b.	Explain the application of Conductometric sensors in the estimation of acid mixture.	**7**	**L2**	**CO4**
	c.	Define the terms a) Transducer b) Actuators c) Sensors.	**6**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	Explain the role of artificial intelligence in e-waste management.	**6**	**L2**	**CO4**
	b.	Explain the synthesis and properties of alginate hydrogel with reference to its applications in brain–computer interfaces (BCIs).	**7**	**L2**	**CO4**
	c.	Explain the extraction of gold from e-waste by bioleaching method.	**7**	**L2**	**CO4**

		OR			
Q.10	a.	Explain the effects of e-waste on the Environment and Human Health.	6	L2	CO4
	b.	Explain the green synthesis of ZnO nano particles and mention its uses in magnetic Radio Frequency Identification. (RFID).	7	L2	CO4
	c.	Explain the synthesis and properties of polylactic Acid (PLA). Mention its uses in touch screen applications.	7	L2	CO4

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CBCS SCHEME

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

1BPHEC102

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

Quantum Physics and Electronics Sensors

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. VTU formula handbook is permitted.

		Module – 1	M	L	C
Q.1	a.	Discuss Heisenberg's uncertainty principle and state the three relationships. Use the energy-time uncertainty to explain the broadening of spectral lines.	8	L2	CO1
	b.	Set up Schrodinger's time independent wave equation in one dimension.	8	L2	CO1
	c.	A particle of mass 0.5 MeV/C^2 has kinetic energy 100 eV. Find its de-Broglie wavelength where C is the velocity of light.	4	L3	CO1
		OR			
Q.2	a.	Use the time-independent Schrödinger wave equation for the particle in an infinite well to arrive at an expression for the eigenvalues and eigen functions.	8	L2	CO1
	b.	Explain the wave function; mention its properties and physical significance of a wave function. Discuss the principle of complementarity.	8	L2	CO1
	c.	Calculate first three energy Eigen values in a one-dimensional infinite well of width 1 nm.	4	L3	CO1
		Module – 2			
Q.3	a.	Explain the any two failures of Classical free electron theory of metals and the Assumptions of Quantum free electron theory.	8	L2	CO2
	b.	Derive an expression for carrier concentration in a conductor.	8	L2	CO2
	c.	Calculate the probability of an electron occupying an energy level 0.024eV below the Fermi level at 400K.	4	L3	CO2
		OR			
Q.4	a.	With a neat labeled diagram, derive an expression for the Hall voltage and its applications.	8	L2	CO2
	b.	Derive an expression for Fermi level in an intrinsic semiconductor.	8	L2	CO2

	c.	A semiconductor sample 0.5 mm thick carries a current of 5 mA in a magnetic field of 0.2 T. If the Hall voltage is 1 mV, determine the Hall coefficient.	4	L3	CO2
		Module – 3			
Q.5	a.	Explain Josephson effect with a diagram. What is flux quantization? Explain DC & AC Josephson effect.	8	L2	CO3
	b.	Explain the term Critical Temperature, Critical field and Critical field, Critical current?	7	L2	CO3
	c.	For a superconducting sample with critical temperature 7.2 K and critical field at 0K is 6.5×10^4 Am-1, find the critical field at 4 K.	5	L3	CO3
		OR			
Q.6	a.	Distinguish between Type I and Type II superconductors using M–H characteristics.	8	L2	CO3
	b.	Explain the phenomenon of super conductivity. Discuss qualitatively BCS Theory of super conductivity.	7	L2	CO3
	c.	Calculate the ratio of critical fields for a superconductor at 7K and 5K gives the critical temperature 8K.	5	L3	CO3
		Module – 4			
Q.7	a.	Derive an expression for the numerical aperture and acceptance angle of an optical fiber, with the help of a neat labeled diagram.	8	L2	CO4
	b.	Explain the construction working of Mach-Zehnder interferometer with a neat diagram.	7	L2	CO4
	c.	Calculate the V-number and number of modes supported by an optical fiber of core radius 25 μm, operating at wavelength 1.3 μm with NA = 0.2.	5	L3	CO4
		OR			
Q.8	a.	Explain the principle and working of a Single Photon Avalanche Diode.	8	L2	CO4
	b.	Derive an expression for the energy density using Einstein's A and B coefficients.	8	L2	CO4
	c.	The ratio of population inversion of two energy levels is 1.059×10^{-30}. Find the wavelength of Light emitted by spontaneous emissions at 330K.	4	L3	CO4

		Module – 5			
Q.9	a.	What is LDR? Explain the Characteristics of LDR and give its applications.	8	L2	CO5
	b.	Explain the construction and working of Phototransistor and mention its applications.	8	L2	CO5
	c.	The resistance of a bulb filament is 112Ω at a temperature of 110°C. And its resistance is 180Ω at 375 °C. Calculate its temperate coefficient.	4	L3	CO5
		OR			
Q.10	a.	What is semiconductor gas sensors? Explain Metal Oxide Semiconductor (MOS) sensors.	8	L2	CO5
	b.	What is Hall effect sensors? Explain the construction and working of Hall effect sensors.	7	L2	CO5
	c.	A Hall sensor is made from a semiconductor with Hall coefficient R_H of 3.66×10^{-4} m^3/C. The sensor has a thickness d of 0.5mm and is operated with a constant bias current of 5.1mA. Calculate the voltage sensitivity (Sv) of the sensor and if the sensor is placed in a magnetic field with a flux density (B) of 500G what will be the hall voltage.	5	L3	CO5

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CBCS SCHEME

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

1BPHYM102

First Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Physics 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. VTU formula handbook is permitted.

		Module – 1	M	L	C
Q.1	a.	Define force constant. Derive the expression for equivalent force constant for two springs connected in series and parallel combination.	8	L2	CO1
	b.	Define Simple harmonic motion. Derive the differential form of expression for Simple Harmonic motion.	6	L2	CO1
	c.	A mass of 0.4 Kg causes an extension of 0.02m in a spring and the system is set for oscillations. Find the force constant of the spring, angular frequency and period of resulting oscillations.	6	L3	CO1
		OR			
Q.2	a.	Discuss the different types of springs used for various applications. Obtain the differential form of expression for a body undergoing forced oscillations and mention the expression for amplitude and phase of oscillations.	10	L2	CO1
	b.	Discuss the condition for amplitude resonance and hence emphasize on sharpness of resonance.	5	L2	CO1
	c.	Calculate the resonance amplitude of the vibration of the system whose natural frequency is 1000 Hz when it oscillates in the resistive medium for which the value of damping per unit mass is 0.008 rad/s under the action of an external periodic force/unit mass of amplitude 5 N/kg, with tunable frequency.	5	L3	CO1
		Module – 2			
Q.3	a.	Define Young's modulus (Y), Rigidity modulus (η) and Poissons ratio (σ). Derive the relation between them.	10	L2	CO2
	b.	With a neat diagram explain the stress- strain curve for elastic materials.	6	L2	CO2
	c.	In a stretching experiment, the extension produced in a wire for a load of 1.5 Kg is 0.2×10^{-2} m. If length and radius of cross section of the wire are 2m and 0.013 cm respectively, determine Young's modulus of materials of the wire.	4	L3	CO2
		OR			
Q.4	a.	Derive the expression for bending moment in terms of moment of inertia and hence arrive at the expression for bending moment for the beams with circular and rectangular cross sections.	9	L2	CO2

	b.	Explain different mechanisms of failure of engineering materials.	6	L2	CO2
	c.	Calculate the force required to produce an extension of 1mm in steel wire of length 2m and diameter 1mm. Given young's modulus of the wire $Y = 2 \times 10^{11} N/m^2$.	5	L3	CO2
		Module – 3			
Q.5	a.	Derive the expression for thermo emf in terms of temperatures of hot and cold junctions.	8	L2	CO3
	b.	Describe the construction and working of a thermoelectric generator.	7	L2	CO3
	c.	The e.m.f of a lead-iron thermocouple, one junction of which is at 0°C, is given by $E = 1784\,T - 2.4\,T^2$ (in μ volts), T being temperature in °C. Find the neutral temperature and Peltier coefficient.	5	L3	CO3
		OR			
Q.6	a.	Describe the construction and working of a thermocouple. Mention their advantages.	9	L2	CO3
	b.	Explain the application of thermoelectricity for refrigerators.	6	L2	CO3
	c.	EMF of a thermo couple is 1200 μV, when working between 0 °C and 100 °C. If its neutral temperature is 300 °C, find the value of coefficients a and b.	5	L3	CO3
		Module – 4			
Q.7	a.	Explain the liquification of oxygen by cascade process.	7	L2	CO4
	b.	Deduce the equation $\Delta T = \Delta P \frac{1}{C_P}\left[\frac{2a}{RT} - b\right]$ and hence discuss three cases.	9	L2	CO4
	c.	Mention the properties and uses of liquid Helium.	4	L3	CO4
		OR			
Q.8	a.	Describe the experimental arrangement and working of porous plug experiment. What are the conclusions drawn from it?	9	L2	CO4
	b.	Explain the construction and working of platinum resistance thermometer.	7	L2	CO4
	c.	In a Joule-Thomson experiment, temperature changes from 100°C to 150° C for pressure changes of 20Mpa to 170Mpa. Calculate Joule- Thomson coefficient.	4	L3	CO4
		Module – 5			
Q.9	a.	Describe the construction and working of an X-ray diffractometer.	7	L2	CO5
	b.	Discuss the motion of a particle in 1D potential well of infinite height and hence obtain it eigen function and eigen values.	9	L2	CO5

	c.	Determine the crystal size, when the peak width is 0.5 and peak position 30^0 for a cubic crystal. Given that, wavelength of the X-rays used is 100^0A and the Scherrer's constant K=0.92.	4	L3	CO5
		OR			
Q.10	a.	Explain quantum confinement in 0, 1, 2 and 3 dimensions and give the graphical representation of density of states.	8	L2	CO5
	b.	Describe the principle, construction and working of an atomic force microscope with a neat diagram.	8	L2	CO5
	c.	A beam of monochromatic X-rays is diffracted by a cubic crystal with a glancing angle of 12^o for first order. Calculate wavelength of the X-rays, if the inter planar spacing of the crystal is 2.82 ^{0}A.	4	L3	CO5

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CBCS SCHEME

USN | | | | | | | | | | | **1BPHYS102**

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

Quantum Physics and Applications

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. VTU formula handbook is permitted.

		Module – 1	**M**	**L**	**C**
Q.1	**a.**	Set up one dimensional time-independent Schrodinger's wave equation.	**8**	**L2**	**CO1**
	b.	Write a brief note on- Physical significance of wave function, Principle of complementarily, Expectation value& Quantum tunneling.	**8**	**L2**	**CO1**
	c.	Calculate the de-Broglie wavelength associated with an electron having a kinetic energy of 100 eV.	**4**	**L3**	**CO1**
		OR			
Q.2	**a.**	Derive a normalized wave function for a particle inside one dimensional infinite potential well.	**8**	**L2**	**CO1**
	b.	State and explain Heisenberg Uncertainty principle with three relationships. Use the energy-time uncertainty to explain the broadening of spectral lines.	**8**	**L2**	**CO1**
	c.	An electron is bound in a 1-dimensional potential well of width 1 Å & of infinite height. Find its energy values in eV for the ground state & the first two excited states.	**4**	**L3**	**CO1**
		Module – 2			
Q.3	**a.**	Define Fermi energy and Fermi factor. Discuss the variation of Fermi factor with temperature and energy.	**8**	**L2**	**CO2**
	b.	What is Hall effect? Derive an expression for Hall voltage in terms of Hall-coefficient with all necessary diagrams.	**8**	**L2**	**CO2**
	c.	Find the temperature at which there is 1% probability that a state with an energy 0.5 eV above Fermi energy is occupied.	**4**	**L3**	**CO2**
		OR			
Q.4	**a.**	Explain the failure of Classical free electron theory of metals and list assumptions of quantum free electron theory.	**8**	**L2**	**CO2**
	b.	Derive the expression for Fermi energy in terms of energy gap of intrinsic semiconductor.	**8**	**L2**	**CO2**
	c.	A semiconductor sample 0.5 mm thick carries a current of 5 mA in a magnetic field of 0.2 T. If the Hall voltage is 1 mV, determine the Hall coefficient.	**4**	**L3**	**CO2**

		Module – 3			
Q.5	**a.**	What are phonons? Explain the role of phonons in Cooper pair formation.	**8**	**L2**	**CO3**
	b.	Explain flux quantization with neat diagram. Discuss DC & AC Josephson effect.	**8**	**L2**	**CO3**
	c.	For a superconducting sample with critical temperature 7.2 K and critical field at 0K is 6.5×10^4 Am^{-1}, find the critical field at 4 K.	**4**	**L3**	**CO3**
		OR			
Q.6	**a.**	Explain Silsbee effect and hence derive an expression for the critical current for a superconducting cylindrical wire.	**8**	**L2**	**CO3**
	b.	Define Meissner's effect. Differentiate between Type I and Type II superconductors.	**8**	**L2**	**CO3**
	c.	A long thin superconducting wire has a radius of 0.5 mm and a critical field of 8 kA m^{-1}. Determine its critical current.	**4**	**L3**	**CO3**
		Module – 4			
Q.7	**a.**	Discuss stimulated emission process. Derive energy density of radiation in thermal equilibrium using Einstein coefficients.	**8**	**L2**	**CO4**
	b.	Explain the construction & working of superconducting nano wire single photon detectors (SNSPDs). Write it's any two advantages.	**8**	**L2**	**CO4**
	c.	The attenuation of light in an optical fiber is estimated at 2.2 dB/km. What fractional initial intensity remains after 2 km and after 6 km?	**4**	**L3**	**CO4**
		OR			
Q.8	**a.**	Define acceptance angle for an optical fiber. Hence, derive the expression for its Numerical Aperture (NA)and arrive at the condition for propagation.	**8**	**L2**	**CO4**
	b.	Describe the construction and working of a semiconductor laser based on energy band diagram.	**8**	**L2**	**CO4**
	c.	A fiber has a core refractive index of 1.48 and a cladding index of 1.46. Calculate its numerical aperture (NA) and acceptance angle in air.	**4**	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	State Moore's law. Distinguish between classical and Quantum computing.	**8**	**L2**	**CO5**
	b.	Outline the operation of the CNOT gate and define its standard matrix and logical truth table.	**8**	**L2**	**CO5**
	c.	Given $\|\psi\rangle = \begin{pmatrix}\alpha_1\\ \alpha_2\end{pmatrix}$ and $\|\phi\rangle = \begin{pmatrix}\beta_1\\ \beta_2\end{pmatrix}$. Prove that $\langle\psi\|\phi\rangle = \langle\phi\|\psi\rangle^*$	**4**	**L3**	**CO5**
		OR			

Q.10	a.	Define bit and qubit. Mention four properties of a qubit. Explain the representation of qubit using Bloch sphere.	8	L2	CO5
	b.	Mention the Pauli X and Y gate and apply these on the state $\|0>$ and $\|1>$ mention the truth table along with circuit symbol.	8	L2	CO5
	c.	Prove, using matrix algebra, that two consecutive T gates are equivalent to a single S gate in quantum circuit.	4	L3	CO5

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CBCS SCHEME

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1BAIA103

First Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Introduction to AI and Applications

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 the different types of Artificial Intelligence based on functionality and capabilities.	7	L2	CO1
	b.	Explain different types of knowledge used in AI with suitable examples.	6	L2	CO1
	c.	Compare traditional programming with machine learning.	7	L2	CO1
		OR			
Q.2	a.	What is Machine Learning? Relate AI and Machine Learning?	7	L2	CO1
	b.	What is AI Agent? Classify the agents in an AI system.	7	L2	CO1
	c.	Compare weak AI and strong AI.	6	L2	CO1
		Module – 2			
Q.3	a.	Differentiate between Zero-shot, One-shot, and Few-shot prompting.	6	L2	CO4
	b.	Explain Self-Consistency Prompting and how does it improve model performance.	6	L2	CO4
	c.	Apply LLM-based writing prompts to produce creative content for digital marketing campaigns.	8	L3	CO4
		OR			
Q.4	a.	Build a zero-shot prompt to classify comments as positive or negative. Explain why it qualifies as zero-shot.	6	L3	CO4
	b.	Explain the steps for Effective Prompt Engineering.	6	L2	CO4
	c.	Build a creative prompt that encourages ChatGPT to propose futuristic transportation ideas. Explain how this promotes imaginative thinking.	8	L3	CO4
		Module – 3			
Q.5	a.	Is Labelled data supervised or unsupervised machine learning? Extend your answer explaining different types of machine learning.	6	L2	CO2
	b.	Outline K-Means Algorithm with merits and demerits.	8	L2	CO2
	c.	Summarize the features of: (i) Reinforcement Learning (ii) Support Vector Machines (SVM)	6	L2	CO2
		OR			

Q.6	a.	Explain the four steps to create Decision Trees with suitable example for each step.	6	L2	CO2
	b.	Define conditional probability and the Bayes rule with examples.	8	L2	CO2
	c.	How does computer vision work with deep learning? Explain the tasks involved in computer vision.	6	L2	CO2
		Module – 4			
Q.7	a.	List and explain any four Trusted AI principles.	8	L2	CO5
	b.	Describe the concept of AI as a Service (AIaaS). Outline two advantages and two challenges of using AIaaS in organizations.	6	L2	CO5
	c.	Relate the role of ethics in AI.	6	L2	CO5
		OR			
Q.8	a.	What is expert system? Explain three components of expert system.	6	L2	CO5
	b.	Differentiate between the following: (i) AI Programs and Robots (ii) Human–controlled and fully – autonomous bots	6	L2	CO5
	c.	What is Neuromorphic Computing? Explain its architecture, features resembling the human brain, and how it contributes toward achieving Artificial General Intelligence (AGI).	8	L2	CO5
		Module – 5			
Q.9	a.	Relate the role of AI in Biology and Environmental Sciences.	6	L2	CO3
	b.	What is No-Code AI. Explain why No-Code AI Must be Used?	6	L2	CO3
	c.	Identify the role of AI in scientific experimentation by examining how it supports different disciplines and breaking down the specific experimental activities such as data collection, pattern identification, simulation, and hypothesis testing that AI enhances.	8	L3	CO3
		OR			
Q.10	a.	Explain the role of AI in early disease prevention.	6	L2	CO3
	b.	What is Low Code AI. Compare Traditional tools with Low Code AI.	6	L2	CO3
	c.	Explain how AI contributes to environmental science by breaking down its role in climate modelling, air and water quality monitoring, waste management, and resource conservation. Describe the specific data, techniques, and decision-making processes involved in each area.	8	L3	CO3

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CBCS 2025- SCHEME

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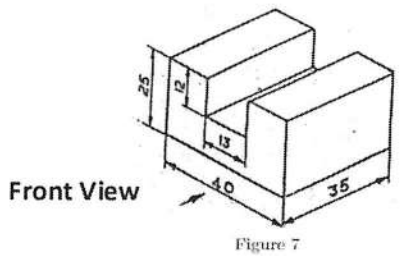
1BCEDC/M/EC/E/S103

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

COMPUTER AIDED ENGINEERING DRAWING

Time: 3 Hours **COMMON TO ALL BRANCHES** **Max. Marks: 100**

Note: i) Answer one full question from each Module, ii) Grid sheet may be provided for Sketching and iii) CAD must be in A4 Sheet only

Q. No.	Module – I	Marks
1(a)	A point P is 30 mm in front of VP, 40 mm above HP and 50 mm from RPP. Draw its projections.	10
1 (b)	Draw the projections of a straight line AB, 100 mm long, inclined at 45^0 to HP and 30^0 to VP. The end A is in HP and the end B is in VP. Find the shortest distance between the straight line AB and the line of intersection of planes of projection.	10
	OR	
2	A regular hexagonal lamina of sides 25 mm is lying in such a way that one of its sides on HP while the side opposite to the side on which it rests is on VP. If the lamina makes 60° to HP. Draw the projections of the lamina.	20
	Module – II	
3	A cone of base diameter 40 mm and axis length 50 mm is resting on a point on the circumference of its base such that its apex is at 40 mm above HP and the top view of the axis is inclined at 60^0 to VP. Draw the top and front views of the solid. Also, determine the inclination of the axis with HP.	30
	OR	
4	A square pyramid 35mm sides of base and 60 mm axis length rests on HP on one of its corners of the base such that the two base edges containing the corner on which it rests make equal inclinations with HP. Draw the projections of the pyramid when the axis of the pyramid is inclined to HP at 40^0 and appears to be inclined to VP at 45^0.	30
	Module – III	
5	A pentagonal prism of 30mm side of base and height 50mm lies with its base on HP such that one of the rectangular faces is inclined at 40^0 to VP. It is cut to the shape of a truncated pyramid with the truncated surface inclined at 30^0 to the axis so as to pass through a point on it 30mm above the base. Develop the truncated portion of the prism.	25
	OR	
6	A hexagonal pyramid 25mm side of base and axis 65mm long is resting on its base on HP with one of the edges of the base parallel to VP. It is cut by a vertical section plane at a distance of 8mm from the axis towards right side. Develop the lateral surface of the left part of pyramid	25
	Module – IV	
7	A rectangular pyramid of base 40 mm x 25 mm and height 50 mm is placed centrally on a cylindrical slab of diameter 100 mm and thickness 30 mm. Draw the isometric view of the combination of solids.	25
	OR	
8	Draw the top view, front view and side view of the following figure  Front View Figure 7	25

Name & Signature of Examiner 1 Name & Signature of Examiner 2

CBCS 2025- SCHEME

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

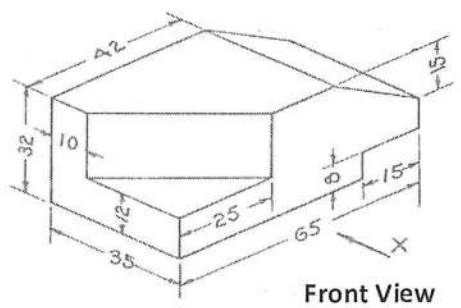
1BCEDC/M/EC/E/S103

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

COMPUTER AIDED ENGINEERING DRAWING

Time: 3 Hours **COMMON TO ALL BRANCHES** **Max. Marks: 100**

Note: i) Answer one full question from each Module, ii) Grid sheet may be provided for Sketching and iii) CAD must be in A4 Sheet only

Q. No.	Module – I	Marks
1(a)	Draw the projections of the following points on the same XY line, keeping convenient distance between each projector and state the Quadrants in which they lie. P – 10 mm above HP and 15 mm in front of VP and Q – 40 mm below HP and 50 mm behind VP	10
1 (b)	A line AB 65 mm long has its end A 20 mm above HP and 25 mm in front of VP. The end B is 40 mm above HP and 65 mm in front of VP. Draw the projections of AB and show its inclinations with HP and VP.	10
	OR	
2	A hexagonal lamina of sides 25 mm rests on one of its corners on HP. The lamina makes 45° to HP and the diagonal passing through the corner on which it rests appears to be inclined at 30° to VP. Draw its projections.	20
	Module – II	
3	A pentagonal prism 25mm sides of base and 60 mm axis length rests on HP on one of its corners of the base such that the two base edges containing the corner on which it rests make equal inclinations with HP. Draw the projections of the prism when the axis of the prism is inclined to HP at 40^0 and appears to be inclined to VP at 45^0.	30
	OR	
4	A hexagonal pyramid 25 mm sides of base and 50 mm axis length rests on HP on one of its edges of the base which is inclined to VP at 30^0. Draw the projections of the pyramid when the axis is inclined to HP at 45^0.	30
	Module – III	
5	A regular pentagonal prism of height 60mm and base edge 30mm rests with its base on HP. The vertical face closest to VP is 30^0 to it. Draw the development of the truncated prism with its truncated surface inclined at 60^0 to its axis and bisecting it.	25
	OR	
6	A frustum of a square pyramid has its base 40mm sides, top 16mm sides and height 60mm having a side of its base parallel to VP. Draw the projections of the frustum and show the development of lateral surfaces of it.	25
	Module – IV	
7	A square prism base side 40 mm and height 50 mm is placed centrally on a cylindrical slab of diameter 100 mm and thickness 30 mm. Draw the isometric view of the combination of solids.	25
	OR	
8	Draw the top view, front view and side view of the following figure  Front View	25

Name & Signature of Examiner 1 Name & Signature of Examiner 2

CBCS 2025- SCHEME

USN										

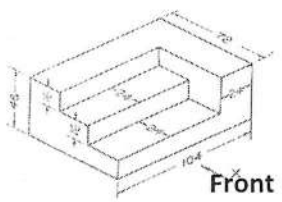
1BCEDC/M/EC/E/S103

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

COMPUTER AIDED ENGINEERING DRAWING

Time: 3 Hours **COMMON TO ALL BRANCHES** **Max. Marks: 100**

Note: i) Answer one full question from each Module, ii) Grid sheet may be provided for Sketching and iii) CAD must be in A4 Sheet only

Q. No.	Module – I	Marks
1(a)	A point A is 20 mm above HP and in the first Quadrant. Its shortest distance from the line of intersection of X1Y1 and XY line is 40 mm. Draw its projections. Find the distance of point from VP	10
1 (b)	A straight-line PQ 65 mm long is inclined at 45^0 to HP and 30^0 to VP. The point P is 70 mm from both the reference planes and the point Q is towards the reference planes. Draw the projections.	10
	OR	
2	A hexagonal lamina of sides 25 mm rests on one of its corners on HP. The corner opposite to the corner on which it rests is 35mm above HP and the diagonal passing through the corner on which it rests is inclined at 30° to VP. Draw its projections. Find the inclination of the surface with HP.	20
	Module – II	
3	A hexagonal prism 25 mm sides of base and 50 mm axis length rests on HP on one of its edges. Draw the projections of the prism when the axis is inclined to HP at 45^0 and appears to be inclined to VP at 40^0.	30
	OR	
4	A hexagonal pyramid 25mm sides of base and 50 mm axis length rests on HP on one of its corners of the base such that the two base edges containing the corner on which it rests make equal inclinations with HP. Draw the projections of the pyramid when the axis of the pyramid is inclined to HP at 40^0 and appears to be inclined to VP at 45^0.	30
	Module – III	
5	A pentagonal prism of base sides 30mm and axis length 60mm rests with its base on HP and an edge of the base inclined at 45^0 to VP. It is cut by plane perpendicular to VP, inclined at 40^0 to HP and passing through a point on axis, at a distance of 30mm from the base. Develop the remaining surfaces of the truncated prism.	25
	OR	
6	A square pyramid base 40mm side and axis 65mm long has its base on HP and all the edges of the base are equally inclined to VP. It is cut by an inclined section plane so as the truncated surface is at 45^0 to its axis, bisecting it. Draw the development of the truncated pyramid.	25
	Module – IV	
7	A square prism of base side 40 mm and height 50 mm is placed centrally on a rectangular slab of sides 100 mm x 60 mm and thickness 20 mm. Draw the isometric view of the combination of solids.	25
	OR	
8	Draw the top view, front view and side view of the following figure 	25

Name & Signature of Examiner 1

Name & Signature of Examiner 2

CBCS SCHEME

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1BESC104A

First Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Building Science and Mechanics

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	CO
Q.1	a.	Explain the following scope of Civil Engineering in the following discipline: i) Structural Engineering ii) Environmental Engineering	8	L1	CO1
	b.	Write a note on constitution of cement.	6	L1	CO1
	c.	Explain the types and uses of Bricks.	6	L1	CO1
		OR			
Q.2	a.	List and explain the structural elements of a building.	8	L1	CO1
	b.	Briefly explain the Structural steel in the construction and its types.	6	L1	CO1
	c.	Write a note on the importance of Construction planning and Project Management in the sustainable construction of a project.	6	L1	CO1
		Module – 2			
Q.3	a.	Explain the types and uses of Autoclaved Aerated (AAC) Blocks.	8	L1	CO2
	b.	Write a note on emerging materials for a sustainable construction.	6	L1	CO2
	c.	Write a note on Energy efficient building.	6	L1	CO2
		OR			
Q.4	a.	Write a note on Green Building Concept and its rating system with IGBC (Indian Green Building Council).	8	L1	CO2
	b.	Write note on Smart City Concept.	6	L1	CO2
	c.	Brief the challenges and limitations of Plastic Recycling.	6	L1	CO2
		Module – 3			
Q.5	a.	Describe the System of Forces with the neat sketch.	4	L2	CO3

	b.	Determine the magnitude and direction of the resultant of the coplanar concurrent system of forces shown in Fig.5(b)	8	L3	CO3

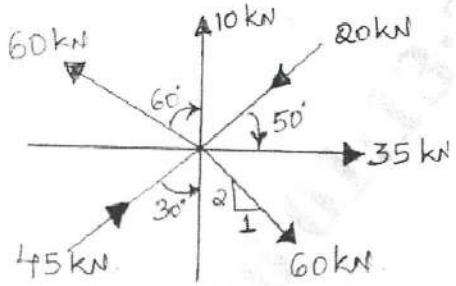


Fig.5(b)

	c.	Determine the magnitude, direction and position of the resultant of the coplanar non concurrent system of forces shown in Fig.5(c)	8	L3	CO3

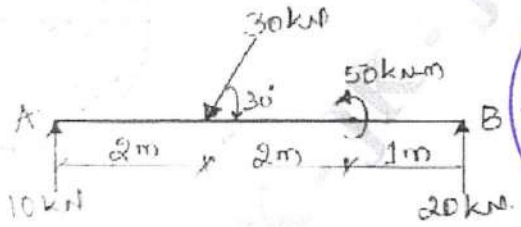


Fig.5(c)

OR

Q.6	**a.**	State and Prove Varignon's theorem of Moments.	**4**	**L2**	**CO3**
	b.	Determine the magnitude and direction of the resultant of the coplanar concurrent system of forces shown in Fig.6(b)	**8**	**L3**	**CO3**

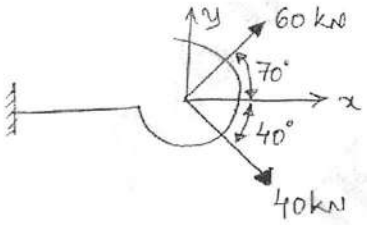


Fig.6(b)

	c.	Determine the magnitude, direction and position of the resultant of the coplanar non concurrent system of forces shown in Fig.6(c)	8	L3	CO3

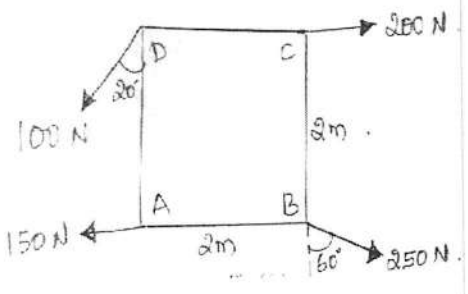
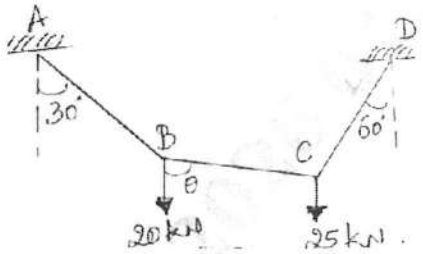
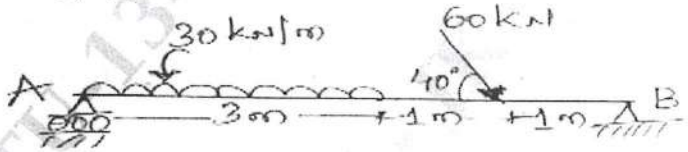
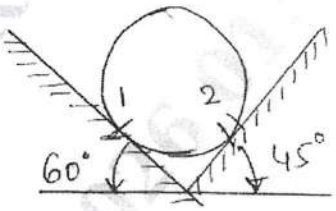
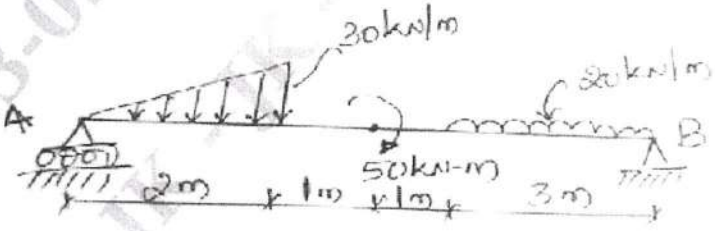
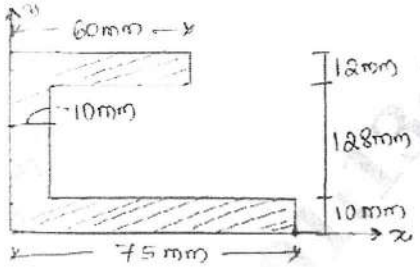
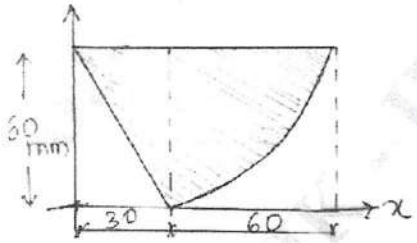
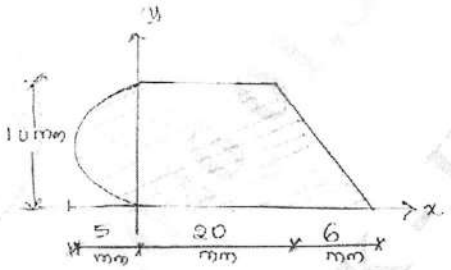
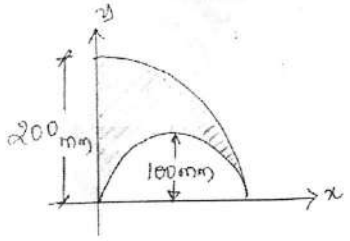


Fig.6(c)

		Module – 4			
Q.7	**a.**	State and Prove Lami's Theorem.	**4**	**L2**	**CO4**
	b.	Determine the tension developed in the segments AB, BC and CD of the wire and also the inclination of BC to the vertical as shown in the Fig.7(b)  Fig.7(b)	**8**	**L3**	**CO4**
	c.	Find the reactions developed at supports A and B of the loaded beam as shown in the Fig.7(c)  Fig.7(c)	**8**	**L3**	**CO4**
		OR			
Q.8	**a.**	Explain with the neat sketches on the types of Supports in structures.	**4**	**L2**	**CO4**
	b.	A 500 N sphere is resting in a trough as shown in the Fig.8(b). Determine the reactions developed at contact surfaces 1 and 2 as shown in the figure.  Fig.8(b)	**8**	**L3**	**CO4**
	c.	Determine the reactions developed at supports A and B of the beam shown in the Fig8(c)  Fig.8(c)	**8**	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	Derive the centroid of a triangle of width 'b' and depth'd' by the method of integration.	**4**	**L2**	**CO5**

	b.	Determine the centroid of the shaded area shown in the Fig.9(b)	8	L3	CO5
		 Fig.9(b)			
	c.	Determine the centroid of the shaded area shown in the Fig.9(c)	8	L3	CO5
		 Fig.9(c)			
		OR			
Q.10	a.	Derive the centroid of a Semicircle of radius 'r' by the method of integration.	4	L2	CO5
	b.	Determine the centroid of the shaded area shown in the Fig.10(b)	8	L3	CO5
		 Fig.10(b)			
	c.	Determine the centroid of the shaded area shown in the Fig.10(c)	8	L3	CO5
		 Fig.10(c)			

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CBCS SCHEME

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1BESC104C

First Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Introduction to Electronics and Communication

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. VTU Formula Hand Book is permitted.

		Module – 1	M	L	C
Q.1	a.	With a neat block diagram, explain the working of a regulated DC power supply, clearly describing each stage.	8	L3	C01
	b.	With circuit diagram and waveforms, explain the working of Bi - Phase full wave rectifier.	6	L2	C01
	c.	With circuit diagram, brief out the operation of voltage doubler.	6	L2	C01
		OR			
Q.2	a.	Derive an expression for the gain of an amplifier with negative feedback. Explain how feedback improves performance.	10	L3	C01
	b.	Write short notes on any four types of amplifiers with its frequency response curves.	6	L2	C01
	c.	An amplifier produces an output voltage of 5 V for an input of 85 mV. If the input and output currents in this condition are, respectively, 5 mA and 200 mA, determine the: (a) voltage gain (b) current gain (c) power gain.	4	L2	C01
		Module – 2			
Q.3	a.	With a neat block diagram, derive the expression for overall gain of a positive feedback amplifier. Explain the conditions for sustained oscillations.	9	L3	C02
	b.	Explain the operation of three-stage ladder RC network oscillator with neat circuit diagram.	7	L2	C02
	c.	In wein bridge oscillator, if C1 = C2 = 125nF, determine the frequency of oscillation, When R1 = R2 = 5KΩ.	4	L2	C02
		OR			
Q.4	a.	Define the following with respect to operational amplifier and provide their typical values. (i) Open loop voltage gain (ii) Input offset voltage (iii) Slew Rate (iv) Full power Bandwidth	8	L2	C02
	b.	Explain the operation of an Op-Amp integrator and differentiator with circuit diagrams and output waveforms.	7	L2	C02

	c.	An operational amplifier with negative feedback produces an output voltage of 3V when supplied with an input of 450 μV. Determine the value of closed – loop voltage gain and express the answer in decibels.	5	L3	C02
		Module – 3			
Q.5	a.	Draw the block diagram of a communication system and explain the function of each block.	10	L2	C03
	b.	Explain the concept of noise and briefly the different types of radio wave propagation.	10	L2	C03
		OR			
Q.6	a.	What are the advantages of digital communication over analog communication? Explain the generation of Amplitude Modulation (AM) with neat waveforms.	10	L2	C03
	b.	With waveforms, explain ASK, FSK, and PSK modulation schemes.	10	L2	C03
		Module – 4			
Q.7	a.	Define embedded systems and list its key characteristics. Also list out the major application areas of embedded systems.	10	L2	C04
	b.	Discuss the purpose of embedded systems. Differentiate between embedded systems and general-purpose computing systems.	10	L2	C04
		OR			
Q.8	a.	Explain the role of memory, sensors, actuators, and display devices (LED and 7-segment) in embedded systems.	10	L2	C04
	b.	Compare RISC and CISC architectures and GPP and ASIP processors	10	L2	C04
		Module – 5			
Q.9	a.	Explain 1's and 2's complement methods with two examples each.	10	L2	C05
	b.	Convert: i) $(100101)_2$ - Decimal and Octal ii) $(782F)_{16}$ - Binary and Decimal. iii) $(59.2589)_{10}$ - Octal and Binary	10	L3	C05
		OR			
Q.10	a.	Implement full adder circuit with its truth table and write the expressions for sum and carry.	10	L3	C05
	b.	Using basic Boolean theorems prove i) $(x + y)(x + z) = x + yz$ ii) $Xy + xz + yz' = xz + yz'$	10	L3	C05

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1BESC104D

First Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Introduction to Mechanical 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 various roles of mechanical engineers in solving the real case problems.	10	L1	CO1
	b.	With schematic diagram explain briefly the working principle of centrifugal pump.	05	L2	CO1
	c.	State the working principle of power steering with schematic sketch.	05	L1	CO1
		OR			
Q.2	a.	With block diagram explain the working of refrigeration system.	10	L2	CO1
	b.	With sketch state the working principle of Pelton turbine.	05	L1	CO1
	c.	State the functions of important parts of drone.	05	L2	CO1
		Module – 2			
Q.3	a.	Using appropriate diagrams, explain how a 4-stroke diesel engine works, and represent the cycle on a P–V diagram.	10	L2	CO2
	b.	Sketch the basic layout of an electric vehicle and label its components.	06	L2	CO2
	c.	State the advantages of Electrical vehicles.	04	L1	CO2
		OR			
Q.4	a.	What do you mean by the term Gear train? With the help of a neat sketch, explain the working of a compound gear train.	10	L2	CO2
	b.	With sketch discuss in brief about Hybrid Electrical.	10	L1	CO2
		Module – 3			
Q.5	a.	Explain the properties and applications of ferrous metals.	08	L2	CO3
	b.	Differentiate between ferrous and non ferrous metals.	06	L4	CO3
	c.	What are composite materials? List the classification of composite materials based on matrix and reinforcement materials.	06	L1	CO3
		OR			
Q.6	a.	State the advantages, disadvantages and applications of composite materials.	08	L2	CO3

	b.	What are smart materials? State the applications of smart materials.	06	L1	CO3
	c.	State advantages and disadvantages of shape memory alloys.	06	L1	CO3
		Module – 4			
Q.7	a.	Describe the classification of manufacturing processes. Explain the factors that influence the selection of a suitable manufacturing process.	08	L1	CO4
	b.	State the principles of welding and brazing.	06	L1	CO4
	c.	With sketches explain turning and knurling processes of lathe.	06	L2	CO4
		OR			
Q.8	a.	State the principle of drilling. With neat sketches explain reaming and tapping operations of drilling machine.	08	L1	CO4
	b.	With block diagram explain the basic components of CNC machine.	06	L2	CO4
	c.	Explain the principle of 3D printing. State the standard steps in 3D printing process.	06	L2	CO4
		Module – 5			
Q.9	a.	Define automation and explain different types of automation.	08	L1	CO5
	b.	What is Mechatronics system? Mention its applications.	06	L2	CO5
	c.	State the working principle of Potentiometer as sensor and mention its applications.	06	L1	CO5
		OR			
Q.10	a.	What is an optical encoder? Explain its working principle and industrial applications.	08	L2	CO5
	b.	Explain why it is necessary to integrate technology.	06	L2	CO5
	c.	What is Advanced Driver Assistance Systems (ADAS) and state its features.	06	L1	CO5

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1BESC104E

First Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Essentials of Information 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.

		Module – 1	M	L	C
Q.1	a.	What is flip flop? Explain the working of a simple flip flop circuit.	6	L2	CO1
	b.	Explain the three major categories of machine instructions with suitable examples.	6	L2	CO1
	c.	What is machine cycle? Explain the procedure of computer programs are execution.	8	L2	CO1
		OR			
Q.2	a.	What is the role of Controllers while communicating computer with other devices.	6	L2	CO1
	b.	With block diagram explain the computer architecture.	6	L3	CO1
	c.	Explain the organization of magnetic systems, optical systems and flash drives for mass storage.	8	L2	CO1
		Module – 2			
Q.3	a.	What is bootstrapping? Explain the booting process.	10	L3	CO2
	b.	Explain the deadlock problem which arises during resource allocation.	6	L2	CO2
	c.	List the problem-solving phases used for program development.	4	L1	CO2
		OR			
Q.4	a.	Explain briefly the function of : i) Window manager ii) File Manager iii) Memory Manager iv) Scheduler	8	L3	CO2
	b.	Summarize the distinctions between a process, an algorithm and a program.	6	L1	CO2
	c.	Explain how multiprogramming works between various processes in the system.	6	L2	CO2
		Module – 3			
Q.5	a.	With neat diagram, explain Internet Architecture.	10	L3	CO2
	b.	Define Artificial Intelligence (AI) and discuss the ethical risk of biases in AI model in critical areas.	4	L1	CO2
	c.	What is URL? With diagram explain the segments of typical URL.	6	L2	CO3

		OR			
Q.6	**a.**	With suitable diagram explain the use of switch and repeater in networking.	**8**	**L3**	**CO2**
	b.	Explain the practices used to keep password safe and secure as part of good cyber hygiene.	**6**	**L3**	**CO5**
	c.	Define online tracking and explain the effects of social media addictions.	**6**	**L2**	**CO5**
		Module – 4			
Q.7	**a.**	Explain the traditional development phases of the software life cycle.	**8**	**L2**	**CO4**
	b.	Describe the concept of Modularity and explain why it is essential for large-scale software systems.	**6**	**L2**	**CO4**
	c.	With diagram explain the conceptual layers of database implementation.	**6**	**L2**	**CO4**
		OR			
Q.8	**a.**	Compare and contrast the Waterfall model with Incremental and Iterative software development methodologies.	**8**	**L3**	**CO3**
	b.	Explain the role of Unified Modeling Language (UML) in software engineering. Develop use case diagram for Hospital Records System.	**6**	**L2**	**CO4**
	c.	Explain with example Three relational database operations.	**6**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	Explain the basic structure of an HTML page with example.	**6**	**L2**	**CO3**
	b.	Explain the fundamental difference between 2D and 3D computer graphics. Which of these typically requires more computational power and why?	**6**	**L2**	**CO3**
	c.	Illustrate the importance of CSS in modern Web design. Develop a CSS to have page background color 'white', Heading-1 with color 'Black' with text alignment to center and paragraph with font family 'Times New Roman' with font size of 30px.	**8**	**L3**	**CO3**
		OR			
Q.10	**a.**	Explain how user can create tables in HTML to help organize data.	**6**	**L2**	**CO3**
	b.	Discuss the role of "Shading" and "Lighting" in the rendering process. How do they contribute to the realism of an image?	**6**	**L2**	**CO3**
	c.	Explain how the folder structure helps in linking files such as images or style sheets in HTML.	**8**	**L2**	**CO3**

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1BEIT105

First Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Programming in C

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 C. Explain the HISTORY of C.	5	L2	CO1
	b.	Explain the System development life cycle.	5	L2	CO1
	c.	Explain the General form of a C program with example.	5	L2	CO1
	d.	Explain the steps in Compiling a C Program. With suitable Example.	5	L2	CO1
		OR			
Q.2	a.	Define data type. Explain primitive data types supported in C language with example.	5	L2	CO1
	b.	Define Operators. Explain the Increment and Decrement operators with suitable Examples.	5	L2	CO1
	c.	Show the evaluation of the following expressions with intermediate and final values. i) x = a-b/3+ c*2 -1when a = 9, b = 12 , c = 3 10! = 10||5 < 4 && 8.	5	L2	CO1
	d.	Develop a C program to multiply, subtract and division by taking two whole numbers. Choose suitable data types for variables.	5	L3	CO5
		Module – 2			
Q.3	a.	Explain the Reading and Writing characters.	5	L2	CO2
	b.	With a suitable example, Explain formatted input and output statements.	5	L2	CO1
	c.	List the conditional branching statements in'C'. Explain any two with suitable examples.	5	L2	CO2
	d.	Develop a C program to print Floyd's triangle for N rows (N > 0).Choose suitable control statements. [forn=4] 1 23 456 78910	5	L3	CO5
		OR			

Q.4	a.	Explain the Iteration Statements with suitable Examples.	5	L2	CO1
	b.	Explain the role of break and continue statements in C with suitable examples.	5	L2	CO2
	c.	Explain the go to , return and Block Statements in C with suitable examples.	5	L2	CO2
	d.	Develop a program to find the roots of quadratic equations.	5	L3	CO5
		Module – 3			
Q.5	a.	Define an array. How a single dimension and two-dimensional arrays are declared and initialized? Illustrate with suitable examples.	5	L2	CO2
	b.	Explain how arrays are passed to Functions.	5	L2	CO2
	c.	Define variable length array. Illustrate how variable length array is different from static array.	5	L2	CO2
	d.	Develop a C Program to find the Transpose of MATRIX.	5	L3	CO5
		OR			
Q.6	a.	Define a pointer. How do you declare and initialize pointer sin C. Explain accessing array elements using a pointer.	5	L2	CO2
	b.	Explain any two pointers operators and pointer Expressions with suitable Examples.	5	L2	CO2
	c.	Explain the concept of Multiple Indirection in Pointers	5	L2	CO2
	d.	Develop a C program to add two numbers using pointers to the variables.	5	L3	CO5
		Module – 4			
Q.7	a.	Define function. Explain the syntax of function definition and function declaration with a simple example.	5	L2	CO3
	b.	Explain the Function Arguments and Return statements in C.	5	L2	CO3
	c.	Explain the Function Prototypes with suitable Examples.	5	L2	CO3
	d.	Define recursion. Develop a C program and a function to compute factorial of a given number using recursion.	5	L3	CO3
		OR			
Q.8	a.	Define Dynamic memory allocation. List and explain the different functions to handle dynamic memory allocation in C.	5	L2	CO3
	b.	List the advantages of functions in programming.	5	L2	CO3
	c.	Explain TWO techniques of parameter passing to functions with suitable program segments.	5	L2	CO3

	d.	Develop a C-program and a function to check whether the given number is Prime or not.	5	L3	CO3
		Module – 5			
Q.9	a.	Define a structure in C. Explain the different types of structure declarations with examples.	5	L2	CO4
	b.	Explain how Array of Structures is passed to a function.	5	L2	CO4
	c.	Explain the differences between structures and unions.	5	L2	CO4
	d.	Develop a C program to store and display the Employee details using Structures.	5	L3	CO5
		OR			
Q.10	a.	Describe a method to compare two structure variables of the same type, and provide a simple example.	5	L2	CO4
	b.	Define Enumerated data type. Explain the declaration and access of enumerated data types with the help of C program segment.	5	L2	CO4
	c.	What are Bit-fields and typedef in C. Explain with example.	5	L2	CO4
	d.	Develop a C program to access and modify the members of structures, in array of structures in C.	5	L3	CO5

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CBCS SCHEME

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

1BECE105

First Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Fundamentals of Electronics and Communication 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. VTU Formula Hand Book is permitted.

		Module – 1	M	L	C
Q.1	a.	Explain the operation of forward and reverse bias Characteristics of PN junction diode.	8	L2	CO1
	b.	With circuit diagram and waveforms, explain the operation of full wave rectifier circuit using center tap transformer.	8	L2	CO1
	c.	Find the forward and reverse resistances offered by a silicon diode for the given values I_F=100mA, V_R=50V. For silicon diode V_F =0.75V and I_R=100 nA.	4	L1	CO1
		OR			
Q.2	a.	Demonstrate the circuit diagram of three input AND and OR gate using diodes.	8	L2	CO1
	b.	With circuit diagram and waveforms, explain the operation of Half wave rectifier.	8	L2	CO1
	c.	Explain Zener diode as voltage regulator under no load condition.	4	L2	CO1
		Module – 2			
Q.3	a.	With neat diagram, Explain input and output characteristics of BJT in common emitter configuration.	8	L2	CO2
	b.	Explain the construction and operation of N-channel JFET.	8	L2	CO2
	c.	Explain BJT voltages and currents.	4	L2	CO2
		OR			
Q.4	a.	Explain the circuit operation and analysis of voltage divider bias method.	8	L2	CO2
	b.	Explain N-channel Enhancement type MOSFET and describe the construction and Operation.	8	L2	CO2
	c.	Show the circuit symbol of N-channel and P-channel JFET.	4	L1	CO2
		Module – 3			
Q.5	a.	Explain the ideal Op-Amp characteristics.	8	L2	CO3

	b.	Explain Op-Amp as an inverting and non-inverting amplifier circuit.	8	L2	CO3
	c.	Briefly explain Op-Amp as a voltage follower.	4	L2	CO3
		OR			
Q.6	a.	Define the following with respect to Op-Amp. i) Input Bias current ii) CMRR iii) Slew Rate	8	L1	CO3
	b.	Explain Op-Amp differentiator and integrator circuit.	8	L2	CO3
	c.	Explain the Equivalent Circuit of Op-Amp.	4	L2	CO3
		Module – 4			
Q.7	a.	With a block diagram, explain the basic elements of communication system.	8	L2	CO4
	b.	What is Modulation? Define Amplitude and Frequency Modulation with neat waveforms.	8	L1	CO4
	c.	With a block diagram, explain AM Super heterodyne receiver.	4	L2	CO4
		OR			
Q.8	a.	What is a communication channel? Explain the characteristics of different communication channels.	12	L2	CO4
	b.	With a block diagram, explain FM super heterodyne receiver.	8	L2	CO4
		Module – 5			
Q.9	a.	Find the result the following i)$1101_{(2)} + 1010_{(2)}$ ii) $(110011)_2$ = ------$(?)_{10}$ iii) $(186)_{10}$ = ------$(?)_2$ iv) $(ABCD)_{16}$ = -----$(?)_2$	8	L1	CO5
	b.	State, Demonstrate and prove De Morgan's theorems for two variables.	8	L2	CO5
	c.	Explain the design a Half adder circuit using basic logic gates.	4	L2	CO5
		OR			
Q.10	a.	By using 1's complement performs the following subtraction i) $(1101)_2 - (1000)_2$ ii) $(1111)_2 - (1011)_2$	8	L2	CO5
	b.	Explain the design of Full adder circuit using basic logic gates.	8	L2	CO5
	c.	Simplify Y= (A+B)(A+$\bar{B}$)($\bar{A}$+B) by using laws and theorems of Boolean Algebra.	4	L2	CO5

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CBCS SCHEME

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

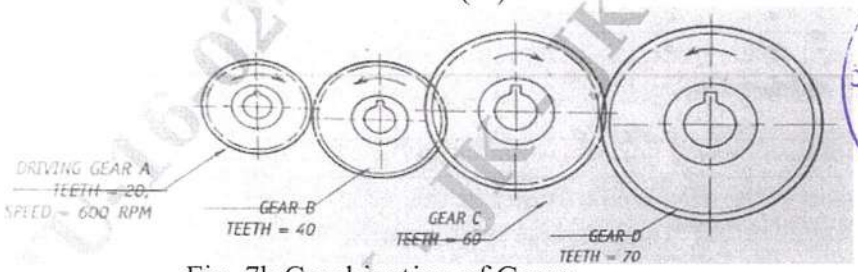
1BEME105

First Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Elements of Mechanical 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. Use of Steam Table is Permitted.

		Module – 1	M	L	C
Q.1	a.	Discuss the meaning of ferrous materials and outline any three ferrous materials.	10	L2	CO1
	b.	What are smart materials? Explain Piezo-electric materials, MR Fluids and Shape Memory Alloys.	10	L2	CO1
		OR			
Q.2	a.	Describe Nano Materials. Indicate the types of nano materials with their advantages, disadvantages, and applications.	10	L2	CO1
	b.	What are composite materials? Discuss briefly about the types of composite materials based on types of reinforcements and matrix.	10	L2	CO1
		Module – 2			
Q.3	a.	With the Enthalpy-Temperature Diagram, Discuss the formation of steam.	08	L2	CO2
	b.	Find the enthalpy of 1 kg of steam at 12 bar when (i) The steam is dry saturated, (ii) Steam is 22% wet and (iii) Superheated to 250°C. Use the steam table. Assume the specific heat of the superheated steam as 2.25 kJ/kg K.	07	L2	CO2
	c.	Briefly explain Heat Engines.	05	L2	CO2
		OR			
Q.4	a.	With the help of neat Sketch, Enumerate the working principle of 4 stroke SI Engine. Indicate the P-V Diagram.	08	L2	CO2
	b.	Explain the components of Electric Vehicles.	07	L2	CO2
	c.	List the advantages and disadvantages of Hybrid Electric Vehicles.	05	L2	CO2
		Module – 3			
Q.5	a.	With the neat sketch explain the following lathe machine operation. (a) Turning (b) Facing (c) Taper Turning by Swiveling the compound rest method.	08	L2	CO3
	b.	Illustrate the following drilling operation with neat sketch. (a) Reaming (b) Counter Boring (c) Counter Sinking	06	L2	CO3
	c.	Differentiate between up milling and down milling.	06	L2	CO3
		OR			

Q.6	**a.**	Describe with a neat sketch, the working principle of Arc welding process.	**08**	**L2**	**CO3**
	b.	Discuss the following milling operation with neat sketch. (a) Plain Milling (b) Slot Milling.	**06**	**L2**	**CO3**
	c.	Discuss the key differences between soldering and brazing.	**06**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	Derive expression for simple and compound gear trains.	**08**	**L2**	**CO4**
	b.	A simple gear train is made up of four gears A, B, C and D having 20, 40, 60 and 80 teeth respectively. If gear "A" is the main driver rotating at 500 rpm clockwise. Estimate the following. (i) Speed of the intermediate gears (ii) Speed and Direction of the last follower (iii) Train Value.  Fig. 7b Combination of Gears	**07**	**L2**	**CO4**
	c.	Write a note on open and cross belt drives.	**05**	**L2**	**CO4**
		OR			
Q.8	**a.**	Define Industrial Robot. Enlist the classification of robot based on the physical configuration. Explain the Cartesian coordinate robot with neat sketch.	**08**	**L2**	**CO4**
	b.	Elucidate the following terms related to robots. (i) Work Volume , (ii) Accuracy, (iii) Precision, (iv) Repeatability.	**07**	**L2**	**CO4**
	c.	Write a short note on spur gears.	**05**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	With the help of block diagram, Describe the components of CNC machine.	**08**	**L2**	**CO5**
	b.	Classify the applications of Additive Manufacturing into suitable categories.	**05**	**L2**	**CO5**
	c.	Summarize the sequence of processes in Additive Manufacturing.	**07**	**L2**	**CO5**
		OR			
Q.10	**a.**	What is meant by automation? Discuss the concept and features of flexible automation.	**08**	**L2**	**CO5**
	b.	Highlight the key advantages and disadvantages of CNC systems.	**05**	**L2**	**CO5**
	c.	Elaborate on the contributions of AI to (i) manufacturing operations and (ii) mechanical design solutions.	**07**	**L2**	**CO5**

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CBCS SCHEME

USN | | | | | | | | | | | 1BPLC105B

First Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Python Programming

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 salient features of Python.	6	L2	CO1
	b.	Describe the Collatz 3n + 1sequence and explain how iteration and conditional statements are used in its implementation.	8	L2	CO1
	c.	Write a Python program to calculate factorial of a number.	6	L3	CO1
		OR			
Q.2	a.	Explain Syntax Error, Runtime Error, and Semantic error with an example.	6	L2	CO1
	b.	Explain break and continue statements with example.	8	L2	CO1
	c.	Write a Python program to print only even Fibonacci numbers up to n terms.	6	L3	CO1
		Module – 2			
Q.3	a.	Explain Python string handling method with example : find ( ) , Upper ( ) , isupper ( ) , len ( ).	8	L2	CO2
	b.	Tuples are immutable. Explain with an example. And also differentiate between tuple and list.	5	L2	CO2
	c.	Write a Python program to count occurrences of characters in a string and print the count.	7	L3	CO2
		OR			
Q.4	a.	Explain the string operations in Python for slicing, concatenation, repetition and comparison with suitable example.	8	L2	CO2
	b.	What is a list? Explain append ( ), insert ( ), remove ( ), pop () with example.	5	L2	CO2
	c.	Develop a Python program to sort a given list of numbers using Bubble sort from lowest to highest order.	7	L3	CO2
		Module – 3			
Q.5	a.	Explain dictionary methods like keys( ), values( ), items( ) with an example.	6	L2	CO2
	b.	What is Broadcasting in NumPy. Develop a program to illustrate Broadcasting array elements.	6	L3	CO3

	c.	Develop a Python program to count the number of lines and words in the file.	8	L3	CO4
		OR			
Q.6	a.	Explain the concept of aliasing and copying in dictionary with an example.	6	L2	CO2
	b.	What is Masking in NumPy. Develop a program to illustrate masking to filter array elements.	6	L3	CO3
	c.	Develop a Python program to sort the contents of a text file in reverse order and write the sorted contents in to a separate file.	8	L3	CO4
		Module – 4			
Q.7	a.	Discuss the various methods of importing modules in python program.	6	L2	CO3
	b.	Define class and object. Explain with syntax and an example how to define class in Python. How to initiate a class and how the class members are accessed.	8	L2	CO5
	c.	Develop a Python program to illustrate how variable lookup follows LEGB (Local, Enclosing, Global, Built-in) rule.	6	L3	CO3
		OR			
Q.8	a.	Explain how to create user-defined modules in Python with an example. Also discuss the uses of user-defined modules.	6	L2	CO3
	b.	Explain __init__( ) and __str__( ) methods with an example.	8	L2	CO5
	c.	Develop a program that simulates a simple stopwatch that records random time intervals and calculates the average elapsed time.	6	L3	CO3
		Module – 5			
Q.9	a.	Briefly explain Assertion and raising an exception.	4	L2	CO5
	b.	What is polymorphism? Develop a program to illustrate polymorphism by defining a common interface method in two different classes.	8	L3	CO5
	c.	Create a Python class Point with attributes x and y. Demonstrate sameness using 'is' operator, deep equality using ==, and show the effect of mutability when modifying one reference.	8	L3	CO5
		OR			
Q.10	a.	Explain the term objects are mutable with an example.	4	L2	CO5
	b.	What is operator overloading? Define a Class Complex. Overload the + operator to add two complex numbers. Write a Python program to read N (N ≥ 2) complex numbers and find their cumulative sum using operator overloading.	8	L3	CO5
	c.	Explain the need for exception handling in Python. Develop a program to illustrate: try, except, else, finally blocks and also show how to raise an exception.	8	L3	CO5

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CBCS SCHEME

USN | | | | | | | | | | **1BPLC105E**

First Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Introduction to C Programming

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 Algorithm. Develop an algorithm to find the average of three numbers taken as input from the user.	5	L2	CO1
	b.	Define Variable? Explain the rules for constructing variables in C language. Identify whether the following variable is valid or invalid, State the reason for the same. i) int ii) area iii) 20group_one iv) $type v) _ptr123.	10	L2	CO1
	c.	List the features of C programming language. Explain the process of compiling and executing a C Program.	5	L2	CO1
		OR			
Q.2	a.	Define Flow chart. List the symbols used in designing a flowchart. Write a flowchart to calculate area of circle.	6	L2	CO1
	b.	Explain the basic structure of C program with a programming example.	10	L2	CO1
	c.	Explain Input and Output functions in C Programming with suitable example.	4	L2	CO1
		Module – 2			
Q.3	a.	Define an Operator. List different types of operators of C and explain any FIVE operators with an example.	10	L2	CO1
	b.	Explain if else statement with syntax and a suitable program.	5	L2	CO2
	c.	Develop a C program to find whether a given number is prime or not.	5	L3	CO2
		OR			
Q.4	a.	Differentiate between entry controlled loop and exit controlled loop.	6	L2	CO2
	b.	Explain switch statement with syntax and a suitable program.	8	L2	CO2
	c.	Develop a C program to find the roots of quadratic equations.	6	L3	CO2
		Module – 3			
Q.5	a.	Define Array? Demonstrate the declaration and different initialization methods of One-Dimensional array with syntax and example.	7	L2	CO3
	b.	Develop a C program to find the length of a string without using built in function.	5	L3	CO3

	c.	Develop a C program to find key elements in an array using linear search.	8	L3	CO3
		OR			
Q.6	a.	Define a String? Explain declaration and initialization of strings with example.	5	L3	CO3
	b.	List and explain any FIVE String-handling Functions with example.	7	L2	CO3
	c.	Develop a C program to concatenate two strings, find length of a string and copy one string to other using string operations.	8	L3	CO3
		Module – 4			
Q.7	a.	Define a function? Explain the various elements of user defined functions with suitable example.	10	L2	CO4
	b.	Explain function with arguments and no return value with suitable programming example.	10	L2	CO4
		OR			
Q.8	a.	Explain function with no arguments and no return value with suitable programming example.	10	L2	CO4
	b.	Develop a modular C program to find GCD and LCM of given numbers using user defined functions.	10	L3	CO4
		Module – 5			
Q.9	a.	Define structure. Explain the general format of a structure definition with example.	7	L2	CO5
	b.	Differentiate between arrays and structures with an example.	7	L2	CO5
	c.	Define pointer. Illustrate declaring and initialization of a pointer variable with an example.	6	L2	CO5
		OR			
Q.10	a.	Explain Arrays within Structure with suitable programming example.	10	L2	CO5
	b.	Develop a C program to declare the structure of employees and display the employee records with higher salary among two employees.	10	L3	CO5

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CBCS SCHEME

1BENG106

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

Question Paper Version : A

First Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Communication Skills

Time: 1 hr. Max. Marks: 50

INSTRUCTIONS TO THE CANDIDATES

1. Answer all the **fifty** questions, each question carries one mark.
2. Use only **Black ball point pen** for writing / darkening the circles.
3. **For each question, after selecting your answer, darken the appropriate circle corresponding to the same question number on the OMR sheet.**
4. Darkening two circles for the same question makes the answer invalid.
5. **Damaging/overwriting, using whiteners** on the **OMR** sheets are strictly prohibited.

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1. What does "Communicative English" refer to?
   a) Fluent reading skills
   b) Ability to write essays
   c) Effective use of English for communication
   d) Learning English vocabulary

2. Why is English important for global interaction?
   a) It's a universal language for business
   b) It's a native language in most countries
   c) It's the easiest language to learn
   d) It has a simple grammar

3. Non-verbal communication does not include
   a) Gestures
   b) Posture
   c) Silence
   d) Words

4. What does the term 'communication' refer to?
   a) Conveying information only
   b) Conveying feelings and emotions
   c) Conveying information, ideas, thoughts, and more
   d) Nonverbal communication only

5. An employee sends a suggestion about improving a process directly to the CEO. This is an example of :
   a) Downward communication
   b) Horizontal communication
   c) Diagonal communication
   d) Upward communication

6. Which of the following is a psychological barrier to effective communication?
   a) Background noise
   b) Lack of attention
   c) Limited vocabulary
   d) Technical jargon

7. She is still a _____.
   a) bachelor b) spinster c) female bachelor d) bacheloress

8. Chronemics refers to :
   a) Use of physical touch b) Study of time in communication
   c) Facial expressions d) Writing style and structure

9. What is one of the most common mistakes among new English learners related to pronunciation?
   a) Vocabulary usage b) Punctuation errors
   c) Misuse of prepositions d) Mispronunciation

10. What is the syllabic structure of the word "dictionary"?
    a) CVC-V-CVC b) VC-CVC c) V-CV-CV-CV d) CVC-CVC-VCV

11. Which of these qualities is important in a group discussion?
    a) Hostility b) Aggressiveness
    c) Emotional stability d) Ignorance

12. Which of the following is most essential in delivering an effective PEP Talk?
    a) Use of complex vocabulary b) Clear and inspiring message
    c) Lengthy explanations d) Reading directly from notes

13. Which of the following words belongs to technical vocabulary in engineering?
    a) Algorithm b) Happiness c) Beautiful d) Quickly

14. In a group discussion, we should be _____
    a) Assertive b) Dominating c) Subjective d) Ignorant

15. A presentation is a form of oral communication in which a person shares factual information with a _____audience.
    a) Mixed b) Large c) Specific d) Small

16. When using scanning to read an achiever's interview, the reader should :
    a) Look for the general mood of the passage
    b) Read slowly and carefully for each sentence
    c) Search for specific details such as dates, achievements or quotes
    d) Summarize the entire text in their own words

17. To select the content of presentation, you should know :
    a) The available material b) Your time limit
    c) The audience's needs d) Your purpose

18. Identify the sentence pattern: "She reads books."
    a) S + V b) S + V + O c) S + V + IO + DO d) S + V + C

19. What is the correct sequence when writing a short biography based on reflections?
    a) Achievements → Death → Early life → Advice
    b) Earlylife → Education → Career / achievements → Reflections/advice
    c) Advice → Earlylife → Achievements → Education
    d) Career → Earlylife → Reflections → Education

20. Choose the sentence that follows the pattern S+V+C (Subject + Verb + Complement) :
a) He wrote a letter
b) She is a doctor
c) The boy kicked the ball
d) They offered him a job

21. When responding to an email, what is considered best practice?
a) Reply as soon as possible, preferably 24 hours
b) Wait at least a week before replying
c) Only respond if you agree with the content
d) Forward the email to others before replying

22. Which among these should not be present in a formal letter?
a) The name of the firm
b) The date
c) Business jargon
d) Courteous leave - taking

23. What is the main purpose of a concluding sentence?
a) Introduce a new idea
b) Summarize the paragraph and provide closure
c) Confuse the reader
d) Make the paragraph

24. Which of the following is not a type of paragraph?
a) Descriptive
b) Bibliographic
c) Narrative
d) Argumentative

25. Which tool can assist in proof reading but should not be fully relied upon?
a) Dictionary
b) Spell check / Grammar check software
c) Thesaurus
d) Notebook

26. Which of the following is a non-Wh question?
a) Where are you going?
b) Why is she late?
c) Do you like coffee?
d) What is your name?

27. Identify the grammatical error in the sentence :
"He don't know the answer"
a) Spelling error
b) Subject – verb agreement error
c) Punctuation error
d) Word choice error

28. I should be ___the paper then
a) reading
b) read
c) readed
d) red

29. The correct form of reported speech of-She said him, "What did you say?"
a) She asked him what he said
b) She asked him what he had said
c) She asked him what he say
d) She asked him what did you say

30. Identify the correct question tag:
"You are a student, _____?"
a) Are you
b) aren't you
c) is you
d) isn't you

31. Said to him, "Who are you?"
a) I enquired of him who he was
b) I enquired who I was
c) I enquired him who was he
d) I enquired of him who I was

32. What is a major challenge for students in rural areas when accessing digital resources?
    a) Too many books in the library
    b) Poor internet connectivity and lack of devices
    c) High cost of printing physical copies
    d) Difficulty using shelves

33. Which of the following is a popular online grammar-checking tool that also offers plagiarism detection?
    a) Canva b) Grammarly c) Photoshop d) Trello

34. Posting confidential company data on social media without permission violates which principle of netiquette?
    a) Respect for privacy b) Respect for diversity
    c) Avoiding spam d) Using proper grammar

35. Which of the following is NOT an advantage of online communication?
    a) Connects people across geographies b) Cost savings on travel and logistics
    c) Guarantees nom is interpretation of tone d) Supports multimedia and collaboration

36. Why is using ALLCAPS in online communication discouraged?
    a) It uses too much data b) It is difficult to read
    c) It is considered shouting or aggressive d) It is informal

37. Which of these tools supports both synchronous and asynchronous communication?
    a) Whats App b) Google Docs c) Email d) Forum

38. A company wants to create a permanent discussion space where employees can post suggestions anytime and HR can respond later. Which tool is MOST appropriate?
    a) Zoom b) Slack video call c) Email thread d) Discussion forum

39. Which of the following is asynchronous communication tool?
    a) Moodle Forum b) Zoom Webinar c) Email d) Linked in Group

40. What is the function of using a quote(" ") around a search phrase?
    a) Highlight key words in results b) Search for synonyms
    c) Search for an exact – match of the phrase d) Exclude the phrase from results

41. Telephone interviews are often used as :
    a) The final stage of the hiring process
    b) A casual conversation with HR
    c) A screening step before face – to – face interviews
    d) A group discussion replacement

42. In a formal job interview, which of the following greetings is most appropriate?
    a) Hey, what's up? b) Good morning, Sir/Madam
    c) Hi buddy! d) Yo, how's it going?

43. For a fresher, the ideal length of a resume is :
    a) 3-4 pages b) 2-3 pages c) 1 page d) 5 pages

44. Which of these is a common mistake in resume?
a) Using action verbs
b) Tailoring a resume for each job
c) Including irrelevant details
d) Highlighting measurable achievements

45. Primary requirements for an interview are
a) A good cover letter and updated Curriculum Vitae
b) Wearing formal attire
c) Knowledge about the company
d) All of these

46. Fill in the blank with the correct modal auxiliary verb : "You ----wear a helmet while riding a bike."
a) may b) must c) could d) might

47. Which modal auxiliary verb best fits in the given sentence? "Employees -- submit their Reports before Friday."
a) should b) may c) might d) can

48. Which of the following best defines plagiarism?
a) Using open – access materials from the internet
b) Using someone else's ideas or words without giving credit
c) Writing your own ideas in your own words
d) Quoting a source with proper citation

49. Which of the following is NOT a benefit of mock interviews?
a) Boosting confidence
b) Receiving constructive feedback
c) Learning how to answer common interview questions
d) Ensuring your are hired by the company

50. A good mock interview should include :
a) Realistic interview questions
b) Feedback on verbal and non-verbal communication
c) Time management practice
d) All of these

* * * * *

CBCS SCHEME

1BKBK109

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

Question Paper Version : D

First Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Balake Kannada

Time: 1 hr. Max. Marks: 50

INSTRUCTIONS TO THE CANDIDATES

1. Answer all the **fifty** questions, each question carries one mark.
2. Use only **Black ball point pen** for writing / darkening the circles.
3. **For each question, after selecting your answer, darken the appropriate circle corresponding to the same question number on the OMR sheet.**
4. Darkening two circles for the same question makes the answer invalid.
5. **Damaging/overwriting, using whiteners** on the **OMR** sheets are strictly prohibited.

Substitute word from following each sentence in appropriate places:

1. Kaaleju :Kaalejininda:: Mane : _____
   a) Maneyaalli b) Maneinda c) Manedu d) Mane

2. Iru :Irtivi :: Bari : _____
   a) Baritivi b) Barathe c) Baru d) None of these

3. Swami: Swamigalu::Kurchi : _____
   a) Kurchigalu b) Kurchiyalli c) Kurchii d) None of these

4. Hogu: Hogonaa :: Kodu: _____
   a) Baarona b) KodoNa c) Kodusu d) Kudiyiri

5. Naanu: Nanna :: Neenu: _____
   a) Avala b) Ninna c) Avana d) Avara

6. Amma: Mother :: Tangi: _____
   a) Sister b) Brother c) Father d) Friend

7. What: Enu :: Where: _____
   a) Elli b) Hege c) Eeke d) Yaaru

8. Seven: Elu :: Ten: _____
   a) Muuru b) Aaru c) Ondu d) Hattu

Translate questions from Kannada to English :

9. Avaru yaaru?
a) Who is there? b) Why are they? c) Who are they? d) Come here?

10. Howdu, yaake?
a) Why so b) Let's go c) Yes, why? d) None of these

11. Eshtu gante saar?
a) What time sir b) What is time now
c) What is time now d) What is the time sir?

12. Allige naanu hogabahudaa ?
a) May I go there? b) Will you go there?
c) When you will go? d) Is she going there?

13. Neenu yaaru?
a) Who are you? b) What is that? c) Who was there? d) None of these

14. Idu yaara byaagu?
a) Whose bag is this? b) Whose book is this?
c) Whose pen is this? d) None of these

Translate questions from English to Kannada :

15. Who sir?
a) Yaake amma b) Yaake akka c) Yaaru saar d) Aytu saar

16. Shall we go?
a) Aytu saar b) Nan hogalla c) Yavagahogalii d) Navu HogoNave

17. It is mine
a) Andare nannadu b) Eshtu gante c) Tindi aytaa d) Adu nannadu

18. What is your name?
a) Nimma hesarenu? b) Nee yelliyavanu
c) Neevu yaaru d) None of these

19. Where is Hampi?
a) Hampi hegide b) Hampi yeshtu doddadide
c) Hampi yellide d) All of these

20. Had your breakfast?
a) Oata ayitha b) Tindi ayitha c) Thindi yenu d) None of these

Choose the past tense word for the given word:

21. Hogu:
a) Hoguvanu b) Hoguthane c) Hogiddanu d) Hogu

22. Bandiddane:
a) Banda b) Bandidda c) Baa d) None of these

23. Madu:
a) Madutidda b) Maduthidane c) Madalla d) Madu

Choose the future tense word from the given word:

24. Helu :
a) Helida b) heluthiddane c) Heluthane d) None of these

25. Bari :
a) Bari b) Bariyabeku c) Bariyuthidane d) Bareyuthene

26. Odu :
a) Odidanu b) Oduvanu c) Odu d) None of these

Fill in the blanks by choosing suitable words given below:

27. Nimma kaalejinaa_____?
a) Baana b) Maarga c) Hesarenu d) Yaavudu

28. Naanu _____ bengalurige hoguve
a) Neenu b) Avaru c) NaLe d) Nenne

29. Nanage nimma maneya_____ kodi
a) Yavudu b) Vilaasa c) Kodi d) Hesaru

30. Namma annanige _____ banna tumba ista
a) Baana b) Pustaka c) Neeli d) None of these

31. Illi yaavudaadaru roomu _____ ideyaa?
a) Badigege b) Naana c) Ninnu d) None of these

32. Adu _____ roomu?
a) Yelli b) Kappu c) Belli d) Yaara

33. Namma maneya banna.
a) Kempu b) Hosadhu c) Yake d) Yelli

34. Naale _____ urige hoganave?
a) Naavu b) Naanu c) Ivalu d) Avanu

Choose Kannada word for given English word:

35. Long
a) Chikka b) Sanna c) Udda d) Dappa

36. Thank you Sir.
a) Yavaga bandiri b) Vandenengalu saar c) aytu saar d) bedi saar

37. Why sir?
a) Yaake amma b) Yaake akka c) Yaake saar d) Aytu saar

38. Story:
a) Mane b) Paatha c) Tangi d) Kate

39. Shall I go?
a) Aytu saar b) Nan hogalaa c) Yavaga hogali d) None of these

40. That means
a) Andare b) Eshtu gante c) Tindi aytaa d) None of these

41. Stand up
a) kutkoli b) eddu nillu c) olage banni d) kelage ba

42. Get out
a) Belagge ba b) naale ba c) olage ba d) horage hogu

Choose English word for given Kannada word:

43. Kesari
a) Red b) Black c) White d) Orange

44. Chikka
a) Small b) Tall c) Thin d) Fat

45. Nodona
a) Come see b) Let's do c) Let us come d) Let us see

46. Baadige
a) Rent b) House c) Own d) Middle

47. Naataka
a) Story b) Lesson c) Marriage d) Drama

48. Mane
a) Palace b) Mall c) House d) Office

49. Anna
a) Uncle b) Grandfather c) Brother d) Nephew

50. Hattu
a) Ten b) Five c) Six d) Four

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CBCS SCHEME

USN | | | | | | | | | |

1BKSK109

Question Paper Version : A

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

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ - Samskruthika Kannada

Time: 1 hrs. Max. Marks: 50

ಸೂಚನೆಗಳು

1. ಎಲ್ಲ ೫೦ ಪ್ರಶ್ನೆಗಳಿಗೂ ಉತ್ತರಿಸಿರಿ. ಪ್ರತಿ ಪ್ರಶ್ನೆಗೆ ಒಂದು ಅಂಕ.
2. ಓ.ಎಂ.ಆರ್ ಉತ್ತರ ಪತ್ರಿಕೆಯಲ್ಲಿ ಯು.ಎಸ್.ಎನ್ ಸಂಖ್ಯೆ ಹಾಗೂ ಪಶ್ನೆ ಪತ್ರಿಕೆಯ ಶ್ರೇಣಿಯನ್ನು ಅಂದರೆ A, B, C ಅಥವಾ D ಯನ್ನು ತಪ್ಪಿಲ್ಲದಂತೆ ಕಡ್ಡಾಯವಾಗಿ ಗುರುತಿಸುವುದು ಅಭ್ಯರ್ಥಿಯ ಜವಾಬ್ದಾರಿಯಾಗಿರುತ್ತದೆ.
3. ಓ.ಎಂ.ಆರ್ ಉತ್ತರ ಪತ್ರಿಕೆಯಲ್ಲಿ ನಿಗದಿಪಡಿಸಿರುವ ಸ್ಥಳದಲ್ಲಿ ಭರ್ತಿಮಾಡದೆ ಹಾಗೆಯೇ ಬಿಟ್ಟಲ್ಲಿ ಅಥವಾ ಭರ್ತಿಮಾಡಿದ ಮಾಹಿತಿಯಲ್ಲಿ ಯಾವುದೇ ವ್ಯತ್ಯಾಸವಿದ್ದಲ್ಲಿ ಅಂತಹ ಉತ್ತರ ಪತ್ರಿಕೆಗಳನ್ನು ರದ್ದು ಪಡಿಸಲಾಗುವುದು.
4. ಕೇವಲ ಒಂದು ಉತ್ತರವನ್ನು ಮಾತ್ರ ಉತ್ತರ ಪತ್ರಿಕೆಯಲ್ಲಿ ಗುರುತಿಸತಕ್ಕದ್ದು. ಒಂದೆ ಪ್ರಶ್ನೆಗೆ ಎರಡು ಉತ್ತರವನ್ನು ಗುರುತಿಸುವುದು ಅಮಾನ್ಯ.
5. ಎಲ್ಲಾ ಉತ್ತರಗಳನ್ನು ನಿಮಗೆ ಒದಗಿಸಲಾದ ಓ.ಎಂ.ಆರ್ ಉತ್ತರ ಪತ್ರಿಕೆಯ ಹಾಳೆಯ ಮೇಲೆ ಕಪ್ಪು ಅಥವಾ ನೀಲಿ ಶಾಹಿಯ ಬಾಲ್‌ಪಾಯಿಂಟ್ ಪೆನ್ನಿನಿಂದ ಗುರುತು ಮಾಡಬೇಕು.

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1. ಭಾಷಾ ಕಲಿಕೆಗೆ ಎಷ್ಟು ಕೌಶಲಗಳು ಇವೆ ?
   a) ಎರಡು b) ಮೂರು c) ನಾಲ್ಕು d) ಐದು

2. ಕರ್ಣ ರಸಾಯನ ಮಲ್ತೆ ಭಾರತಂ – ಎಂದು ಹೇಳಿರುವ ಕವಿ ಯಾರು ?
   a) ಪಂಪ b) ಜನ್ನ c) ಪೊನ್ನ d) ರನ್ನ

3. ಕವಿರಾಜಮಾರ್ಗ ಕೃತಿಯಲ್ಲಿ ಕರ್ನಾಟಕದ ಗಡಿಗಳನ್ನು ಎಲ್ಲಿಂದ ಎಲ್ಲಿಯವರೆಗೆ ಕವಿ ಗುರುತಿಸಿದ್ದಾನೆ ?
   a) ಬ್ರಹ್ಮಪುತ್ರ-ಗೋದಾವರಿ b) ಕೃಷ್ಣ-ಮಲಪ್ರಭೆ
   c) ತುಂಗಾ-ಭದ್ರಾ d) ಕಾವೇರಿ-ಗೋದಾವರಿ

4. ಕರ್ನಾಟಕ ಏಕೀಕರಣಕ್ಕಾಗಿ ಧಾರವಾಡದಲ್ಲಿ ಸ್ಥಾಪಿತವಾದ ಸಂಘ ಯಾವುದು ?
   a) ಕರ್ನಾಟಕ ವಿದ್ಯಾವರ್ಧಕ ಸಂಘ b) ಕನ್ನಡ ಸಂಘ
   c) ಕನ್ನಡ ಸಾಹಿತ್ಯ ಪರಿಷತ್ತು d) ಕರ್ನಾಟಕ ಸಂಘ

5. 1920 ರಲ್ಲಿಕಾಂಗ್ರೆಸ್ ಅಧಿವೇಶನ ಎಲ್ಲಿ ನಡೆಯಿತು ?
a) ಆಂಧ್ರಪ್ರದೇಶ b) ಮಹಾರಾಷ್ಟ್ರ
c) ಬೆಂಗಳೂರು d) ನಾಗಪುರ

6. ವಿನೋಬಾ ಭಾವೆಯವರು ಕನ್ನಡ ಲಿಪಿಯನ್ನು ಏನೆಂದು ಕರೆದಿದ್ದಾರೆ ?
a) ಲಿಪಿರಾಜ b) ಲಿಪಿಗಳರಾಣಿ
c) ಸಿರಿಲಿಪಿ d) ಲಿಪಿಲಾವಣ್ಯ

7. ಹಂಪ ನಾಗರಾಜಯ್ಯನವರು ಹುಟ್ಟಿದ ಊರು ?
a) ಮಂಡ್ಯ b) ಹಂಪಸಂದ್ರ
c) ಮೈಸೂರು d) ಹಂಪಿ

8. ಭಾರತದಲ್ಲಿ ಎಷ್ಟು ಭಾಷಾ ಸೂತ್ರ ಜಾರಿಯಲ್ಲಿದೆ ?
a) ಏಕಭಾಷಾ b) ಬಹುಭಾಷಾ
c) ತ್ರಿಭಾಷಾ d) ದ್ವಿಭಾಷಾ

9. ಆಂಡಯ್ಯ ಕವಿ ಬರೆದ ಕೃತಿ ಯಾವುದು ?
a) ಕವಿರಾಜಮಾರ್ಗ b) ಕಬ್ಬಿಗರಕಾವ್ಯ
c) ಕರ್ನಾಟಕವೈಭವ d) ಆದಿಪುರಾಣ

10. ಧರ್ಮಸಹಿಷ್ಣುತೆ ಕುರಿತು ಯಾವ ಶಾಸನ ತಿಳಿಸುತ್ತದೆ ?
a) ಹಲ್ಮಿಡಿಶಾಸನ b) ಮಸ್ಕಿಶಾಸನ
c) ಬೇಲೂರುಶಾಸನ d) ಬಾದಾಮಿಶಾಸನ

11. ಶಿಶುನಾಳ ಶರೀಫರು ಯಾವ ಸಾಹಿತ್ಯ ಪ್ರಕಾರದಲ್ಲಿ ಪ್ರಸಿದ್ಧರು ?
a) ತತ್ವಪದ b) ಕೀರ್ತನೆ
c) ವಚನ d) ಸಾಂಗತ್ಯ

12. ಕಳ್ಳನಿಗೆ ಅಂಜಿ ಕಾಡು ಹೊಕ್ಕರೆ_____ತಿನ್ನದೆ ಇರುತ್ತದೆ ?
a) ಸಿಂಹ b) ಚಿರತೆ
c) ಹುಲಿ d) ಕರಡಿ

13. ತಮಂಧ ಪದದ ಅರ್ಥವೇನು ?
a) ಕತ್ತಲು b) ಬೆಳಕು
c) ರಾತ್ರಿ d) ಹಗಲು

14. ಕುಂಬಾರಕಿ ಏನನ್ನು ತುಂಬಿಕೊಂಡಿದ್ದಾಳೆ ?
a) ಸ್ವರ್ಗ b) ನರಕ
c) ಬ್ರಹ್ಮಾಂಡ d) ಪ್ರಪಂಚ

15. ಜೇಡರದಾಸಿಮಯ್ಯನವರ ಅಂಕಿತ ನಾಮವೇನು ?
a) ರಾಮನಾಥ b) ಕೂಡಲಸಂಗಮದೇವ
c) ಗುಹೇಶ್ವರ d) ಚೆನ್ನಮಲ್ಲಿಕಾರ್ಜುನ

16. ಅದರಿಂದೇನುಫಲ ಇದರಿಂದೇನುಫಲ- ಇದು ಯಾರ ಕೀರ್ತನೆ ?
a) ಕನಕದಾಸ b) ಪುರಂದರದಾಸ
c) ಶ್ರೀಪಾದರಾಯ d) ಮಹಿಪತಿದಾಸ

17. ಕಾಗೆ ತನ್ನ ಕಣ್ಣು ಕಾಣದೇ ಯಾರನ್ನು ಬಯ್ಯುವುದು ?
a) ರವಿ b) ಶಶಿ
c) ಸೂರ್ಯ d) ಕತ್ತಲು

18. ಅಡವಿಯೊಳಗೆ ಆಡುವ_____ಆಹಾರವಿತ್ತವರು ?
a) ಕಾಗೆ-ಗೂಗೆ b) ಕಾಡುಪ್ರಾಣಿಗೆ
c) ಮೃಗಪಕ್ಷಿಗಳಿಗೆ d) ಜಲಚರಗಳು

19. ಕಾಯಕದಲ್ಲಿ ನಿರತನಾದೊಡೆ- ಇದು ಇವರ ವಚನ.
a) ಬಸವಣ್ಣ b) ಅಕ್ಕಮಹಾದೇವಿ
c) ದಾಸಿಮಯ್ಯ d) ಆಯ್ದಕ್ಕಿಮಾರಯ್ಯ

20. ಕನಕದಾಸರ ಜನ್ಮಸ್ಥಳ ಯಾವುದು ?
a) ಶಿಗ್ಗಾವಿ b) ಹಾವೇರಿ
c) ಬಾಡ d) ಬಂಕಾಪುರ

21. ಡಿ.ವಿ. ಗುಂಡಪ್ಪನವರು ಹುಟ್ಟಿದ ವರ್ಷ?
a) 1887 b) 1990 c) 1890 d) 1897

22. ವಸುಧೆ ಪದದ ಅರ್ಥ ?
a) ಆಕಾಶ b) ಭೂಮಿ c) ಭಾಸ್ಕರ d) ನಕ್ಷತ್ರ

23. ತಣ್ಣನ ಜೋಮಾಲೆ ಎಲ್ಲಿತ್ತು?
a) ಕೊರಳು b) ಕಾಲು c) ಹಣೆ d) ಕೈಯಲ್ಲಿ

24. ಬೇಂದ್ರೆಯವರ ಜ್ಞಾನಪೀಠ ಪ್ರಶಸ್ತಿ ಪಡೆದ ಕೃತಿ ?
a) ಸಖೀಗೀತ b) ನಾಕುತಂತಿ
c) ನಾದಲೀಲೆ d) ಕೃಷ್ಣಾಕುಮಾರಿ

25. ಯಾರ ಸಿಂಹಾಸನಕೆ ಕೊನೆಗಾಲ ಬಂದಿದೆ ಎಂದು ಕುವೆಂಪು ಹೇಳಿದ್ದಾರೆ ?
a) ಚಂದ್ರ b) ರಾಜ c) ಇಂದ್ರ d) ಬ್ರಹ್ಮ

26. ಹುಲ್ಲಾಗು ಬೆಟ್ಟದಡಿ_____ಆಗು
a) ಸಂಪಿಗೆ b) ಮಲ್ಲಿಗೆ c) ಗುಲಾಬಿ d) ಸೇವಂತಿಗೆ

27. ವಿಪ್ಲವ ಎಂದರೇನು ?
a) ಕಾಂತಿ b) ಶಾಂತಿ c) ಕ್ರಾಂತಿ d) ಭ್ರಾಂತಿ

28. ಸರ್ವರಿಗೂ ಸಮಬಾಳು ಸರ್ವರಿಗೂ ಸಮಪಾಲು ಎಂದಿರುವ ಕವಿ ಯಾರು?
a) ಬೇಂದ್ರೆ b) ಕಂಬಾರ c) ಕಾರಂತ d) ಕುವೆಂಪು

29. ನಗುವ ಸಹಜದ ಧರ್ಮ; ನಗಿಸುವುದು_____
a) ಧರ್ಮ b) ಅಧರ್ಮ
c) ಸ್ವಧರ್ಮ d) ಪರಧರ್ಮ

30. ಕುರುಡು ಕಾಂಚಾಣಾ ಏನು ಮಾಡುತಲಿತ್ತು ?
a) ಹಾಡುತಲಿತ್ತು b) ಕುಣಿಯುತಲಿತ್ತು
c) ಹಾರುತಲಿತ್ತು d) ಜಿಗಿಯುತಲಿತ್ತು

31. ಕರಕುಶಲ ಕಲೆ _____ಕೈಕಸಬಾಗಿ ಆರಂಭವಾಗಿದೆ.
a) ಪುರುಷರ b) ಮಹಿಳೆಯರ
c) ವೃದ್ಧರ d) ಬಾಲಕಿಯರ

32. ಗಾಂಧೀಜಿ ವಿಶ್ವೇಶ್ವರಯ್ಯನವರನ್ನು ಏನೆಂದು ಕರೆದರು ?
a) ಭಗೀರಥ b) ಅನ್ನಯಜ್ಞ
c) ದೇವರು d) ಅನ್ನಬ್ರಹ್ಮ

33. ಭಾರತದಲ್ಲಿ ಬಣ್ಣಗಳನ್ನು ನೀಡುವ ಅಂದಾಜು ಗಿಡಗಳ ಸಂಖ್ಯೆ_____
a) 200 b) 900 c) 300 d) 800

34. ಬಣ್ಣ ಕಟ್ಟುವ ಕಲೆಯಲ್ಲಿ ನಿಪುಣರಾಗಿದ್ದವರು
a) ನೇಕಾರರು b) ಕೃಷಿಕರು c) ಬಡಿಗರು d) ಕಮ್ಮಾರರು

35. ವಿಶ್ವೇಶ್ವರಯ್ಯನವರಿಗೆ ಸತ್ಯವೇ _____
a) ಸೌಂದರ್ಯ b) ಅದ್ಭುತ c) ನಿಗೂಢ d) ಸೊಗಸು

36. ಭಾರತವು ಬಟ್ಟೆಯ ಮೇಲಿನ _____ಕಲೆಗೆ ಮೂಲ.
a) ಚಿತ್ರಕಲೆ b) ಮುದ್ರಣಕಲೆ
c) ಬಿದಿರಿಕಲೆ d) ಕುಶಲಕಲೆ

37. ವಿಶ್ವೇಶ್ವರಯ್ಯನವರು ಕಟ್ಟಿಸಿದ ಜಲಾಶಯ ಯಾವುದು ?
a) ತುಂಗಭದ್ರಾ b) ನಾರಾಯಣಪುರ
c) ಆಲಮಟ್ಟಿ d) ಕೃಷ್ಣರಾಜಸಾಗರ

38. ಕರಕುಶಲ ಕಲೆಗಳಿಗೆ ಎಷ್ಟು ವರ್ಷಗಳಿಂದ ಬೇಡಿಕೆ ಇದೆ ?
a) 6200 b) 4200 c) 2500 d) 5200

39. ಭದ್ರಾವತಿ ಕಬ್ಬಿಣ ಮತ್ತು ಉಕ್ಕು ಕಾರ್ಖಾನೆಯನ್ನು ಯಾರು ಸ್ಥಾಪಿಸಿದರು ?
a) ರಾಮಾನುಜನ್ b) ವಿಶ್ವೇಶ್ವರಯ್ಯ
c) ರಾಮಕೃಷ್ಣ d) ವಿಶ್ವಾರಾಧ್ಯ

40. ಪ್ರಯಾಣದಲ್ಲಿರುವಾಗ ವಿಶ್ವೇಶ್ವರಯ್ಯನವರ ಸೂಟ್‌ಕೇಸ್‌ನಲ್ಲಿ ಇರುತ್ತಿದ್ದುದು ?
a) ಭಗವದ್ಗೀತೆ b) ಹಣ c) ಬಾಂಡ್‌ಪೇಪರ್ d) ಬಂಗಾರ

41. ಮೆಗಾನೆಯಲ್ಲಿ ಯಾವ ಜನಾಂಗ ವಾಸವಾಗಿತ್ತು ?
a) ಗೊಂಡ b) ಕುರುಬ c) ಕುಣಬಿ d) ಜೇನುಕುರುಬ

42 ಪ್ರಹ್ಲಾದ್ ಯಾವ ವೃತ್ತಿಯಲ್ಲಿದ್ದನು ?
a) ಕಾರ್ಪೆಂಟರ್ b) ಲೆಕ್ಚರರ್ c) ಇಂಜಿನಿಯರ್ d) ಬಿಜಿನೆಸ್

43. ಆಶ್ರಮ ಶಾಲೆಯ ಮಾಸ್ತರರು ಯಾರು ?
a) ಹುಚ್ಚಪ್ಪ b) ಶ್ರೀನಿವಾಸಮೂರ್ತಿ c) ಲಿಂಗೇಗೌಡ d) ಕುಪ್ಪಯ್ಯ

44. ಹಿ.ಚಿ. ಬೋರಲಿಂಗಯ್ಯನವರು ಯಾವ ವಿವಿಕುಲಪತಿಯಾಗಿದ್ದರು ?
a) ಮೈಸೂರು ವಿವಿ b) ಹಂಪಿ ಕನ್ನಡ ವಿವಿ
c) ಕಲಬುರಗಿ ವಿವಿ d) ಜಾನಪದ ವಿವಿ

45. ಮಗನಮನೆ _____ದಂತಿದೆ
a) ಇಂದ್ರಪ್ರಸ್ಥ b) ಬೃಂದಾವನ c) ನಂದನವನ d) ಗಂಧದಮನೆ

46. ಕುಪ್ಪಯ್ಯನ ಕಣ್ಣಿಗೆ _____ಬಿತ್ತು
a) ಹುಲಿ b) ಸಿಂಹ c) ಇಲಿ d) ಮೊಲ

47. ಗೋಪಣ್ಣನ ಹೆಂಡತಿಯ ಹೆಸರೇನು ?
a) ರೇಖಾ b) ರುಕ್ಮಿಣಮ್ಮ c) ಚಾಂದಿನಿ d) ರೇಷ್ಮಾ

48. ಸಂಗೀತಪುರ ಎಂಬ ಹೆಸರು ಯಾವ ಹಳ್ಳಿಗಿತ್ತು ?
a) ನಾಗವಳ್ಳಿ b) ಮೆಗಾನೆ c) ಹಾಡುವಳ್ಳಿ d) ಬಟ್ಟರಹಳ್ಳಿ

49. ಸರ್ಕಾರಿ ಆಸ್ಪತ್ರೆಯಲ್ಲಿದ್ದ ದಾದಿ ?
a) ರೇಖಾ b) ಚಾಂದಿನಿ c) ರಾಧಾ d) ಗೋಪಣ್ಣ

50. ಸಂಡೂರು ಯಾರ ಜನ್ಮಸ್ಥಳ ?
a) ವಸುಧೇಂದ್ರ b) ಅನಂತಮೂರ್ತಿ c) ಲಂಕೇಶ್ d) ತೇಜಸ್ವಿ

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