AJ Institute of Engineering and Technology Mangaluru.

VTU Question Papers

BE I & II Semester Supplementary Exam

Physics & Chemistry Cycle

2022 SCHEME

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AJ Institute of Engineering and Technology, Mangaluru.

NH-66, Kottara Chowki, Mangaluru – 575 006

INDEX

INDEX

CBCS SCHEME

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

BMATS101

First Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Mathematics – I for CSE Stream

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. VTU Formula Hand Book is permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	With usual notations, prove that $\tan\phi = r\frac{d\theta}{dr}$.	6	L2	CO1
	b.	Show that the curves $r = a(1 + \sin\theta)$ and $r = b(1 - \sin\theta)$ intersect each other orthogonally.	7	L2	CO1
	c.	Find the radius of curvature at the point $\left(\frac{39}{2}, \frac{39}{2}\right)$ for the curve $x^3 + y^3 = 3axy$.	7	L3	CO1
		OR			
Q.2	a.	With usual notations prove that $\rho = \frac{\left[1 + y_1^2\right]^{3/2}}{y_2}$	8	L2	CO1
	b.	Find the pedal equation of the curve : $r^n = a^n \cos n\theta$.	7	L1	CO1
	c.	Using modern mathematical tool, write a program/code to plot the curve $r = 2\lvert\cos 2\theta\rvert$.	5	L1	CO5
		Module – 2			
Q.3	a.	Obtain the Maclaurin's expansion of $\log(1 + e^x)$ upto the term containing x^4.	6	L2	CO1
	b.	If $u = f[2x - 3y, 3y - 4z, 4z - 2x]$ then find the value of $\frac{1}{2}\frac{\partial u}{\partial x} + \frac{1}{3}\frac{\partial u}{\partial y} + \frac{1}{4}\frac{\partial u}{\partial z}$.	7	L1	CO1
	c.	Find the maximum and minimum value of the function, $f(x, y) = x^3 + 3xy^2 - 15x^2 - 15y^2 + 72x$.	7	L1	CO1
		OR			
Q.4	a.	Evaluate $\lim_{x \to 0}\left(\frac{a^x + b^x + c^x + d^x}{4}\right)^{\frac{1}{x}}$	7	L2	CO1

	b.	If $u = x^2 - y^2$, when $x = e^t \cos t$, $y = e^t \sin t$, show that $\frac{\partial u}{\partial t} = 2e^{2t}[\cos 2t - \sin 2t]$.	8	L2	CO1
	c.	Using modern mathematical tool write a program/code to show that $u_{xx} + u_{yy} = 0$, given $u = e^x[x\cos y - y\sin y]$.	5	L3	CO5
		Module – 3			
Q.5	a.	Solve: $\frac{dy}{dx} + \frac{y}{x} = y^2 x$	6	L3	CO2
	b.	Find the orthogonal trajectories of $\frac{x^2}{a^2+x} + \frac{y^2}{b^2+x} = 1$ where λ is a parameter.	7	L1	CO2
	c.	Solve : $x^2p^2 + xyp - 6y^2 = 0$.	7	L3	CO2
		OR			
Q.6	a.	Solve : $(y^4 + 2y)dx + (xy^3 + 2y^4 - 4x)dy = 0$.	6	L2	CO2
	b.	Solve the differential equation $L\frac{di}{dt} + Ri = 200\sin 300t$ when L = 0.05 and R = 100 and find the value of the current I at any time t, it initially there is no current in the circuit. What value does i approach after a long time.	7	L3	CO2
	c.	Find the general and singular solution of $(a^2 - x^2)p^2 + 2xyp + b^2 - y^2 = 0$	7	L2	CO2
		Module – 4			
Q.7	a.	(i) Find the remainder when 41^{75} is divided by 3, (ii) Find the last digit in 7^{289}.	6	L2	CO3
	b.	Find the solution of the linear congruence $18x \equiv 30 (\text{mod } 42)$	7	L2	CO3
	c.	Using RSA algorithm find public key and private key with respect to p = 3, q = 11 and m = 31	7	L3	CO3
		OR			
Q.8	a.	Show that $8^{30} - 1$ is divisible by 31 using Fermet to little theorem.	6	L2	CO3
	b.	Solve the system of linear congruence's using CRT $x \equiv 2(\text{mod } 3)$, $x \equiv 3(\text{mod } 5)$, $x \equiv 2(\text{mod } 7)$.	7	L3	CO3
	c.	(i) Find the remainder when $349 \times 74 \times 36$ is divided by 3. (ii) Find the roots of $x^2 + 2x - 3 \equiv 0(\text{mod } 5)$	7	L2	CO3
		Module – 5			
Q.9	a.	Find the rank of the matrix $\begin{bmatrix} -2 & -1 & -3 & -1 \\ 1 & 2 & 3 & 1 \\ 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 1 \end{bmatrix}$.	6	L2	CO4

	b.	Test for consistency and solve $5x+3y+7z=4$, $3x+26y+2z=9$, $7x+2y+10z=5$	**7**	**L3**	**CO4**
	c.	Find the largest Eigen value and the corresponding Eigen vector, $A=\begin{bmatrix}6 & -2 & 2\\ -2 & 3 & -1\\ 2 & -1 & 3\end{bmatrix}$ with initial vector $[1\ 1\ 1\ 1\ 1]^T$ carry out 5 iterations.	**7**	**L1**	**CO4**
		OR			
Q.10	**a.**	Solve the system of equations by Gauss Seidal method $83x+11y-4z=95$, $7x+52y+13z=104$, $3x+8y+29z=71$. Carry out three iterations.	**8**	**L4**	**CO3**
	b.	Solve the system of equations by using Gauss-Jordan method: $x+2y+z=8$ $2x+3y+4z=20$, $4x+3y+2z=16$	**7**	**L3**	**CO4**
	c.	Using modern mathematical tool, write a program/code to find the largest eigen value of, $A=\begin{bmatrix}1 & 1 & 3\\ 1 & 5 & 1\\ 3 & 1 & 1\end{bmatrix}$	**5**	**L3**	**CO5**

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BMATE101

First Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Mathematics – I for EEE Stream

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. VTU Formula Hand Book is permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	With usual notations prove that $\cot\phi = -\frac{1}{r}\left(\frac{dr}{d\theta}\right)$	6	L2	CO1
	b.	Find the angle between the curves $r = 6\cos\theta$ and $r = 2(1+\cos\theta)$	7	L2	CO1
	c.	Find the radius of curvature of the curve $\sqrt{x}+\sqrt{y}=4$ at the point where it cuts the line passing through the origin making an angle 45° with the X-axis.	7	L3	CO1
		OR			
Q.2	a.	Find the Pedal equation of the curve $r^2 = a^2 \sec 2\theta$	7	L2	CO1
	b.	Show that for the curve $r = a(1+\cos\theta)$ is p^2/r = constant.	8	L3	CO1
	c.	Using modern mathematical tool, write a program/code to plot the sine and cosine curve.	5	L3	CO5
		Module – 2			
Q.3	a.	Expand log(sec x) up to the term containing x^4 using Maclaurin's series.	6	L2	CO1
	b.	If $u = f(x-y, y-z, z-x)$, show that $\frac{\partial u}{\partial x}+\frac{\partial u}{\partial y}+\frac{\partial u}{\partial z}=0$	7	L2	CO1
	c.	If $x = r\sin\theta\cos\phi$, $y = r\sin\theta\sin\phi$, $z = r\cos\theta$ find the value of $\frac{\partial(x,y,z)}{\partial(r,\theta,\phi)}$	7	L3	CO1
		OR			
Q.4	a.	If $z = e^{ax+by} f(ax-by)$, show that $b\frac{\partial z}{\partial x}+a\frac{\partial z}{\partial y}=2abz$	7	L2	CO1
	b.	Find the extreme values of the function $f(x, y) = x^3 + y^3 - 3x - 12y + 20$	8	L3	CO1

	c.	Using modern mathematical tool, write a program/code to evaluate $\lim_{x \to \infty} \left(1+\frac{1}{x}\right)^x$	5	L3	CO5
		Module – 3			
Q.5	a.	Solve $\frac{dy}{dx}+\frac{y}{x}=y^2x$	6	L2	CO2
	b.	Find the orthogonal trajectories of the family of curves $\frac{x^2}{a^2}+\frac{y^2}{b^2+\alpha}=1$, where α is a parameter.	7	L3	CO2
	c.	Solve $xyp^2-(x^2+y^2)p+xy=0$.	7	L2	CO3
		OR			
Q.6	a.	Solve $\frac{dy}{dx}+\frac{y\cos x+\sin y+y}{\sin x+x\cos y+x}=0$	6	L2	CO2
	b.	Show that a differential equation for the current i in an electrical circuit containing an inductance L and resistance R in series and acted on by an electromotive force E sin wt, satisfies the equation $L\frac{di}{dt}+Ri=E\sin wt$. Find the value of the current at any time t, if initially there is no current in the circuit.	7	L3	CO2
	c.	Solve the equation $(px-y)(py+x)=2p$ by reducing in to Clairaut's form, taking the substitution $X=x^2$, $Y=y^2$.	7	L2	CO2
		Module – 4			
Q.7	a.	Evaluate $\int_{-1}^{1}\int_{0}^{z}\int_{x-z}^{x+z}(x+y+z)\,dy\,dx\,dz$	6	L2	CO3
	b.	Evaluate $\int_{-2}^{2}\int_{0}^{\sqrt{4-x^2}}(2-x)\,dy\,dx$ by changing the order of integration.	7	L2	CO3
	c.	Prove that $\int_{0}^{\pi/2}\frac{d\theta}{\sqrt{\sin\theta}}\times\int_{0}^{\pi/2}\sqrt{\sin\theta}\,d\theta=\pi$	7	L2	CO3
		OR			
Q.8	a.	Evaluate $\int_{0}^{\infty}\int_{0}^{\infty}e^{-(x^2+y^2)}dx\,dy$ by changing into polar coordinates.	6	L2	CO3
	b.	Derive the relation between beta and gamma function.	7	L2	CO3
	c.	Find the volume bounded by the cylinder $x^2+y^2=4$ and the planes $y+z=4$, $z=0$.	7	L3	CO3

		Module – 5			
Q.9	**a.**	Find the rank of the matrix $\begin{bmatrix} 0 & 1 & -3 & -1 \\ 1 & 0 & 1 & 1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & -2 & 0 \end{bmatrix}$	**6**	**L2**	**CO4**
	b.	Solve the system of equations by Gauss elimination method $2x + y + 4z = 12$ $4x + 11y - z = 33$ $8x - 3y + 2z = 20$	**7**	**L3**	**CO4**
	c.	Solve the following system of equations by Gauss-Seidel method $20x + y - 2z = 17$ $3x + 20y - z = -18$ $2x - 3y + 20z = 25$	**7**	**L3**	**CO4**
		OR			
Q.10	**a.**	Using Gauss Jordan method, solve $2x + 5y + 7z = 52$, $2x + y - z = 0$, $x + y + z = 9$	**7**	**L3**	**CO4**
	b.	Using Rayleigh's power method find the dominant eigenvalue and the corresponding eigenvector of $\begin{bmatrix} 4 & 1 & -1 \\ 2 & 3 & -1 \\ -2 & 1 & 5 \end{bmatrix}$ by taking $[1, 0, 0]^T$ as initial eigen vector [carryout 5 iterations].	**8**	**L3**	**CO5**
	c.	Using modern mathematical tool. Write a program/code to test the consistency of equations: $x + 2y - z = 1$ $2x + y + 4z = 2$ $3x + 3y + 4z = 1$	**5**	**L3**	**CO5**

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BMATTM101

First Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Mathematics – I for ME Stream

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. VTU Formula Hand Book is permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	With usual notations prove that $\tan \phi = r.\frac{d\theta}{dr}$.	6	L2	CO1
	b.	Find the angle of intersection for the pair of curves $r = a(1 + \cos\theta)$, $r = b(1 - \cos\theta)$.	7	L2	CO1
	c.	Find the Pedal equation for the curve $r^n = a^n \cos n\theta$.	7	L2	CO1
		OR			
Q.2	a.	Derive an expression for radius of curvature in Cartesian form $\int = \frac{[1+y_1^2]^{3/2}}{y_2}$.	7	L1	CO1
	b.	Show that the pair of curves intersect each other orthogonally. $r^n = a^n \cos n\theta$ and $r^n = b^n \sin n\theta$.	8	L3	CO1
	c.	Using modern mathematical tool write a program to plot sine and cosine curve.	5	L3	CO5
		Module – 2			
Q.3	a.	Expand $\log(1 + x)$ upto the term containing x^4, using Maclaurins series.	6	L2	CO2
	b.	If $u = f(p, q, r)$ where $p = x-y$, $q = y-z$, $r = z-x$. Show that, $\frac{\partial u}{\partial x}+\frac{\partial u}{\partial y}+\frac{\partial u}{\partial z}=0$	7	L2	CO2
	c.	Show that $z(x, y) = x^3 + y^3 - 3xy + 1$ is minimum at $(1, 1)$.	7	L3	CO2
		OR			
Q.4	a.	Evaluate the $\lim_{x \to 0}\left[\frac{a^x + b^x + c^x}{3}\right]^{1/x}$.	8	L2	CO2
	b.	If $u = x^2 + y^2 + z^2$, $v = xy + yz + zx$, $w = x + y + z$ find $\frac{\partial(u, v, w)}{\partial(x, y, z)}$.	7	L2	CO2

	c.	Using modern mathematical tool, write a program/code to evaluate: $\lim_{x \to \infty} \left(1+\frac{1}{x}\right)^x$.	5	L5	CO5
		Module – 3			
Q.5	a.	Solve the Bernoulli's differential equation: $\frac{dy}{dx}+\frac{y}{x}=y^2x$.	6	L2	CO3
	b.	Find the orthogonal trajectories of the family $y^2 = cx^3$.	7	L3	CO3
	c.	Solve : $y \cdot p^2 + (x - y)\, p - x = 0$.	7	L2	CO3
		OR			
Q.6	a.	Solve : $(5x^4 + 3x^2y^2 - 2xy^3)dx + (2x^3y - 3x^2y^2 - 5y^4)dy = 0$.	6	L2	CO3
	b.	A body in air at 25°C cools from 100°C to 75°C in 1 minute. Find the temperature of the body at the end of 3 minutes.	7	L3	CO3
	c.	Modify the equation into Clairaut's form. Hence find the general and singular solution of $xp^2 - py + kp + a = 0$.	7	L2	CO3
		Module – 4			
Q.7	a.	Solve : $(D^3 - 2D^2 + 4D - 8)\, y = 0$.	6	L2	CO3
	b.	Solve : $(6D^2 + 17D + 12)\, y = e^{-x}$.	7	L2	CO3
	c.	Solve by variation of parameters $(D^2 + 1)y = \tan x$.	7	L2	CO3
		OR			
Q.8	a.	Solve : $(D^3 + 1)\, y = 0$	6	L2	CO3
	b.	Solve : $y'' + 2y' + y = 2x + x^2$	7	L2	CO3
	c.	Solve : $x^2y'' - 2y = x^2$	7	L2	CO3
		Module – 5			
Q.9	a.	Find the rank of the matrix $A = \begin{bmatrix} 1 & 2 & 3 & 2 \\ 2 & 3 & 5 & 1 \\ 1 & 3 & 4 & 5 \end{bmatrix}$	6	L2	CO4
	b.	Solve the system of equation by using Gauss elimination method $x + 2y + z = 3,\ 2x + 3y + 3z = 10,\ 3x - y + 2z = 13$	7	L3	CO4

	c.	Using Rayleigh's power method, find the largest eigen value and the corresponding eigen vector of the matrix, $A = \begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$ by taking initial vector as $[1\ 1\ 1]^T$.	7	L3	CO4
		OR			
Q.10	**a.**	Solve the system of equation by using Gauss-Jordan method. $x + y + z = 8, -x - y + 2z = -4, 3x + 5y - 7z = -14$	7	L3	CO4
	b.	Solve the system of equations by Gauss-Seidel method $20x + y - 2z = 17, 3x + 20y - z = -18, 2x - 3y + 20z = 25.$	8	L3	CO4
	c.	Using modern mathematical tool write a program/code to test the consistency of the equations $x + 2y - z = 1, 2x + y + 4z = 2, 3x + 3y + 4z = 1.$	5	L3	CO5

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BMATC101

First Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Mathematics – I for Civil Engineering Stream

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. VTU Formula Hand Book is permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	With usual notations, prove that $\tan\phi = r\frac{d\theta}{dr}$.	6	L2	CO1
	b.	Find the angle between the curves $r = a(1 + \sin\theta)$ and $r = a(1 - \sin\theta)$.	7	L2	CO1
	c.	Show that the radius of curvature for the curve $r^n = a^n \cos n\theta$ varies inversely as r^{n-1}.	7	L3	CO1
		OR			
Q.2	a.	Show that the radius of curvature for the catenary of uniform strength $y = a \log[\sec(x/a)]$ is $a\sec(x/a)$.	7	L2	CO1
	b.	Find the pedal equation of the curve : $\frac{2a}{r} = (1+\cos\theta)$.	8	L2	CO1
	c.	Using modern mathematical tool, write a program/code to plot the sine and cosine curve.	5	L3	CO5
		Module – 2			
Q.3	a.	Expand $\log(\sec x)$ upto the terms containing x^6 using Maclaurin's series.	6	L2	CO1
	b.	If $u = f(x - y, y - z, z - x)$ then show that $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} = 0$.	7	L3	CO1
	c.	Examine the function $f(x, y) = xy(a - x - y)$ for extreme values.	7	L3	CO1
		OR			
Q.4	a.	If $u = e^{ax+by} \times f(ax - by)$, prove that $b\frac{\partial u}{\partial x} + a\frac{\partial u}{\partial y} = 2abu$.	7	L2	CO1
	b.	If $u = x + 3y^2 - z^3$, $v = 4x^2yz$, $w = 2z^2 - xy$, find $\frac{\partial(u,v,w)}{\partial(x,y,z)}$ at $(1, -1, 0)$.	8	L3	CO1
	c.	Using modern mathematical tool write a program/code to evaluate $\lim_{x\to\infty}\left(1+\frac{1}{x}\right)^x$.	5	L3	CO5

		Module – 3			
Q.5	**a.**	Solve: $\frac{dy}{dx} + \frac{y}{x} = y^2x$	**6**	**L2**	**CO2**
	b.	Show that the family of parabolas $y^2 = 4a(x + a)$ is self orthogonal.	**7**	**L3**	**CO2**
	c.	Solve : $p^2 + 2py \cot x = y^2$.	**7**	**L2**	**CO2**
		OR			
Q.6	**a.**	Solve : $(2x + y + 1)\,dx + (x + 2y + 1)\,dy = 0$.	**6**	**L2**	**CO2**
	b.	A body originally at 80°C cools down to 60°C in 20 minutes, the temperature of the air being 40°C. What will be the temperature of the body after 40 minutes from the original?	**7**	**L3**	**CO2**
	c.	Solve the equation $(px - y)(py + x) = 2p$ by reducing into Clairaut's form, taking the substitution $X = x^2$, $Y = y^2$.	**7**	**L2**	**CO2**
		Module – 4			
Q.7	**a.**	Solve : $(4D^4 - 4D^3 - 23D^2 + 12D + 36)\,y = 0$.	**6**	**L2**	**CO3**
	b.	Solve : $(D - 2)^2 y = 8(e^{2x} + \sin 2x)$.	**7**	**L2**	**CO3**
	c.	Solve by the method of variation of parameters $y'' + a^2y = \sec ax$.	**7**	**L3**	**CO3**
		OR			
Q.8	**a.**	Solve : $y'' + 3y' + 2y = 12x^2$.	**6**	**L2**	**CO3**
	b.	Solve : $\frac{d^2y}{dx^2} - 4y = \cosh(2x - 1) + 3^x$.	**7**	**L2**	**CO3**
	c.	Solve : $(2x + 1)^2 y'' - 6(2x + 1)y' + 16y = 8(2x + 1)^2$.	**7**	**L3**	**CO3**
		Module – 5			
Q.9	**a.**	Find the rank of the matrix $A = \begin{bmatrix} 1 & 2 & 4 & 3 \\ 2 & 4 & 6 & 8 \\ 4 & 8 & 12 & 16 \\ 1 & 2 & 3 & 4 \end{bmatrix}$.	**6**	**L2**	**CO4**
	b.	Solve the system of equations by using Gauss-Jordan method: $2x + y + z = 10$, $3x + 2y + 3z = 18$, $x + 4y + 9z = 16$.	**7**	**L3**	**CO4**
	c.	Using Rayleigh's power method, find the dominant eigen value and corresponding eigen vector of $\begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$ by taking $[1, 1, 1]^T$ as the initial eigen vector. Carryout 6 iterations.	**7**	**L3**	**CO4**

		OR			
Q.10	**a.**	Find the rank of the matrix $\begin{bmatrix} 11 & 12 & 13 & 14 \\ 12 & 13 & 14 & 15 \\ 13 & 14 & 15 & 16 \\ 14 & 15 & 16 & 17 \end{bmatrix}$.	**7**	**L3**	**CO4**
	b.	Solve the system of equations by using Gauss-Seidel method: $10x + 2y + z = 9$, $x + 10y - z = -22$, $-2x + 3y + 10z = 22$. Carryout 3 iterations.	**8**	**L3**	**CO4**
	c.	Using modern mathematical tool, write a program/code to test the consistency of the equations $x + 2y - z = 1$, $2x + y + 4z = 2$, $3x + 3y + 4z = 1$.	**5**	**L3**	**CO5**

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BPHYS102/202

First/Second Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Applied Physics for 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.

		Module – 1	M	L	C
Q.1	a.	Obtain the expression for energy density using Einstein's coefficients of absorption and emission.	08	L2	CO1
	b.	Define angle of acceptance. Explain types of optical fibres with neat ray diagram and refractive index profile.	07	L2	CO1
	c.	Find the ratio of population of the two states in a He-Ne laser that produce light of wavelength 6328 A° at 27°C.	05	L3	CO1
		OR			
Q.2	a.	Derive an expression for numerical aperture of an optical fibre in terms of fraction of RI.	08	L2	CO1
	b.	What is active medium? Explain construction and working of semiconductor laser.	07	L2	CO1
	c.	For a 30 cm long fiber attenuation 0.8 dB/km, find the output power if a 200 μW power is launched?	05	L3	CO1
		Module – 2			
Q.3	a.	Define graph velocity, phase velocity, wave function and probability density.	08	L2	CO2
	b.	Derive time-independent Schrödinger wave equation.	07	L2	CO2
	c.	Which has shorter wavelength, a 10 eV photon or a 10 eV electron? Explain.	05	L2	CO2
		OR			
Q.4	a.	State and explain Heisenberg's uncertainty principle. Explain principle of complimentarity.	07	L2	CO2
	b.	Derive the wave function of a particle inside infinite potential well of width 'a' using normalization condition.	08	L2	CO2
	c.	Compute the energy of the lowest three levels for an electron in a square well of width 3 A°.	05	L3	CO2
		Module – 3			
Q.5	a.	What is Block Sphere? Represent $\|0>$ and $\|1>$ on the Bloch sphere.	08	L2	CO1
	b.	Explain probability, normalization and quantum superposition.	07	L2	CO1
	c.	Using two X-gates in series, show that two not gates in series are equivalent to a quantum wire.	05	L2	CO1
		OR			
Q.6	a.	Discuss two qubit quantum NOT gate or controlled NOT gate with four different input states.	08	L2	CO3
	b.	State Moore's law. Show that S gate can be formed by connecting two T gates in series.	07	L3	CO3
	c.	Find the inner product basis of states $\|1>$ and $\|0>$, and draw conclusions on the result.	05	L3	CO3

		Module – 4			
Q.7	**a.**	State Mathiessen's rule. Discuss variation of Fermi factor with temperature and energy.	**08**	**L2**	**CO4**
	b.	Define critical field. Write a note on high temperature super conductors.	**07**	**L1**	**CO4**
	c.	In a solid, consider the energy level lying 0.01 eV below the fermilevel. What is the probability of this level not being occupied by an electron?	**05**	**L3**	**CO4**
		OR			
Q.8	**a.**	Define super conductors. Give brief account on BCS theory of super conductors.	**08**	**L2**	**CO4**
	b.	What is density of states? Explain failures of classical free electron theory.	**07**	**L2**	**CO4**
	c.	Find the transition temperature of a metal whose critical magnetic field is 5×10^3 A/m at 6 K and 2×10^4 A/m at 0 K.	**05**	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	What are frames and frames per seconds? Explain how the odd rule can be applied to place the object in specific frames.	**08**	**L2**	**CO5**
	b.	Explain Monte-Carlo method applied to approximating the value of x.	**07**	**L2**	**CO5**
	c.	While animating a speeding up car the total distance travelled over 6 frames is 25 m, calculate the basic distance.	**05**	**L2**	**CO5**
		OR			
Q.10	**a.**	Define jump magnification. Explain how to calculate jump timing.	**07**	**L2**	**CO5**
	b.	Explain Poisson and normal distribution with their probability functions.	**08**	**L2**	**CO5**
	c.	The number of particles emitted per second by a random radioactive source has a Poison distribution with $\alpha = 4$. Calculate the probability of P(x = 0), P(x = 1) and P(x = 2).	**05**	**L3**	**CO5**

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CBCS SCHEME

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BPHYE102/202

First/Second Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Applied Physics for EEE Stream

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. VTU Formula Hand Book is permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Obtain the expression for Eigen value and Eigen function for a particle in one dimensional potential well of infinite height.	10	L2	CO1
	b.	What is Wave function? Give its physical significance and properties.	6	L2	CO1
	c.	An electron is bound in an one dimensional potential well of width 1A° and of infinite height. Find its energy values in eV in the ground state and first two excited states.	4	L3	CO1
		OR			
Q.2	a.	State and explain Heisenberg's uncertainty principle. Show that an electron does not exist inside the nucleus on the basis of Heisenberg's uncertainty principle.	10	L2	CO1
	b.	What is wave function, probability density and normalization of wave function.	6	L2	CO1
	c.	Calculate the de Broglie wavelength associated with an electron having a kinetic energy of 100eV.	4	L3	CO1
		Module – 2			
Q.3	a.	Describe Type I and Type II superconductors. Explain construction and working of MAGLEV vehicle.	10	L2	CO2
	b.	Derive Clausius Mossotti equation.	6	L2	CO2
	c.	Show that the sum of the probability of occupancy of an energy state of ΔE below Fermi level and that at ΔE above Fermi level is unity.	4	L3	CO2
		OR			
Q.4	a.	Discuss the probability of occupation of various energy states by electrons at T = 0K and T > 0K on the hosis of fermi factor.	10	L2	CO2
	b.	Describe different types of polarization mechanisms in dielectric materials.	6	L2	CO2

	c.	If NaCl crystal is subjected to an electric field of 1000V/m and the resulting polarization is $4.3 \times 10^{-8} c/m^2$. Calculate dielectric constant of NaCl.	4	L3	CO2
		Module – 3			
Q.5	a.	What is numerical aperture? Obtain an expression for numerical aperture of optical fiber.	8	L2	CO3
	b.	Describe the construction and working of carbon dioxide laser with energy level diagram.	8	L2	CO3
	c.	In a diffraction grating experiment with a semiconductor laser, the grating constant is 4.7×10^{-5} per metre. If the angle of diffraction for the second order is 1.5 degree, find the wavelength of the laser.	4	L3	CO5
		OR			
Q.6	a.	Obtain an expression for energy density of radiation under thermal equilibrium condition interms of Einstein's coefficients.	10	L2	CO3
	b.	Explain different types of attenuations of fibers.	6	L2	CO3
	c.	Determine the resonance frequency of an LCR series circuit with inductance = 0.5H, capacitance = 0.45 microfarad and resistance 300 = Ω.	4	L3	CO5
		Module – 4			
Q.7	a.	Derive wave equation for electromagnetic waves in vacuum in terms of electric field using Maxwell's equation.	9	L2	CO4
	b.	Explain the terms gradient of scalar, divergence and curl of a vector.	6	L2	CO4
	c.	Prove that $3y^4z^2\hat{a}_x + 4x^3z^2\hat{a}_y + 3x^2y^2\hat{a}_z$ is solenoidal.	5	L3	CO4
		OR			
Q.8	a.	State and prove Gauss Divergence theorem.	7	L2	CO4
	b.	Explain Faraday's law of electromagnetic induction. Express the same in the point form of Maxwell's equation.	8	L2	CO4
	c.	Find the divergence of the vector field $\vec{A}$ given by $\vec{A} = 6x^2\hat{a}_x + 3xy^2\hat{a}_z + xyz^3\hat{a}_z$.	5	L3	CO4
		Module – 5			
Q.9	a.	What is Hall effect? Obtain an expression for the Hall coefficient in terms of Hall voltage.	8	L2	CO5
	b.	Explain the construction and working of photodiode. Define the power responsivity in a photodiode.	8	L2	CO5
	c.	The resistivity of intrinsic Germanium at 27°C is equal to 0.47 ohm-meter. Assuming electron and hole mobilities are $0.38 m^2v^{-1}s^{-1}$ and $0.18 m^2v^{-1}s^{-1}$ respectively. Calculate the intrinsic carrier density.	4	L3	CO5

		OR			
Q.10	**a.**	Establish relation between Fermi energy and energy gap for an intrinsic semi conductor.	**8**	**L2**	**CO5**
	b.	Derive expression for electrical conductivity in extrinsic and intrinsic semiconductors.	**8**	**L2**	**CO5**
	c.	The following data are given for intrinsic Germanium at 300K, $n_i = 2.4 \times 10^{19}/m^3$, $\mu_e = 0.39 m^2v^{-1}s^{-1}$, $\mu_h = 0.19 m^2v^{-1}s^{-1}$. Calculate the resistivity of the sample.	**4**	**L3**	**CO5**

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CBCS SCHEME

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BPHYM102/202

First/Second Semester B.E./B.Tech Degree Supplementary Examination, June/July 2024

Applied Physics for ME 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.

		Module – 1	M	L	C
Q.1	a.	Define spring constant. Obtain expression for equivalent force constant for two springs connected in series and parallel combination.	9	L2	CO1
	b.	Obtain a differential equation for a body undergoing forced oscillation and mention expression for amplitude and phase of oscillation.	6	L2	CO1
	c.	A mass of 0.5kg causes an extension of 0.03m in a spring and the system is set for oscillations. Find the force constant of the spring, angular frequency and the time period of the resulting oscillations.	5	L3	CO2
		OR			
Q.2	a.	Describe the construction and working of hand operated Reddy shock tube. Mention any two key feature of Reddy shock tube.	10	L2	CO1
	b.	Discuss the conditions for resonance and explain the sharpness of resonance.	6	L2	CO1
	c.	The distance between the two pressure sensors in a shock tube is 150mm. The time taken by a shock wave to travel the distanced is 0.3ms, if the velocity of sound under the same condition is $340ms^{-1}$. Find the Mach number of the shock wave.	4	L3	CO1
		Module – 2			
Q.3	a.	Define Young's modulus, bulk modulus and rigidity modulus. Derive relation between y, n and σ.	10	L2	CO1
	b.	With neat diagram explain the stress-strain curve for elastic materials.	6	L2	CO1
	c.	Calculate the Poisson's ratio for the material given that $y = 12.25 \times 10^{10} N/m^2$ and $\eta = 4.55 \times 10^{10} N/m^2$.	4	L3	CO2
		OR			
Q.4	a.	Explain the term bending moment. Show the bending moment of a thin uniform bar of rectangular cross section is $\frac{Ybd^3}{12R}$.	10	L2	CO1
	b.	What is the fracture of elastic materials? Discuss on ductile and brittle fractures.	6	L2	CO1
	c.	Calculate the force required to procedure an extension of 1mm in steel wire of length 2m and diameter 1mm [Young's modulus for steel is $2 \times 10^{11} N/m^2$].	4	L3	CO1

Module – 3

Q.5	**a.**	Discuss seebeck effect and peltier effect with their co-efficient.	**8**	**L2**	**CO2**
	b.	State and explain laws of thermo electricity's.	**8**	**L2**	**CO2**
	c.	The emf in lead-iron thermocouple, one junction of which is at 0°C, is given by $E = 1784t - 2.4t^2$ (in μ volts) where t is temperature in °C. Find the neutral temperature.	**4**	**L3**	**CO2**
		OR			
Q.6	**a.**	Derive expression for thermo emf in terms of T_1 and T_2.	**8**	**L2**	**CO2**
	b.	What are thermoelectric materials? Explain low, mid and high temperature thermoelectric materials.	**8**	**L2**	**CO2**
	c.	For Fe – Cu thermocouple it is observed that the thermo emf is zero when one of the junctions is at 20°C and other one is at some higher temperature. If the neutral temperature is 285°C, Calculate the higher temperature. Hence find out the temperature of inversion, if the cold junction temperature is at – 20°C.	**4**	**L3**	**CO2**
		Module – 4			
Q.7	**a.**	Explain Joule Thomson effect show that, $\Delta T = \frac{(P_1 - P_2)}{C_P}\left[\frac{2a}{RT} - b\right]$.	**10**	**L2**	**CO3**
	b.	Explain the liquefaction of Helium.	**6**	**L2**	**CO3**
	c.	Calculate inversion temperature of gas. Given a = 0.244atm L^2/mol^2, b = 0.027 L/mol and R = 0.0821 L atm/K/mol.	**4**	**L3**	**CO3**
		OR			
Q.8	**a.**	Explain the construction and working of porous plug experiment with neat diagram.	**10**	**L2**	**CO3**
	b.	Explain briefly the applications of cryogenics in food processing and a aerospace.	**6**	**L2**	**CO3**
	c.	In Joule Thomson experiment temperature changes from 100°C to 150°C for pressure change of 20MPa to 170MPa. Calculate Joule Thomson co-efficient.	**4**	**L3**	**CO3**

		Module – 5			
Q.9	**a.**	With neat diagram, explain the construction and working of x-ray diffractometer.	**10**	**L2**	**CO4**
	b.	Define nano-material and nano-composite and classify the nano-materials based on the dimensional constraints.	**6**	**L2**	**CO4**
	c.	First order Bragg reflection occurs when a monochromatic beam of x-rays of wavelength 0.675 Å is incident on a crystal at a glancing angle of 4.85°. What is the glancing angle for third order Bragg reflection to occur?	**4**	**L3**	**CO4**
		OR			
Q.10	**a.**	Describe the construction and working of atomic force microscopy.	**8**	**L2**	**CO4**
	b.	Give the principle, construction and working of Scanning Electron Microscope (SEM).	**8**	**L2**	**CO4**
	c.	Determine the crystallite size given the wavelength of x-rays 10nm, the peak width 0.5° and peak position 25° for a cubic crystal given K = 0.94.	**4**	**L3**	**CO4**

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CBCS SCHEME

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BCHES102/202

First/Second Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Applied Chemistry for CSE Stream

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. VTU Formula Hand Book is permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes

		Module – 1	M	L	C
Q.1	a.	Define the following terms : i) Sensor ii) Transducer iii) Actuator	6	L1	CO1
	b.	Discuss the principle, working and applications of electro chemical sensors.	7	L2	CO1
	c.	Explain the detection of ascorbic acid using disposable sensor.	7	L2	CO1
		OR			
Q.2	a.	Define a battery. Give the classification of batteries with examples.	6	L1	CO1
	b.	Explain the construction and working of Li-ion battery. Mention any four applications.	7	L2	CO1
	c.	Discuss construction and working of Quantum Dot Sensitized Solar Cell. (QDSSC)	7	L2	CO1
		Module – 2			
Q.3	a.	Mention any Four properties and used of QLED.	6	L1	CO2
	b.	Discuss classification of liquid crystals. Mention any four properties and applications of liquid crystals.	7	L2	CO2
	c.	Explain the types of organic memory devices by taking P-type and n-type semiconducting materials.	7	L2	CO2
		OR			
Q.4	a.	Write any Four properties and applications of Polythiophenes (P_3HT) suitable for optoelectronic devices.	6	L1	CO2
	b.	What are memory devices? Explain the classification of electronic memory devices with suitable examples.	7	L2	CO2
	c.	Define optoelectronic device. Explain the working principle of optoelectronic device.	7	L2	CO2
		Module – 3			
Q.5	a.	Define metallic corrosion. Write the steps involved in the electro chemical theory of corrosion by taking rusting of Iron as an example.	6	L1	CO3

	b.	What is CPR? A thick brass sheet of area 400 inch^2 is exposed to moist air, after 2 years of period it was found to experience a weight loss 375g due to corrosion. If the density of brass is 8.73 g/cm^3, calculate CPR in mpy and mmpy units? K = 87.6 (mmpy), K = 534(mpy)	7	L2	CO3
	c.	Explain the principle, instrumentation and working of conductometry.	7	L2	CO3
		OR			
Q.6	a.	What are reference electrodes? Write the construction and working of calomel electrode with a neat labelled diagram.	6	L1	CO3
	b.	Define concentration cell? Emf of the cell Ag/Ag NO_3 (0.01M)//Ag NO_3 (X M)/Ag is 0.0659V at 298K. Write cell reactions and calculate the value of "x".	7	L2	CO3
	c.	Briefly explain the principle, instrumentation and working of potentiometry.	7	L2	CO3
		Module – 4			
Q.7	a.	What is green fuel? Mention the advantages of green fuel (Hydrogen).	6	L1	CO4
	b.	A polymer sample contains 100 molecules of mol. Mass is 2×10^4 g/mol 300 molecules of molecular mass 3×10^3 g/mol and 500 molecules of molecular mass 5×10^3 g/mol. Calculate the number and weight average molecular weight of polymer.	7	L2	CO4
	c.	Describe the generation of hydrogen gas by alkaline water electrolysis with a neat labelled diagram.	7	L2	CO4
		OR			
Q.8	a.	What is Photovoltaic cell? Write the construction and working of PV cell with a neat labelled diagram.	6	L2	CO4
	b.	Explain the preparation, properties and commercial applications of graphene oxide.	7	L2	CO4
	c.	Discuss the conduction mechanism in polyacetylene.	7	L2	CO4
		Module – 5			
Q.9	a.	Define e-waste? Mention the sources and composition of e-waste.	6	L1	CO5
	b.	Briefly discuss the various steps involved in recycling of e-waste.	7	L2	CO5
	c.	Explain health hazards due to exposure of e-waste.	7	L2	CO5
		OR			
Q.10	a.	Write a brief note on role of stake holders such as producers, consumers, recyclers and statutory bodies in managing the e-waste.	6	L1	CO5
	b.	Discuss the following: i) Pyrometallurgy ii) Hydrometallurgy.	7	L2	CO5
	c.	Explain the steps involved in the extraction of gold from e-waste.	7	L2	CO5

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CBCS SCHEME

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BCHEE102/202

First/Second Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Chemistry for EEE Stream

Time: 3 hrs. Max. Marks: 100

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

		Module – 1	M	L	C
Q.1	a.	Explain purification of electronic grade si using quartz by float zone method.	07	L2	CO1
	b.	Describe electroless plating of cu in the manufacture of PCB.	07	L2	CO1
	c.	Define : (i) Conducting polymers (ii) Number average molecular weight (iii) Weight average molecular weight	06	L2	CO1
		OR			
Q.2	a.	Explain classification of materials as conductors, semiconductors and insulators using band theory.	07	L2	CO1
	b.	Explain synthesis, properties and applications of graphene oxide.	06	L2	CO1
	c.	In a polymer sample, 20% of molecules have molecular mass 15000 g/mol, 45% molecules have molecular mass 25000 g/mol, remaining molecules have molecular mass 27000 g/mol. Calculate number average mol.wt ($\overline{M}_n$) and weight average molecular weight ($\overline{M}_w$).	07	L3	CO1
		Module – 2			
Q.3	a.	Explain construction and working of Na-ion battery and mention its application.	07	L2	CO2
	b.	What are fuel cells? Explain construction and working of Methonol – O_2 fuel cell.	07	L2	CO2
	c.	Explain construction and working of PV cells.	06	L2	CO2
		OR			
Q.4	a.	What are batteries? Explain classification of batteries with examples.	07	L2	CO2
	b.	Explain the construction and working of Lithium-polymer battery. Mention its applications.	07	L2	CO2
	c.	Explain construction and working of polymer electrolyte membrane fuel cell.	06	L2	CO2
		Module – 3			
Q.5	a.	Define corrosion. Explain electrochemical theory of corrosion taking Fe as example.	07	L2	CO3
	b.	Explain the process of galvanization with applications.	07	L2	CO3
	c.	Explain sacrificial anodic method of prevention of corrosion.	06	L2	CO3
		OR			
Q.6	a.	What is Anodising? Explain Anodising of Al.	07	L2	CO3
	b.	What is e-waste? Explain the methods of e-waste disposal.	06	L2	CO3
	c.	A sheet of carbon steel meter wide by three meters long has lost 40g to corrosion over the past six months. Calculate corrosion penetration rate (cpr) in mpy and mmpy. (carbon steel density = 7.8 g/cc, K = 87.6 mmpy, K = 534 mpy)	07	L3	CO3

		Module – 4			
Q.7	**a.**	What are Nano materials? Explain any two size dependent properties of nano materials.	**07**	**L2**	**CO4**
	b.	Explain synthesis of nano materials by sol gel method.	**06**	**L2**	**CO4**
	c.	What are liquid crystals? Explain the properties and applications of OLED and QLED.	**07**	**L2**	**CO4**
		OR			
Q.8	**a.**	What are pervoskite materials? Give the properties and applications of pervoskite materials.	**07**	**L1**	**CO4**
	b.	Write a note on nanofibres and nano sensors.	**06**	**L1**	**CO4**
	c.	Explain the classification of liquid crystals. Mention their application.	**07**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	What are reference electrodes? Explain construction and working of calomel electrode.	**07**	**L2**	**CO5**
	b.	Explain the process of determination of p^H of Vinegar using glass electrode.	**06**	**L2**	**CO5**
	c.	Represent a cell formed by immersing two silver electrodes in $AgNO_3$ solution of concentration 0.01 and 0.1 M. Write the reactions and find the emf of the cell.	**07**	**L3**	**CO5**
		OR			
Q.10	**a.**	Explain principle, instrumentation and application of potentiometric sensors in estimation of iron.	**07**	**L3**	**CO5**
	b.	Explain how the strength of a weak acid is determined using a conductometric sensor.	**07**	**L2**	**CO5**
	c.	Explain how cu is estimated using colorimeter.	**06**	**L3**	**CO5**

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CBCS SCHEME

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BCHEM102/202

First/Second Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Applied Chemistry for ME Stream

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. VTU Formula Hand Book is permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Define Chemical fuel. Explain the classification of fuel with examples.	7	L1,2	CO1
	b.	Define GCV and NCV. Explain the determination of calorific values of a solid fuel using bomb colorimeter.	7	L3	CO1
	c.	The 0.85g of coal sample (carbon = 90% H_2 = 5% and ash = 5%) was subjected to combustion in a bomb calorimeter mass of water taken in the colorimeter was 2000g and the water equivalent of the calorimeter was 600g. The rise in temperature was found to be 3.5°C. Calculate the gross and net calorific values of the sample. (Latent heat of stream = 2.454kJ/g : specific heat of water = 4.2kJ/kg °C)	6	L4	CO1
		OR			
Q.2	a.	What is Fuel cell? Explain the construction and working of Methanol – Oxygen fuel cell.	7	L3	CO1
	b.	Explain the construction, working and application of PV cell.	6	L3	CO1
	c.	What are Green Fuels? Explain the production of hydrogen by electrolysis of water and mention its advantages.	7	L1,2	CO1
		Module – 2			
Q.3	a.	Define Metallic Corrosion. Describe the electrochemical theory of corrosion taking Iron as an example.	7	L2	CO2
	b.	What is Anodizing? Explain the process of anodizing of Aluminium.	6	L2	CO2
	c.	What is CPR? A thick brass sheet of area 400 $inch^2$ is exposed to moist air. After 2 years of period, it was found to experience a weight loss 375g due to corrosion. If the density of brass is 8.73tg/cm^3. Calculate CPR in mpy and mmpy.	7	L2	CO2
		OR			
Q.4	a.	What is meant by metal finishing? Mention the technological importance of metal finishing.	6	L1	CO2
	b.	Define electrolessplating? Explain the electroless plating of Nickel.	7	L2	CO2
	c.	Explain the electroplating of chromium as hard and decorative.	7	L2	CO3

		Module – 3			
Q.5	**a.**	Explain the synthesis, properties and application of CPVC.	**7**	**L3**	**CO3**
	b.	What is composite? Explain the properties and industrial application of carbon based reinforced composites.	**7**	**L2**	**CO3**
	c.	Explain the synthesis, properties and industrial application of PMMA.	**6**	**L2**	**CO3**
		OR			
Q.6	**a.**	What are lubricants? Explain the properties and applications of lubricants.	**6**	**L2**	**CO3**
	b.	Explain the synthesis, properties and application polyester.	**7**	**L2**	**CO3**
	c.	In a polymer, 100 molecules have molecular mass 10^3g.mol, 250 molecules have molecular mass 10^4g/mol, and 300 molecules have molecular mass 10^5g/mol. Calculate the number average and weight average molecular mass of the polymer.	**7**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	Define phase rule, explain the following terms with an example phase, components and degree of freedom.	**7**	**L1**	**CO4**
	b.	Explain the estimation of FAS potentiometrically using platinum and calomel electrode as potentiometric sensors.	**7**	**L2**	**CO4**
	c.	Explain the determination of pH of beverages using pH sensor glass electrode.	**6**	**L3**	**CO4**
		OR			
Q.8	**a.**	Explain the lead – silver two components system along with phase diagram.	**7**	**L2**	**CO2**
	b.	Explain the estimation of copper present in a solution by using optical sensor method.	**7**	**L2**	**CO4**
	c.	Explain the determination of pH using glass electrode as pH sensing electrode.	**6**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	Explain the synthesis of nonomaterial by co-precipitation method.	**7**	**L2**	**CO5**
	b.	Explain composition, properties and applications of stainless steel and Brass.	**7**	**L2**	**CO5**
	c.	Explain the following size dependent properties. i) Surface area ii) Catalytic iii) Thermal properties of nanomaterial.	**6**	**L2**	**CO5**
		OR			
Q.10	**a.**	Explain the properties and application of Graphene.	**7**	**L2**	**CO5**
	b.	Explain the synthesis of Nano material by Sol-gel method.	**6**	**L2**	**CO5**
	c.	Explain the properties and applications of perovskities.	**7**	**L2**	**CO5**

CBCS SCHEME

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BCHEC102/202

First/Second Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Applied Chemistry for Civil Engineering Stream

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. VTU Formula Hand Book is permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	What is glass? Describe the preparation of soda lime glass.	07	L2	CO1
	b.	Explain the testing of element by EDTA method.	07	L2	CO1
	c.	Write the properties and applications of stainless steel and duralumin.	06	L2	CO1
		OR			
Q.2	a.	Discuss the production of cement by wet process.	07	L2	CO1
	b.	Define Refractories. Mention the properties and applications of refractory materials.	07	L2	CO1
	c.	Explain the properties and applications of Aluminium and its alloys.	06	L2	CO1
		Module – 2			
Q.3	a.	Explain the electrochemical corrosion of steel in concrete.	07	L2	CO2
	b.	Illustrate the construction and working of photovoltaic cell.	07	L2	CO2
	c.	Discuss the following type of corrosion: (i) Differential metal corrosion (ii) Differential aeration corrosion	06	L2	CO2
		OR			
Q.4	a.	Define secondary batteries. Explain construction and working of Li-ion battery.	07	L2	CO2
	b.	What is anodizing? Explain the anodizing of aluminium.	07	L2	CO2
	c.	Explain the construction and working of Methanol-Oxygen fuel cell.	06	L2	CO2
		Module – 3			
Q.5	a.	100 ml of sample water required 20 ml of 0.01 M EDTA for titration using EBT indicator. In another experiment 100 ml of the sample of water was boiled and precipitate was removed by filtration required 8.0 ml of 0.01 M EDTA using EBT indicator. Calculate: (i) Total Hardness (ii) Permanent Hardness (iii) Temporary Hardness	07	L2	CO3
	b.	What is desalination? Describe the desalination of water by electrodialysis method with a neat labelled diagram.	07	L2	CO3
	c.	Explain the following size dependent properties of nanomaterials: (i) Surface area (ii) Catalytic property	06	L2	CO3
		OR			
Q.6	a.	What are hard waters? Discuss the estimation of total hardness of using EDTA solution.	07	L2	CO3
	b.	Define COD. In a COD test, 28 cm^3 and 16 cm^3 of 0.05 N FAS solutions are required for a blank and sample titration respectively. The volume of sample used was 25 cm^3. Find the COD of a sample solution.	07	L2	CO3
	c.	Define nanomaterial. Explain the synthesis of nanomaterials by sol-gel method.	06	L2	CO3

		Module – 4			
Q.7	**a.**	Describe the synthesis, properties and applications of polyethylene.	**07**	**L2**	**CO4**
	b.	Define biodegradable polymer. Explain the synthesis and applications of polylactic acid.	**07**	**L2**	**CO4**
	c.	What are polymer composites? Mention the properties and application of FRP (Fiber Reinforced Polymer).	**06**	**L2**	**CO4**
		OR			
Q.8	**a.**	What are adhesives? Give the synthesis, properties and applications of epoxy resin.	**07**	**L2**	**CO4**
	b.	A polymer sample contains 50 molecules of molecular mass 1000 g/mols, 100 molecules of molecular mass 2000 g/mols and 150 molecules of molecular mass 3000 g/mols. Calculate the number average and weight average molecular masses of the polymer.	**07**	**L3**	**CO4**
	c.	Mention the properties and applications of geopolymer concrete.	**06**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	Describe the Lead-Silver system with the help of neat phase diagram.	**07**	**L2**	**CO5**
	b.	Describe the instrumentation and applications of conductometric sensors in the estimation of acid mixture.	**07**	**L2**	**CO5**
	c.	Describe the estimation of FAS using potentiometric sensors.	**06**	**L2**	**CO5**
		OR			
Q.10	**a.**	Illustrate the principle, instrumentation and working of potentiometric sensors.	**07**	**L2**	**CO5**
	b.	Define the following terms with examples: (i) Phase (ii) Component (iii) Degree of freedom	**07**	**L2**	**CO5**
	c.	Explain the determination of p^H of soil sample using p^H sensors.	**06**	**L2**	**CO5**

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CBCS SCHEME

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BPOPS103/203

First/Second Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Principles of Programming Using 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.	Discuss the structure of 'C' program with an example.	8	L2	CO1
	b.	What are Variables? Write the rules to declare a variable.	6	L2	CO2
	c.	What are escape sequences? Mention the escape sequences of 'C' language with their meaning.	6	L2	CO2
		OR			
Q.2	a.	Explain any two output devices in detail.	6	L2	CO1
	b.	With an example, explain Input – Output statements in 'C'.	6	L2	CO2
	c.	Discuss the classification of Computers.	8	L2	CO1
		Module – 2			
Q.3	a.	List all decision control statements in 'C'. Explain else – if ladder and nested if with its syntax and example.	8	L2	CO2
	b.	Write a 'C' program to simulate a calculator using switch statement.	6	L3	CO2
	c.	Explain break and continue statement with example.	6	L3	CO2
		OR			
Q.4	a.	Explain the for Loop with its syntax. Write a 'C' program to find whether a given number is prime or not.	8	L3	CO2
	b.	Differentiate while and do – while loops with example.	6	L3	CO2
	c.	What are nested loops? Give example. Write a 'C' program to display the pattern shown below. 1 2 2 3 3 3 4 4 4 4 5 5 5 5 5	6	L3	CO2
		Module – 3			
Q.5	a.	Define Function. Write the syntax of a function. Explain the categories of function with examples.	10	L2	CO2

	b.	Briefly explain the storage classes supported by 'C' language.	10	L2	CO2
		OR			
Q.6	a.	Differentiate pass by value end pass by address parameter passing techniques.	5	L3	CO3
	b.	How 2 – dimensional arrays are declared and initialized? Write a 'C' program to find the transpose of a matrix.	7	L4	CO3
	c.	Define Recursion. Mention the properties of Recursion function. Write a 'C' program to find GCD of 2 numbers using recursive function.	8	L4	CO3
		Module – 4			
Q.7	a.	What are Strings? Explain the 'C' function used to read and write characters.	6	L2	CO3
	b.	Write a program to find length of given string without using built in function.	6	L3	CO2
	c.	What is a Pointer? How pointer are declared and initialized? Mention the various operations that are carried out on pointers.	8	L4	CO4
		OR			
Q.8	a.	Write a program to copy and concatenate from one string to another.	8	L3	CO5
	b.	Explain any 6 string manipulation functions.	6	L3	CO4
	c.	Write a 'C' program to find sum, mean, standard deviation of all elements in an array using pointers.	6	L5	CO5
		Module – 5			
Q.9	a.	What is Union? Give its syntax. Differentiate unions and structures.	8	L2	CO4
	b.	Explain with an example array of structures and arrays within structure.	6	L2	CO4
	c.	Write a note on Structures and Functions.	6	L3	CO4
		OR			
Q.10	a.	What is a File? Explain different modes of File with example.	8	L2	CO5
	b.	Write a note on Enumerated Data type.	6	L2	CO4
	c.	Write a 'C' program to copy the contents from one file to another.	6	L4	CO5

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CBCS SCHEME

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BBEE103/203

First/Second Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Basic Electronics for EEE Stream

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. VTU Formula Hand Book is permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Explain the forward and reverse characteristics of a silicon diode.	08	L2	CO1
	b.	Describe the working of a two diode full wave rectifier with neat circuit diagram and waveforms.	08	L2	CO1
	c.	Explain the working of a capacitor filter for a half wave rectifier with neat circuit diagram and waveforms.	04	L2	CO1
		OR			
Q.2	a.	Explain the working of a full wave bridge rectifier with neat circuit diagram and waveforms.	08	L2	CO1
	b.	Illustrate how Zener diode can be used as voltage regulator in load and no load conditions.	08	L2	CO1
	c.	Write a note on ideal, practical and piecewise linear characteristics of a pn junction diode.	04	L2	CO1
		Module – 2			
Q.3	a.	Explain the input and output characteristics of a transistor in common Emitter configuration.	08	L2	CO2
	b.	Indicate the various voltages and currents in a transistor circuit and derive β_{dc} interms of α_{dc}.	06	L2	CO2
	c.	Explain the operating principle of an n channel JFET.	06	L2	CO2
		OR			
Q.4	a.	Explain the working of an n-channel enhancement type MOSFET.	08	L2	CO2
	b.	Describe the input and output characteristics of a transistor connected in common base configuration.	06	L2	CO1
	c.	Explain how the DC load line can be constructed with respect to a BJT.	06	L2	CO1
		Module – 3			
Q.5	a.	Define the following with respect to an opamp: (i) Slew rate (ii) CMRR (iii) Input Offset Voltage	06	L2	CO1
	b.	Explain how an opamp can be used as an integrator and differentiator.	08	L2	CO2
	c.	An opamp inverting amplifier has a feedback resistor of 15 KΩ and a input resistor of 2KΩ. Calculate the gain of the opamp and the output voltage if it is supplied with an input of 0.75V.	06	L3	CO2
		OR			
Q.6	a.	List the characteristics of an ideal opamp.	06	L2	CO1
	b.	Describe how an opamp can be used as a difference amplifier/subtracting circuit.	08	L2	CO2
	c.	Show how an opamp summing circuit can be used to produce an output voltage: $V_0 = -(3V_1 + 3V_2 + 3V_3)$	06	L3	CO2

		Module – 4			
Q.7	**a.**	Perform binary subtraction using 2's complement method on the following: (i) $(1101)_2 - (1010)_2$ (ii) $(10101.101)_2 - (01110.111)_2$	**04**	**L3**	**CO3**
	b.	Perform the following conversions: (i) $(82.25)_{10} = (?)_2$ (ii) $(46)_{10} = (?)_8$ (iii) $(126)_{10} = (?)_{16}$ (iv) $(111011.1001)_2 = (?)_{10}$	**08**	**L3**	**CO3**
	c.	Simplify the following Boolean functions: i) $(A + \overline{B}C)(\overline{A} + B + \overline{C})(A + \overline{B})$ ii) $A + A\overline{B} + \overline{A}B$	**08**	**L3**	**CO3**
		OR			
Q.8	**a.**	With neat diagram, explain Half adder.	**02**	**L2**	**CO3**
	b.	Explain how a full adder can be realized using two half adders.	**08**	**L2**	**CO3**
	c.	List the Boolean laws. Also state and prove Demorgan's theorem.	**10**	**L2**	**CO3**
		Module – 5			
Q.9	**a.**	Describe the working of a LVDT with neat diagram.	**08**	**L2**	**CO5**
	b.	Explain the general block diagram of communication system.	**06**	**L2**	**CO4**
	c.	Define modulation. What are the needs of modulation.	**06**	**L2**	**CO4**
		OR			
Q.10	**a.**	Explain the working of potentiometer-type resistive transducer.	**08**	**L2**	**CO5**
	b.	Describe piezo electric transducer.	**06**	**L2**	**CO5**
	c.	Write a short note on photodiodes.	**06**	**L2**	**CO5**

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CBCS SCHEME

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BESCK104C/ BESCKC104

First Semester B.E/B.Tech. Degree Supplementary Examination, June/July 2024
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.

		Module – 1	M	L	C
1	a.	Describe full wave bridge rectifier with relevant waveform? Memorize its measurable parameters.	7	L2	CO1
	b.	Explain how zener diode acts as voltage regulator. Discuss line and load regulation.	7	L2	CO1
	c.	Illustrate the difference between zener and avalanche breakdown.	6	L2	CO1
		OR			
2	a.	Discuss half wave rectifier with capacitor filter. Memorize ripple factor.	7	L2	CO1
	b.	Describe with neat sketch and working operation of RC coupled amplifier and specify frequency response with parameters.	7	L2	CO1
	c.	Discriminate half wave rectifier and full wave rectifier.	6	L2	CO1
		Module – 2			
3	a.	Describe the operation of crystal oscillator and state its applications.	7	L2	CO2
	b.	Discuss any two applications of OPAMP.	7	L2	CO2
	c.	State ideal and practical characteristics of OPAMP.	6	L2	CO2
		OR			
4	a.	Explain the concept for sustained oscillations of ladder type network oscillator.	7	L2	CO2
	b.	Define multivibrator and also discuss single stage astable oscillator using OPAMP.	7	L2	CO2
	c.	Describe various blocks of OPAM and discuss its measurable parameter.	6	L2	CO2
		Module – 3			
5	a.	i) Convert $(725.25)_8$ to ($)_{10}$ and ($)_2$ ii) Determine the value of x if $(211)_x = (152)_8$	7	L3	CO3
	b.	Discuss the different theorems and postulates of Boolean Algebra and prove each of them with truth table.	7	L2	CO3
	c.	Find the complement of functions F_1 and F_2 i) $F_1(x, y, z) = x'yz' + x'y'z$ ii) $F_2(x, y, z) = x(y'z' + yz)$.	6	L3	CO3

		OR			
6	a.	Simplify and realize the expression using NAND and NOR $F = AB + AC + BD + CD$.	7	L3	CO3
	b.	Implement full adder circuit with truth table and deduce expression for sum and carry.	7	L2	CO3
	c.	Implement EX–OR and EX–NOR using NAND.	6	L2	CO3
		Module – 4			
7	a.	Define general computing system. Describe its classification in contrast to embedded system.	7	L2	CO4
	b.	Compare microprocessor and microcontroller with silent features.	7	L2	CO4
	c.	Explain the following : i) Transducers ii) Actuators.	6	L2	CO4
		OR			
8	a.	Explain various elements of embedded systems and state its applications.	7	L2	CO4
	b.	Distinguish RISC and CISC.	6	L2	CO4
	c.	Explain : i) 7 segment LED display ii) Sensor.	7	L2	CO4
		Module – 5			
9	a.	Explain the concept of AM wave and interpret MI and transmission efficiency.	7	L2	CO5
	b.	Discuss the various modes of radio wave propagation.	7	L2	CO5
	c.	Describe ASK used in communication system.	6	L2	CO5
		OR			
10	a.	Discuss frequency modulation in communication system and describe MI and frequency deviation.	7	L2	CO5
	b.	Describe the various block of communication system.	6	L2	CO5
	c.	Explain PSK modulation technique in communication system.	7	L2	CO5

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CBCS SCHEME

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BESCK104E/ BESCKE104

First Semester B.E/B.Tech. Degree Supplementary Examination, June/July 2024
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
1	a.	Discuss with a neat block diagram, the basic organization of computer.	6	L2	CO1
	b.	Explain with example the basic data types of C language	7	L2	CO2
	c.	Explain with block diagram the compiling and executing of C program.	7	L2	CO2
		OR			
2	a.	Brief out the generation of computers with examples.	7	L1	CO1
	b.	Explain the basic structure of C program with an example.	7	L2	CO2
	c.	Discuss about the variables and constants of C language with examples.	6	L2	CO2
		Module – 2			
3	a.	Explain type conversion of expression in C language show the steps of type conversion for the expression : char ch ; int i ; float f ; double d, res ; res = (ch + i) * (f / i) + (d – f) ;	6	L3	CO2
	b.	Explain various types of decision control statements of C language with syntax and example.	8	L2	CO2
	c.	Write a program to find the largest of three uses defined floating point numbers.	6	L3	CO2
		OR			
4	a.	Discuss with syntactic structure and flow chart of preparing the for loop statement in C language. Give examples.	6	L2	CO2
	b.	Explain use of break and continue statements in C language.	6	L2	CO2
	c.	List and discuss the operators of C language with example.	8	L2	CO2
		Module – 3			
5	a.	Discuss the implementation of uses defined function with suitable examples.	7	L2	CO3
	b.	Implement matrix multiplication and validate the rules of multiplication with C program.	7	L3	CO3
	c.	Differentiate between call by value and call by reference using suitable examples.	6	L2	CO2
		OR			
6	a.	Explain the design and implementation of one dimensional array with example.	6	L2	CO3
	b.	Discuss about the storing and accessing of elements in one dimensional array.	6	L1	CO3
	c.	Write a C program to sort the given N numbers using the bubble sort algorithm.	8	L3	CO3

		Module – 4			
7	a.	Write a program to concatenate two strings without using built-in function.	**6**	**L3**	**CO2**
	b.	Explain about multidimensional array with example.	**7**	**L2**	**CO3**
	c.	Write functions to implement string operations such as compare, string length. Convince the parameter passing techniques.	**7**	**L3**	**CO5**
		OR			
8	a.	Discuss the functions for character manipulations of strings in C language.	**6**	**L2**	**CO3**
	b.	Write a C program to read and write the names of n students of a class using the string array.	**8**	**L3**	**CO5**
	c.	How to pass an array to a function? Discuss with simple examples.	**6**	**L1**	**CO3**
		Module – 5			
9	a.	Discuss about the declaration and initialization of pointer variables in C language.	**6**	**L1**	**CO4**
	b.	Discuss an array of strings with an example.	**6**	**L2**	**CO3**
	c.	Develop a C program using pointers to compute the sum, mean and standard deviation of all elements stored in an array of N real numbers.	**8**	**L3**	**CO4**
		OR			
10	a.	Explain the structures in C language, with examples.	**6**	**L2**	**CO5**
	b.	Implement a structure of student with elements NAME, USN and GRADE. Write function to read and write student structure.	**8**	**L3**	**CO5**
	c.	Explain the passing of pointer variable to a function with an example.	**6**	**L1**	**CO4**

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CBCS SCHEME

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BPLCK105D/BPLCKD105

First Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

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 the terms class, object, encapsulation and polymorphism with suitable examples.	10	L2	CO1
	b.	Design a class triangle containing data items base, height and three member functions getdata( ), findarea( ) and displaydata( ) get the user input to find area of triangle and to display the area respectively.	10	L3	CO1
		OR			
Q.2	a.	Illustrate the structure of C++ program with syntax and example.	10	L2	CO1
	b.	Explain message passing with an example.	10	L2	CO1
		Module – 2			
Q.3	a.	Distinguish any 5 types of expressions in C++ with an example.	10	L2	CO1
	b.	Write a C++ program to find the maximum of two numbers using inline function.	10	L3	CO1
		OR			
Q.4	a.	Explain keywords, identifiers and constant with an example.	10	L2	CO1
	b.	Define operators and its types with suitable examples.	10	L2	CO1
		Module – 3			
Q.5	a.	What is a constructor? List different types of constructor and explain the default constructor with example.	10	L2	CO1
	b.	Develop a C# program to demonstrate function overloading for the following prototype add(inta, intb); add (double a, double b);	10	L2	CO2
		OR			
Q.6	a.	Describe inheritance. Explain the types of inheritance with example.	10	L2	CO3

	b.	Suppose we have three classes vehicle, four wheeler and car. The class vehicle is the base class, the class four wheeler is derived from it and the class car is derived from the class four wheeler, class vehicle has a method 'vehicle' that prints 'I Am a vehicle', class four wheeler has a method 'four wheeler' that prints 'I have four wheels' and class car has a method 'car' that prints 'I Am a car'. So as this is a multi level inheritance. We can have access to all the other classes methods from the object of the class car. We invoke all the methods from a car object and print the corresponding outputs of the methods. So if we invoke the methods in this order, car( ), four wheeler( ) and vehicle( ) then output will be I am a car I have four wheels I am a vehicle Write a C++ program to demonstrate multilevel inheritance using this.	**10**	**L3**	**CO3**
		Module – 4			
Q.7	**a.**	With a neat diagram, explain stream class hierarchy in C++.	**10**	**L2**	**CO4**
	b.	Write a C++ program to create text file, check file created or not, if created it will write some text into the file and read the text from the file.	**10**	**L3**	**CO3**
		OR			
Q.8	**a.**	Describe the following functions with its syntax in text files: i) Open ii) Close iii) Read iv) Write.	**10**	**L3**	**CO4**
	b.	Write a C++ program to write and read time in/from binary file using fstream.	**10**	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	Describe the role of the throw statement in C++ exception handling.	**10**	**L2**	**CO4**
	b.	Write C++ program function which handles array of bounds exception using C++.	**10**	**L3**	**CO4**
		OR			
Q.10	**a.**	List and briefly explain two predefined exceptions in C++. How are these exceptions commonly used in practice?	**10**	**L2**	**CO4**
	b.	Define the concept of exception handling in C++. Explain how it differs from traditional error-handling methods.	**10**	**L2**	**CO4**

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BETCKE105/BETCK105E

First Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Renewable Energy Sources

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. VTU Formula Hand Book is permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Briefly explain the following principles of renewable energy, energy and sustainable development and renewable energy and social implications.	10	L2	CO1
	b.	Discuss the renewable energy availability in India and Worldwide.	10	L2	CO1
		OR			
Q.2	a.	With neat sketch, briefly explain (i) Solar energy (ii) Wind energy	10	L2	CO1
	b.	Explain in detail the concept of Internet of Energy.	10	L2	CO1
		Module – 2			
Q.3	a.	With the help of neat sketch, explain the construction and working of pyrheliometer.	10	L2	CO2
	b.	With the help of neat sketch, explain solar flat plate collector.	10	L2	CO2
		OR			
Q.4	a.	Explain the principle and working of solar photo voltaic cell with the help of neat sketch.	10	L2	CO2
	b.	List the advantages, disadvantages and applications of solar photovoltaic cell.	10	L2	CO2
		Module – 3			
Q.5	a.	Explain with neat sketch the basic components of the wind energy conversion system.	10	L2	CO3
	b.	Compare horizontal axis and vertical axis window turbines.	05	L2	CO3
	c.	List the major problem associated with wind energy conversion systems.	05	L2	CO3
		OR			
Q.6	a.	Explain in detail the photosynthesis process.	10	L2	CO3
	b.	With the help of neat diagram, explain downdraft gasifier.	10	L2	CO3
		Module – 4			
Q.7	a.	Explain with a neat sketch single basin and double basin tidal power plant.	10	L2	CO4
	b.	Explain the advantages and disadvantages of tidal power plant.	10	L2	CO4
		OR			
Q.8	a.	With the help of neat sketch, explain the principle of working of OTEC.	10	L2	CO4
	b.	Explain the different problem associated with OTEC.	10	L2	CO4
		Module – 5			
Q.9	a.	Explain the different classification of fuel cells.	08	L2	CO5
	b.	Explain the concept of zero energy.	06	L2	CO5
	c.	Define and explain a fuel cell.	06	L2	CO5
		OR			
Q.10	a.	With the help of neat diagram, explain electrolysis method of producing hydrogen (H_2).	10	L2	CO1
	b.	List the advantages and problem associated with hydrogen energy.	05	L2	CO1
	c.	List the application of Hydrogen energy.	05	L2	CO1

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BETCK105H/ BETCKH105

First Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Introduction to Internet of Things (IoT)

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 advantages and disadvantages the following network topologies; i) Star ii) Ring iii) Bus iv) Mesh.	8	L2	CO1
	b.	Contrast between the following domains : i) IoT versus M2M ii) IoT versus CPS iii) IoT versus WoT.	12	L2	CO1
		OR			
Q.2	a.	What is ISO – OSI model? Illustrate with a neat diagram networked communication between two hosts following the OSI model.	10	L2	CO1
	b.	Outline the interdependence and reach of IOT over various application domains and networking paradigms.	10	L2	CO1
		Module – 2			
Q.3	a.	Compare between Transducers, sensors, actuators.	6	L2	CO1
	b.	Explain the major factors that influence the choice of sensors in IoT based sensing solutions.	6	L2	CO1
	c.	With neat diagram, explain scalar and multimedia sensing.	8	L2	CO1
		OR			
Q.4	a.	Describe different types of actuators used for IoT applications.	12	L2	CO2
	b.	Explain various characteristics of actuators.	8	L2	CO2
		Module – 3			
Q.5	a.	List out the differences between structured and unstructured data. Outline various data generating and storage sources with a block schematic.	10	L2	CO2
	b.	Explain importance of processing in IoT with suitable examples.	10	L2	CO2
		OR			
Q.6	a.	What are the critical factors to be considered during the design and selection of IoT devices? Explain briefly.	10	L2	CO1
	b.	Discuss the various off load locations and decision making approaches chosen for offloading data in IoT.	10	L2	CO1

		Module – 4			
Q.7	**a.**	Define Virtualization. Discuss advantages of virtualization for end user and Cloud Service Provider (CSP).	**10**	**L1**	**CO2**
	b.	Describe various service models and deployment models in cloud.	**10**	**L2**	**CO2**
		OR			
Q.8	**a.**	Discuss components of agricultural IoT and list out its advantages.	**10**	**L2**	**CO2**
	b.	Design a case study to develop smart irrigation management system.	**10**	**L2**	**CO2**
		Module – 5			
Q.9	**a.**	Describe with a neat diagram, architecture of vehicular IoT.	**10**	**L2**	**CO2**
	b.	Explain advantages and risks associated with health care IoT.	**10**	**L2**	**CO2**
		OR			
Q.10	**a.**	Illustrate with neat diagram, layered architecture of Ambusens.	**10**	**L2**	**CO1**
	b.	Define Machine Learning. Outline different types of machine learning in IoT analytics.	**10**	**L1**	**CO1**

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CBCS SCHEME

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BETCK105J/BETCKJ105

First Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Introduction to Embedded 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.

		Module – 1	M	L	C
Q.1	a.	What is Embedded System? Mention the purpose of Embedded system.	8	L1	CO1
	b.	Explain the applications of Embedded system.	6	L2	CO1
	c.	Differentiate RISC and CISC.	6	L2	CO1
		OR			
Q.2	a.	Explain the classification of embedded system.	8	L2	CO1
	b.	Explain Big endian and little endian processors.	6	L2	CO1
	c.	What is external communication interface? Mention various interfaces.	6	L1	CO1
		Module – 2			
Q.3	a.	Explain the important characteristics of an embedded system.	10	L2	CO1
	b.	Explain different electronic control units used in automotive system.	10	L2	CO2
		OR			
Q.4	a.	Explain the operational and non operational quality attributes of embedded system.	10	L2	CO2
	b.	Explain the different communication buses used in automotive applications.	10	L2	CO2
		Module – 3			
Q.5	a.	Draw and explain the FSM model for automatic Tea/coffee vending machine.	10	L2	CO3
	b.	What is flip flop? List and explain any two flip flops with neat diagram.	10	L2	CO3
		OR			
Q.6	a.	List and explain the fundamental issues in hardware software co-design.	10	L2	CO3
	b.	Explain multiplexer and de-multiplexer with neat diagram.	10	L2	CO3
		Module – 4			
Q.7	a.	Explain the various steps involved in the conversion of assembly language to machine language process.	10	L2	CO4
	b.	Explain the techniques for mixing assembly with C.	10	L2	CO4

		OR			
Q.8	**a.**	Explain the following: i) Storage class ii) Logical operations iii) Relational operations.	**10**	**L2**	**CO4**
	b.	What is Object file? Mention the details stored in object file.	**10**	**L1**	**CO4**
		Module – 5			
Q.9	**a.**	What is operating system? List and explain the different types of operating system.	**10**	**L2**	**CO5**
	b.	Describe the various factors to be considered for the selection of a scheduling criteria.	**10**	**L2**	**CO5**
		OR			
Q.10	**a.**	Draw and explain operating system architecture with microkernel and monolithic kernel.	**10**	**L2**	**CO5**
	b.	Draw a process state transition diagram and explain it.	**10**	**L2**	**CO5**

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CBCS SCHEME

BPWSK106/206

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

Question Paper Version : A

First/Second Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Professional Writing Skills in English

Time: 1 hrs.] [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. Identify the sentence with a parts of speech error:
   a) She plays the piano very well
   b) They are listening to music
   c) He are playing soccer
   d) We is going to the movies.

2. Which sentence contains a parts of speech error?
   a) He are a good student.
   b) She sings beautifully.
   c) We will eat pizza for dinner.
   d) They are playing soccer outside.

3. In which sentence is the error in parts of speech?
   a) She is reading an interesting book.
   b) I can swimming very well.
   c) They are watching a movie.
   d) He plays the guitar

4. What is the grammatical term for a word that connects words, phrases, or clauses?
   a) Conjunction b) Preposition c) Adverb d) Interjection

5. In the sentence, "I saw him running down the street, "what is the function of the word "running"?
   a) Adjective b) Adverb c) Gerund d) Infinitive

6. What is the function of a participle in a sentence?
   a) To modify a noun or pronoun
   b) To express an action
   c) To function as the subject of a verb
   d) To function as the object of a verb

7. In the sentence, "The book on the table is mine," what is the function of the phrase "on the table"?
   a) Adjective
   b) Adverb
   c) Prepositional phrase
   d) Gerund phrase

8. Which sentence has a grammatical error?
   a) He enjoy playing basketball.
   b) They is going to the beach.
   c) She have finished her homework.
   d) We am going to the park.

9. What is the grammatical mistake in the sentence: "The dog laying in the sun"?
   a) Verb tense
   b) Subject-verb agreement
   c) Verb form
   d) Word choice

10. What is the grammatical mistake in the sentence: "The car is blue, and the truck is red color"?
   a) Run-on sentence
   b) Comma splice
   c) Redundancy
   d) Fragment sentence

11. Which sentence contains a grammatical error?
   a) The cat is sleeping on the couch.
   b) She are a doctor.
   c) They is going to the park.
   d) I like to sing.

12. What is the grammatical error in the sentence: "He don't have any money"?
   a) Subject-verb agreement
   b) Pronoun usage
   c) Tense consistency
   d) Sentence structure

13. Which of the following sentences has a grammatical error?
   a) She sings beautifully.
   b) We am going to the park.
   c) They are watching a movie.
   d) He plays basketball every weekend.

14. Which sentence demonstrates correct subject-verb agreement?
   a) The dogs barks loudly in the park.
   b) The dog bark loudly in the park.
   c) The dogs bark loudly in the park.
   d) The dog barks loudly in the park.

15. Which option demonstrates correct subject-verb agreement?
   a) The team are playing well this season.
   b) The team is playing well this season.
   c) The team were playing well this season.
   d) The team am playing well this season.

16. Which of the following sentences is in the present perfect tense?
   a) She will go to the store.
   b) She is going to the store.
   c) She went to the store.
   d) She has gone to the store.

17. What is the future tense of the verb "to swim"?
   a) Swim
   b) Swam
   c) Swimming
   d) Will swim

18. Which tense is used to describe actions that are ongoing or happening at the moment?
   a) Present simple
   b) Past simple
   c) Present continuous
   d) Past continuous

19. What is the past tense of the verb "to eat"?
   a) Eating
   b) Eaten
   c) Ate
   d) Eat

20. In the sentence, "I have lived here for ten years," which tense is used for the verb "have lived"?
   a) Present simple
   b) Present perfect
   c) Past simple
   d) Past perfect

21. What is the future tense of the verb "to run"?
a) Runs b) Running c) Ran d) Will run

22. Which of the following sentences is in the past continuous tense?
a) She has been studying all day. b) She studied for the exam last night.
c) She was studying when the phone rang. d) She will study tomorrow.

23. Which of the following refers to words that have similar meanings?
a) Synonyms b) Antonyms c) Homonyms d) Homophones

24. What term describes words that are spelled the same but have different meanings and sometimes different pronunciations?
a) Synonyms b) Antonyms c) Homonyms d) Homophones

25. Complete the analogy: Cat is to kitten as dog is to _____.
a) Cub b) Puppy c) Foal d) Chick

26. Choose the correct usage: "Yours" versus "You're".
a) Your going to love the party. b) You're going to love the party.
c) Youre going to love the party. d) You are going to love the party.

27. Choose the correct usage: "Its" versus "It's".
a) Its a beautiful day outside. b) It's a beautiful day outside.
c) Its raining heavily d) It is raining heavily.

28. Choose the correct collocation:
a) Make an appointment. b) Do an appointment.
c) Take an appointment. d) Give an appointment.

29. Identify the correct collocation:
a) Take a decision b) Make a decision
c) Do a decision d) Give a decision

30. Which contraction is correct for "they have"?
a) they've b) they're c) they'd d) they'll

31. Choose the correct contraction for "we will":
a) we're b) we've c) we'd d) we'll

32. What is the contraction of "cannot"?
a) can't b) couldn't c) can've d) can't've

33. Rearrange the words to form a grammatically correct sentence" "Yesterday, went, to, I, store, the."
a) Yesterday I went to store the. b) Went I to the store yesterday.
c) Yesterday I went to the store. d) I went to the store yesterday.

34. Rearrange the words to form a coherent sentence: "She books, enjoys, reading, many, by, written, different, authors."
a) She enjoys reading many books by different authors written.
b) She enjoys readings by many books written different authors.
c) She enjoys reading many books written by different authors.
d) She by different enjoys readings many books written authors.

35. Rearrange the words to form a grammatically correct sentence: "In, I, morning, the go, always, for, a, run."
a) Always in the morning go I for a run.
b) In the morning always I go for a run.
c) I always go for a run in the morning.
d) In the always morning I go for a run.

36. Rearrange the words to form a coherent sentence: "Hiking, in, we, enjoyed, the, mountains, beautiful, the."
a) We enjoyed hiking in the mountains the beautiful.
b) In the mountains we enjoyed hiking the beautiful.
c) We enjoyed the beautiful mountains in the hiking.
d) The beautiful mountains in the hiking we enjoyed.

37. Identify the error in the sentence: "The dog wagged it's tail excitedly."
a) The b) dog c) wagged d) it's

38. What is the active voice form of the sentence: "The cake was baked by Sarah"?
a) Sarah has baked the cake. b) Sarah had baked the cake.
c) Sarah bakes the cake. d) Sarah will bake the cake.

39. Which option correctly transforms the sentence into passive voice: "The teacher teaches the students"?
a) The teacher is teaching by the students.
b) The students are being taught by the teacher.
c) The teacher was teaching the students.
d) The students were taught by the teacher.

40. What is the reported speech form of the direct speech: "He said, 'I am leaving for London tonight"?
a) He said that he leaves for London tonight.
b) He said that he left for London tonight.
c) He says that he leaves for London tonight.
d) He says that he left for London tonight.

41. Choose the correct transformation of the sentence into reported speech: "She said, 'I have already finished my homework."
a) She said that she already finished her homework.
b) She says that she has already finished her homework.
c) She said that she has already finished her homework.
d) She says that she had already finished her homework.

42. Identify the error in the sentence: "He don't have enough money to buy a car."
a) He b) don't c) have d) enough

43. Which part of the sentence contains the error: "The student's scored high marks in the exam."
a) The b) student's c) scored high marks d) in the exam

44. Find the error in the sentence: "She sings beautiful."
a) She b) sings c) beautiful d) no error

45. Where is the error in the sentence: "Their going to the beach tomorrow."
a) Their b) going c) to the beach d) tomorrow

46. Identify the error in the sentence: "The book is laying on the table."
a) The b) book c) is laying d) on the table

47. Which option improves the sentence: "He plays good football."
a) He plays well football.
b) He plays football good.
c) He plays football well.
d) He plays football goodly.

48. Choose the improved version of the sentence" "The weather is too much hot today."
a) The weather is very hot today.
b) The weather is too hot today.
c) The weather is much hot today.
d) The weather is hot too much today.

49. Which option corrects the sentence: "I am not feeling good today."
a) I am not feeling well today.
b) I am not feeling goodly today.
c) I am not feeling better today.
d) I am not feeling good today.

50. Choose the corrected version of the sentence: "He goes to gym regular."
a) He goes to gym regularly.
b) He goes to the gym regular.
c) He goes to the gym regularly.
d) He goes to gym regulars.

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CBCS SCHEME

BICOK107/207

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

Question Paper Version : A

First/Second Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Indian Constitution

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. Ultimate source of authority under the Constitution lies in ____
   a) Parliament b) People of India
   c) Judiciary d) Executive

2. The Constitution of India was adopted by the Constituent Assembly in the year or date ___
   a) 26 - 01-1950 b) 29 – 11 - 1949 c) 15 – 08 - 1947 d) 09 – 09 - 1946

3. The basic objectives of Indian Constitution are found in ____
   a) Fundamental Rights b) Directive Principles of State Policy
   c) Preamble d) Fundamental Duties

4. Who was the Permanent Chairman of the Constituent Assembly?
   a) Mahatma Gandhi b) Jawaharlal Nehru
   c) Dr. B.R. Ambedkar d) Dr. Rajendra Prasad

5. Who was the leader of the Extremist group to fight against British Rule?
   a) Sardar Vallabai Patel b) Mahatma Gandhi
   c) Subhash Chandra Bose d) Dr. Rajendra Prasad

6. Government of India set of 1919 introduced a system of ____
   a) Federal b) Diarchy c) Democracy d) Anarchy

7. The Cabinet mission came to India in the year _____
   a) 1935 b) 1944 c) 1945 d) 1946

8. How much time was taken by drafting Committee to draft the Indian Constitution?
   a) 2 years 11 months 18 days b) 3 years 11 months 8 days
   c) 2 years 8 months 11 days d) 1 year 11 months 18 days

9. How many members were appointed for the drafting Committee of the Cons[illegible] excluding Chairman?
   a) 5 b) 6 c) 8 d) 7

10. The term 'Unitary' means :
   a) Concentration of Powers b) Division of Powers
   c) Absolute Power d) All of these

11. Which is the key to open the minds of the makers of the Constitution?
   a) Fundamental Rights b) Directive Principles
   c) Fundamental Duties d) Preamble

12. "Rights are not only privileges but they are the weapons in the hands of people to control Government", who gave this statement?
   a) Dr. Rajendra Prasad b) Dr. B.N. Rao
   c) Dr. Ambedkar d) S.V. Patel

13. The practice of untouchability is prohibited under ___
   a) Article 14 b) Article 15 c) Article 16 d) Article 17

14. Right to Life under Art. 21 does not include
   a) Right to Education b) Right to Dignity
   c) Right to Suicide d) Right to Livelihood

15. Reasonable restrictions can be imposed by the State under :
   a) Art. 19 (1) (a) to (g) b) Art. 19 (2) to (6)
   c) Art. 20 (a) to (c) d) Art. 21

16. Fundamental Rights under Part – III can be protected by
   a) Supreme Court b) Parliament
   c) Union Chief Executive d) Attorney – General of India

17. 'Writ of Mandamers' cannot be issued against :
   a) State Government b) President of India
   c) Prime Minister of India d) Public Servant

18. An arrested person is to be produced before the Magistrate or Court within :
   a) One month b) 3 month c) 24 hours d) 48 hours

19. No Person is to be punished twice for the same offence "is The Fundamental Right available under Article :
   a) 19 b) 20 c) 21 d) 22

20. What is the meaning of "Habeas Corpus"?
   a) You may have the body b) To do a duty
   c) On what Authority? d) None of these

21. "Right to Press" (news media) is included under :
   a) Right to Freedom of Speech and expression
   b) Right to Assembly
   c) Right to trade d) Right to move

22. Right to Minorities are guaranteed under Articles :
a) 14 to 16 b) 21 to 24 c) Arts. 29 & 30 d) 17 and 18

23. The Directive principles of State Policy are :
a) Enforceable by Court b) Not enforceable by Court
c) Only a direction to State Government d) None of these

24. Which provision of the Constitution recognizes International Law?
a) Art. 39 b) Art. 48 c) Art. 51 d) Art. 44

25. DPSP (Part – IV) directs the State to secure to all workers :
a) Minimum wages b) Living wages c) Standard wages d) Fair wages

26. Who is having the duty to send the children to School?
a) State b) Parent / Guardian c) Zilla Panchayat d) None of these

27. Which Article enumerates Fundamental duties?
a) Art. 41 b) Art. 51 c) 51 - A d) Art. 52

28. How many members are nominated to Rajya Sabha by the President?
a) Two b) One c) Twelve d) Eight

29. Who can certify the money bill immediately after introducing in Lok Sabha?
a) Prime Minister b) Speaker c) Finance Minister d) Any one

30. Who can dissolve Lok Sabha?
a) Prime Minister b) Speaker c) President d) Vice - President

31. Who can pass an Ordinance in the State Government?
a) Governor b) Chief Minister c) Law Minister d) Speaker

32. Who can appoint the Chief Justice of Supreme Court?
a) Prime Minister b) Law Minister c) Vice - President d) President

33. What is the minimum age to become the member of Legislative Assembly?
a) 21 years b) 25 years c) 30 years, d) 35 years

34. Special provisions are given for
a) Backward classes b) Women & Children
c) Senior Citizens d) Both 'a' and 'b'

35. How many kinds of emergencies are incorporated in the Constitution?
a) 5 Types b) 4 Types c) 3 Types d) 2 Types

36. Who is to act on the advice of the Council of Ministers?
a) Prime Minister b) President c) Vice - President d) Governor

37. The President cannot issue the proclamation of emergency after 1978 for the reason :
a) Internal disturbance b) Terrorism inside India
c) Armed rebellion d) Covid like Epidemic diseases

38. Who can recommend for the declaration of State emergency?
a) Chief Minister b) Governor c) State Cabinet d) None of these

39. Which are the Articles not to be suspended during National Emergency?
a) Arts. 14 to 16 b) Arts. 19 and 22 c) Arts. 20 and 21 d) Arts. 29 to 30

40. Who appoints the Chief Election Commissioner of India?
a) President b) Prime Minister
c) Chief Justice of India d) Cabinet

41. How many members are there in the Election Commission at present?
a) Seven b) Five c) Four d) Three

42. There is no provision in the Indian Constitution for the impeachment of :
a) President b) Chief Justice of Supreme Court
c) Chief Election Commissioner d) Governor

43. Election Commission does not conduct Election to
a) President b) Vice - President c) Speaker d) MPS

44. Who can amend the provisions of the Constitution?
a) Parliament b) Cabinet c) President d) State Legislative

45. The Amendment procedure laid down in the Indian Constitution under the Article :
a) Art. 324 b) Art. 360 c) Art. 368 d) Art. 378

46. Which one of the following Amendments decreased the age of voting from 21 years to 18 years.
a) 44th Amendment b) 61st Amendment c) 62nd Amendment d) 72nd Amendment

47. By which Amendment the Fundamental Duties of Citizens was included in the Constitution of India?
a) 44th b) 38th c) 41st d) 42nd

48. Who has been made responsible for free and fair Elections in the Country?
a) President b) Chief Justice of Supreme Court
c) Prime Minister d) Chief Election Commissioner

49. The duration of State emergency in the first instance is
a) One month b) Two months c) 3 months d) Six months

50. The concept of Election is based on ___
a) Federalism b) Secularism c) Socialism d) Democracy

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BKSKK107/207
Question Paper Version : A

First/Second Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ

(COMMON TO ALL BRANCHES)

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. ಕಬ್ಬಿಗರ ಕಾವ್ಯ ಇದರ ಕರ್ತೃ ಯಾರು?
   a) ಆಂಡಯ್ಯ b) ಹಂಪನ c) ಪಂಪ d) ಬಸವಣ್ಣ

2. ವಿಜಯನಗರ ಕಾಲದಲ್ಲಿ ಧರ್ಮ ಸಮನ್ವಯತೆಯನ್ನು ಕಾಪಾಡಿದ ರಾಜ ಯಾರು?
   a) ಕೃಷ್ಣದೇವರಾಯ b) ಬುಕ್ಕರಾಯ c) ದೇವರಾಯ d) ಹಕ್ಕರಾಯ

3. ಕನ್ನಡ ನಾಡಿನ ಶಾಸನಗಳು ಮುಕ್ಕಾಲು ಪಾಲು ಯಾವುದರ ವಿವರಣೆ ಮತ್ತು ಪ್ರಶಸ್ತಿಗೆ ಮೀಸಲಾಗಿದೆ?
   a) ದಾನ b) ವೀರ c) ಸಾಹಿತ್ಯ d) ಭಾಷೆ

4. ಅರಸನಿಗೆ ಗಂಡು ಮಗುವಾದರೆ _____ ಕೊಟ್ಟು ಒಬ್ಬ ಪ್ರಾಣ ಬಿಟ್ಟಿದ್ದುಂಟು.
   a) ಸಿಡಿತಲೆ b) ತಲೆ c) ಹಿಡಿತಲೆ d) ಪ್ರಾಣ

5. "ಜಾಗದ ಭೋಗದಕ್ಕರದಗೇಯದ ಗೊಟ್ಟಿಯಲಂಪಿನಿಂಪುಗಳ್ಗೆ ಆಗರವಾದ ಮಾನಸರ್ " ಎಂಬ ಜೀವನ ರಸಿಕತೆಯ ಆದರ್ಶವನ್ನು ಸಾವಿರ ವರ್ಷಗಳು ಹಿಂದೆ ____ ಹೇಳಿದ್ದಾರೆ.

a) ಆದಿಕವಿ ಪಂಪ b) ರತ್ನಾಕರವರ್ಣಿ c) ಬಸವಣ್ಣ d) ಸರ್ವಜ್ಞ

6. ಸುಮಾರು 1800 ರಲ್ಲಿಯೇ ಕರ್ನಾಟಕ ಏಕೀಕರಣದ ಅಭಿಪ್ರಾಯವನ್ನು ಬ್ರಿಟಿಷ್ ಹಿರಿಯ ಅಧಿಕಾರಿಗಳಿಗೆ ತಿಳಿಸಿದ್ದವರು ಯಾರು.

a) ವಾಲ್ಟರ್ b) ಮಾರ್ಕಕಬ್ಬನ್ c) ಥಾಮಸ್ ಮನ್ರೊ d) ಮೆಕಾಲೆ

7. ಕರ್ನಾಟಕ ಗತವೈಭವ ಗ್ರಂಥದ ಲೇಖಕರು ಯಾರು?

a) ಕುವೆಂಪು b) ಆಲೂರು ವೆಂಕಟರಾಯರು c) ಮಾಸ್ತಿ d) ಜಿ.ಎಸ್. ಎಸ್

8. 1973 ನವೆಂಬರ್ 1 ರಂದು ಮೈಸೂರು ರಾಜ್ಯಕ್ಕೆ ____ ಎಂದು ನಾಮಕರಣ ಮಾಡಲಾಯಿತು.

a) ಮೈಸೂರು b) ನವಕರ್ನಾಟಕ c) ನವಮೈಸೂರು d) ಕರ್ನಾಟಕ

9. ಕನ್ನಡಭಾಷೆ ಯಾವ ಭಾಷಾ ವರ್ಗಕ್ಕೆ ಸೇರಿದೆ?

a) ಸೆಮಿಟಿಕ್ b) ತುರೇನಿಯನ್ c) ದ್ರಾವಿಡ d) ಇಂಡೋಆರ್ಯನ್

10. ಎಷ್ಟನೇ ಅನುಚ್ಛೇದದ ಅನುಸಾರ ಆಯಾ ರಾಜ್ಯಗಳ್ಲಿ ಬಳಕೆಯಾಗುವ ಭಾಷೆಗಳನ್ನೇ ಆಡಳಿತ ಭಾಷೆಯೆಂದು ತೀರ್ಮಾನಿಸಲಾಯಿತು?

a) 343 b) 344 c) 345 d) 346

11. ಕನ್ನಡ ಭಾಷೆಯ ಲಿಪಿಯನ್ನು ಲಿಪಿಗಳ ರಾಣಿ ಎಂದು ಕರೆದವರು ಯಾರು?

a) ಸರೋಜನಿ ನಾಯ್ಡು b) ಮದರ್ ತೆರೆಸಾ
c) ವಿನೋಬಾ ಭಾವೆ d) ಝಾನ್ಸಿರಾಣಿ ಲಕ್ಷ್ಮೀಬಾಯಿ

12. ಜೇಡರ ದಾಸಿಮಯ್ಯನ ಅಂಕಿತ ಯಾವುದು?

a) ಗುಹೇಶ್ವರ b) ಕೂಡಲ ಸಂಗಮದೇವಾ
c) ರಾಮನಾಥ d) ಚೆನ್ನ ಮಲ್ಲಿಕಾರ್ಜುನ

13. ಹುಲಿಗಂಜಿ ಹುತ್ತವ ಹೊಕ್ಕಡೆ ಏನು ತಿಂಬುದಮಾಬುದೆ?

a) ಸರ್ಪ b) ಆನೆ c) ಕರ್ಮ d) ಮೃತ್ಯು

14. ಕರಿಘನ ಅಂಕುಶ ಕಿರಿದೆನ್ನಬಹುದೆ ಬಾರದಯ್ಯ ವಚನದ ವಚನಕಾರರು ಯಾರು?
a) ಅಕ್ಕಮಹಾದೇವಿ b) ಆಯ್ದಕ್ಕಿ ಲಕ್ಕಮ್ಮ c) ಆಯ್ದಕ್ಕಿ ಮಾರಯ್ಯ d) ಬಸವಣ್ಣ

15. ಕುರುಡ ಕಣ್ಣ ಕಾಣಲರಿಯದೆ ಏನನ್ನು ಬಯ್ವನು?
a) ಶಶಿಯ b) ಕನ್ನಡಿಯ c) ಕರ್ಮವ d) ರವಿಯ

16. ಕಾಯಕವೇ ಕೈಲಾಸವಾದ ಕಾರಣ ಅಮರೇಶ್ವರ ಲಿಂಗವಾಯಿತ್ತಾದಡು ____ದೊಳಗು.
a) ಮನಸ್ಸು b) ಕರ್ಮ c) ಕಾಯಕ d) ಕನ್ನಡಿ

17. ತಲ್ಲಣಿಸದಿರು ಕಂಡ್ಯತಾಳು ಮನವೇ ಕೀರ್ತನೆಯ ಕೀರ್ತನಕಾರರು ಯಾರು?
a) ಪುರಂದರದಾಸರು b) ಕನಕದಾಸರು
c) ಶಿಶುನಾಳ ಶರೀಫರು d) ಶಿವಯೋಗಿ

18. ಕುಂಬಾರಕಿ ಮೂರು ಕಾಸಿಗೊಂದು ಏನನ್ನು ಮಾರುತ್ತಾಳೆ?
a) ಕುಡುಕಿ b) ಗಡಿಗೆ c) ಮಡಿಕೆ d) ಗುಡಾಣ

19. ಪುರಂದರದಾಸರ ವಚನಗಳ ಅಂಕಿತನಾಮ ಯಾವುದು?
a) ರಾಮನಾಥ b) ವಿಠಲ c) ಗುಹೇಶ್ವರ d) ಪುರಂದರ ವಿಠಲ

20. ಕುಂಬಾರಕಿ ಮಡಿಕೆ ಬಳಸುವ ಮಣ್ಣನು ಶರೀಫರು ಯಾವುದಕ್ಕೆ ಹೋಲಿಸಿದ್ದಾರೆ?
a) ಚಿನ್ನ b) ಮುತ್ತು c) ರತ್ನ d) ಲವಣ

21. ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗ ಕಾವ್ಯಭಾಗದ ಕವಿ ಯಾರು?
a) ಬಿ.ಎಂ.ಶ್ರೀ b) ತೀ.ನಂ.ಶ್ರೀ c) ಜಿ.ಎಸ್. ಎಸ್ d) ಡಿವಿಜಿ

22. ಇರುವೆಗಳು ಕಟ್ಟಿದ ಗೂಡು ಯಾವುದಕ್ಕೆ ಹುತ್ತವಾಗುವುದು?
a) ಇಲಿ b) ಬಾವುಲಿ c) ವಿಷಸರ್ಪ d) ಮುಂಗುಸಿ

23. ಬೇಂದ್ರೆಯವರ ಯಾವ ಕವನ ಸಂಗ್ರಹಕ್ಕೆ ಜ್ಞಾನಪೀಠ ಪ್ರಶಸ್ತಿ ಬಂದಿದೆ?
a) ಮೂಕಜ್ಜಿಯ ಕನಸುಗಳು b) ನಾಕುತಂತಿ
c) ಸಮಗ್ರ ಸಾಹಿತ್ಯ d) ಸಾಹಿತ್ಯ

24. ಸಾಬಾಣ ಪದದ ಅರ್ಥವೇನು?
a) ಸಾಬೂನು b) ಸರಕು c) ಸಂಯಮ d) ಯಾವುದು ಅಲ್ಲ

25. ಕಾಲಿಗೆ ಬಿದ್ದವರ ಯಾವುದು ತುಳಿಯತ್ತಲಿತ್ತು?
a) ಹಣ b) ಕಾಂಚಾನ c) ದುಡ್ಡು d) ಕುರುಡು ಕಾಂಚಾಣ

26. ಕುವೆಂಪುರವರ ಆತ್ಮಕಥೆ ಯಾವುದು?
a) ಗಿರಿಜನ b) ನೆನಪಿನ ದೋಣಿ
c) ಗಿರಿಜನ ಪಯಣ d) ಯಾವುದು ಅಲ್ಲ

27. ಭಗವಂತ ಮಾನವರಿಗೆ ಕಾಣಿಸಿಕೊಂಡರೆ, ಮೊದಲ ಅನ್ನದ ರೂಪದಲ್ಲಿ ಕಾಣಿಸಿಕೊಳ್ಳಬೇಕು ಎಂದು ಹೇಳಿದವರು ಯಾರು?
a) ಗಾಂಧೀಜಿ b) ನೆಹರು c) ವಿಶ್ವೇಶ್ವರಯ್ಯ d) ಮೂರ್ತಿರಾವ್

28. 56ನೇ ಕನ್ನಡ ಸಾಹಿತ್ಯ ಪರಿಷತ್ತು ಯಾವಾಗ ನಡೆಯಿತು?
a) 1983 b) 1984 c) 1985 d) 1986

29. ಬಟ್ಟೆಯ ಮೇಲಿನ ಮುದ್ರಣ ಕಲೆಗೆ ಯಾವ ದೇಶವು ಮೂಲ ನೆಲೆಯಾಗಿದೆ?
a) ಭಾರತ b) ಇಂಗ್ಲೆಂಡ್ c) ಫ್ರಾನ್ಸ್ d) ಅಮೇರಿಕಾ

30. ಡಾ. ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ ಅವರ ಕಾದಂಬರಿ ಯಾವುದು?
a) ಮಳೆಬಿಲ್ಲು b) ಮಳೆ c) ಕಾಮನಬಿಲ್ಲು d) ಮಳೆಕೋಗಿಲೆ

31. ಭಾರತದಲ್ಲಿ ಬೇರೆ ಬೇರೆ ಬಣ್ಣಗಳನ್ನು ನೀಡುವ ಸುಮಾರು ಎಷ್ಟ ಗಿಡಗಳಿವೆ ಎಂದು ಅಂದಾಜು ಮಾಡಲಾಗಿದೆ?
a) 200 b) 300 c) 400 d) 500

32. ಎಷ್ಟು ವರ್ಷಗಳಿಂದ ಭಾರತೀಯ ಕರಕುಶಲ ಕಲೆಗಳಿಗೆ ಅಪಾರ ಬೇಡಿದೆ ಇದೆ?
a) ಕ್ರಿ.ಪೂ.2300 b) ಕ್ರಿ.ಶ.2300 c) ಕ್ರಿ.ಪೂ 2500 d) ಕ್ರಿ.ಶ.2500

33. ಹಸಿವಾದರೆ ಊರೊಳಗೆ ಭಿಕ್ಷಾನ್ನಗಳುಂಟು, ತೃಪೆಯಾದರೆ ಕೆರೆ ಬಾವಿ ಹಳ್ಳಗಳುಂಟು, ಶಯನಕ್ಕೆ ಹಾಳು ದೇಗುಲಗಳುಂಟು ಎಂಬ ವಚನ ಬರೆದವರು
a) ಬಸವಣ್ಣ b) ಅಕ್ಕಮಹಾದೇವಿ c) ಅಲ್ಲಮಪ್ರಭು d) ಜೇಡರ ದಾಸಿಮಯ್ಯ

34. ನಾಕ ಪದದ ಅರ್ಥ

a) ನರಕ b) ಸ್ವರ್ಗ c) ಭೂಮಿ d) ಮಣ್ಣು

35. ವಸುಧೇಂದ್ರ ಅವರ ಕಾದಂಬರಿ ಯಾವುದು?

a) ಹರಿಚಿತ್ತ b) ಸತ್ಯ c) ಚಿತ್ತ d) ಹರಿಚಿತ್ತ ಸತ್ಯ

36. ಗೋಪಣ್ಣ ಮಾಸ್ತರರ ಸ್ನೇಹಿತನ ಹೆಸರೇನು?

a) ಕಾಸಿಂಸಾಬರು b) ಸಾಹೇಬ್

c) ಕರೀಂಖಾನ್ d) ಖಾನ್ ಸಾಹೇಬ್

37. ಪ್ರತಿವರ್ಷ ಮೊಹರಂ ದಿನ ದರ್ಗಾಕ್ಕೆ ಹೋಗಿ ಯಾವ ದೇವರಿಗೆ ಸೇವೆ ಸಲ್ಲಿಸುವ ಸಂಪ್ರದಾಯವನ್ನು ಮಾಸ್ತರರು ರೂಢಿಸಿಕೊಂಡಿದ್ದರು?

a) ಪೀಲು b) ಪೀರ್ಲು c) ಪೀರು d) ಪೀರ್ರು

38. ಯುಗಾದಿ ಕಥೆಯಲ್ಲಿ ಬರುವ ದಾದಿಯಾರು?

a) ರಮ್ಯ b) ರಾಧಿಕಾ c) ರಾವಣ್ಣ d) ರಾಧಾ

39. ಪ್ರಸ್ತುತ ದಿನಗಳಲ್ಲಿ ಇದನ್ನು ತಯಾರಿಸಲು ಯಂತ್ರಗಳೇ ಇಲ್ಲ.

a) ಬಿದರ ಬುಟ್ಟಿ b) ಬುಟ್ಟಿ c) ಬೆದರಿಬುಟ್ಟಿ d) ಬಿಟ್ಟಿ

40. ಪ್ರಹ್ಲಾದನ ತಾಯಿಯ ಹೆಸರೇನು?

a) ರುದ್ರಮ್ಮ b) ಕಾಳಮ್ಮ c) ರುಕ್ಮೀಣಿ d) ತಾಯಮ್ಮ

41. ಕಾಸಿಂಸಾಬರ ಮಗನ ಹೆಸರೇನು?

a) ಇಸ್ಮಲ್ b) ಇಸ್ಮಾಲ್ c) ಇಮ್ರಾನ್ d) ಇಸ್ಮಾಯಿಲ್

42 ರುಕ್ಮಿಣಮ್ಮ ಸತ್ತು ಎಷ್ಟು ವರ್ಷಗಳು ಕಳೆದಿವೆ?

a) 10 b) 15 c) 20 d) 25

43. ಹಾಡುವಳ್ಳಿಗೆ ಹಿಂದೆ ಇದ್ದ ಹೆಸರೇನು?

a) ಸಂಗೀತಪುರ b) ಸಂಗೀತವಳ್ಳಿ

c) ಸಂಗೀತಹಳ್ಳಿ d) ಸಂಗೀತ ನಗರ

44. ಡಾ.ಹಿ.ಚಿ ಬೋರಲಿಂಗಯ್ಯನವರ ಮಾರ್ಗದರ್ಶಕರು ಯಾರು?

a) ಕರಿಯ b) ಕುಪ್ಪಯ್ಯ c) ಕುಪ್ಪಯ್ಯ ಕರಿಯ d) ಕಾಳ

45. ಮೆಗಾನೆ ಎಂಬ ಪ್ರದೇಶದಲ್ಲಿ ವಾಸವಾಗಿರುವ ಜನಾಂಗ ಯಾವುದು?

a) ಕುಣವಿ b) ಕುಣಬಿ c) ಕುಣವ d) ಕುಣಬ

46. ಹಾಡಿನ ಯಜಮಾನ ಯಾರು?

a) ಯಂಕ b) ಯಶು c) ಯಶ d) ಯಂಕು

47. ಯಂಕುವಿನ ಪುರ್ವಜರು ಯಾವ ಕಡೆಯವರು?

a) ಗೋವಾ b) ಕರ್ನಾಟಕ c) ಕೇರಳ d) ತಮಿಳುನಾಡು

48. ಡಾ.ಹಿ.ಚಿ ಬೋರಲಿಂಗಯ್ಯನವರ ಪ್ರವಾಸ ಕಥನಕೃತಿ ಯಾವುದು?

a) ಗಿರಿಜನ b) ಗಿರಿಜನರು

c) ಗಿರಜನನಾಡಿಗೆ ಪಯಣ d) ಯಾವುದು ಅಲ್ಲ

49. ಮೆಗಾನೆ ಪರ್ವತದ ಎತ್ತರ

a) 6 ಸಾವಿರ ಅಡಿ b) 5 ಸಾವಿರ ಅಡಿ c) 5 ಕಿಮೀ d) 50 ಅಡಿ

50. ಡಾ.ಹಿ.ಚಿ ಬೋರಲಿಂಗಯ್ಯರವರ ಸ್ನೇಹಿತನ ಹೆಸರೇನು?

a) ನಿಂಗೇಗೌಡ b) ರಾಮೇಗೌಡ c) ಭದ್ರೇಗೌಡ d) ಲಿಂಗೇಗೌಡ

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CBCS SCHEME

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

BMATS201

Second Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Mathematics – II for CSE Stream

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. VTU Formula Hand Book is permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Evaluate $\int_{-1}^{+1}\int_{0}^{z}\int_{x-z}^{x+z}(x+y+z)\,dy\,dx\,dz$.	7	L2	CO1
	b.	Evaluate $\int_{0}^{a}\int_{x/a}^{\sqrt{x}/a}(x^2+y^2)\,dy\,dx$ by changing the order of integration.	7	L3	CO1
	c.	Show that $\beta(m,n)=\frac{\Gamma(m)\Gamma(n)}{\Gamma(m+n)}$.	6	L2	CO1
		OR			
Q.2	a.	Evaluate $\int_{0}^{1}\int_{0}^{\sqrt{1-y^2}}(x^2+y^2)\,dy\,dx$ by changing into polar co-ordinates.	7	L3	CO1
	b.	Find the area between the parabolas $x^2=y$ and $y^2=x$ using double integration.	7	L3	CO1
	c.	Using mathematical number's, write a code to find the area of an ellipse $\frac{x^2}{a^2}+\frac{x^2}{b^2}=1$ by double integration.	6	L3	CO5
		Module – 2			
Q.3	a.	Find the directional derivative of $\phi=4xz^3-3x^2y^2z$ at (2, -1, 2) in the direction of the vector $2\hat{i}-3\hat{j}+6\hat{k}$.	7	L2	CO2
	b.	If $\vec{F}=\nabla(x^3+y^3+z^3-3xyz)$ find div $\vec{F}$ and curl $\vec{F}$.	7	L2	CO2
	c.	Prove that spherical co-ordinate system is orthogonal.	6	L3	CO2
		OR			
Q.4	a.	Find the angle betwen the normals to the surface $xy=z^2$ at the points (4, 1, 2) and (3, 3, -3).	7	L2	CO2
	b.	If $\vec{F}=(x+y+az)\hat{i}+(bx+2y-z)\hat{j}+(x+cy+2z)\hat{k}$, find a, b, c such that curl $\vec{F}=0$.	7	L2	CO2
	c.	Using mathematical tool write a code to find the curl of $\vec{F}=x^3\hat{i}+y^3\hat{j}+z^3\hat{k}$.	6	L3	CO5
		Module – 3			
Q.5	a.	Prove that the set $w=\left\{(x,y,z)/x-3y+4z=0\right\}$ is a subspace of $V_3(R)$.	7	L2	CO3

	b.	Express the matrix $M=\begin{bmatrix}4 & 7\\ 7 & 9\end{bmatrix}$ as a linear combination of the matrices, $P=\begin{bmatrix}1 & 1\\ 1 & 1\end{bmatrix}$, $Q=\begin{bmatrix}1 & 2\\ 3 & 4\end{bmatrix}$, $R=\begin{bmatrix}1 & 1\\ 4 & 5\end{bmatrix}$	7	L2	CO3
	c.	Find the basis and dimension of subspace spanned by the vectors, $\{(1,-2,3),(1,-3,4)(-1,1,-2)\}$ of $V_3(R)$.	6	L3	CO3
		OR			
Q.6	a.	Find the matrix of linear transformation, $T:R^2\to R^2$ defined by, $T(x,y)=(2x+3y,4x-5y)$ with respect to the basis, $B_1=\{(1,2),(2,5)\}$ of R^2.	7	L2	CO3
	b.	The transformation $G:R^3\to R^3$ is defined as G(x,y,z)=(x+2y-z, y+z, x+2y-2z). Find the basis and dimension of Im(G).	7	L2	CO3
	c.	If $f(t)=t+2$, $g(t)=3t-2$, $h(t)=t^2-2t-3$ and $\langle f,g\rangle=\int_0^1 f(t)g(t)dt$, find (i) $\langle f,g\rangle$ (ii) $\langle f,h\rangle$ (iii) $\|f\|$ and $\|g\|$	6	L3	CO3
		Module – 4			
Q.7	a.	Find the real root of the equation $x^3-2x-5=0$, correct to three decimal places using Regula-Falsi method. Carry out three iteration.	7	L2	CO4
	b.	Using Newton's forward interpolation formula find y at x = 5 from the following table:	7	L2	CO4
	c.	Evaluate $\int_0^1 \frac{dx}{1+x^2}$ by using Simpson's $\frac{3}{8}^{th}$ rule taking six equal intervals.	6	L3	CO4
		OR			
Q.8	a.	Find the real root of the equation, $xe^x-2=0$, correct to three decimal places using Newton-Raphson method. Carry out three iterations.	7	L2	CO4
	b.	Using Lagrange's interpolation formula find f(4) given,	7	L2	CO4
	c.	Evaluate $\int_0^1 \frac{x}{1+x^2}dx$ by trapezoidal rule considering six equal intervals.	6	L3	CO4
		Module – 5			
Q.9	a.	Employ Taylor's series method to obtain approximate value of y at x = 0.1 for the differential equation, $\frac{dy}{dx}=2y+3e^x$, $y(0)=0$	7	L2	CO4
	b.	Apply Runge-Kutta method of 4^{th} order to find an approximate value of y at x = 0.2, given that $\frac{dy}{dx}=\frac{y-x}{y+x}$, $y(0)=1$.	7	L2	CO4
	c.	Apply Milne's method to find y(1.4) given $\frac{dy}{dx}=x^2+\frac{y}{2}$ and the following data : $y(1)=2$, $y(1.1)=2.2156$, $y(1.2)=2.4649$, $y(1.3)=2.7514$.	6	L3	CO5

x:	0	2	4	6	8	10
y:	0	4	56	204	496	980

x :	0	2	3	6
f(x) :	-4	2	14	158

		OR			
Q.10	a.	Using modified Euler's method, find y(0.1) given $\frac{dy}{dx} = x - y^2$, y(0) = 1. Carry out 3 iterations.	7	L2	CO4
	b.	Using Runge-Kutta method of fourth order solve $\frac{dy}{dx} = \frac{1}{x+y}$, y(0.4) = 1 at x = 0.5.	7	L2	CO4
	c.	Using mathematical tool, write a code to solve the differential equation $\frac{dy}{dx} = x^2 + y^2$ with y(0) = 0, using Taylor's series method at x = 0.1.	6	L3	CO5

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CBCS SCHEME

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BMATE201

Second Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Mathematics – II for EEE Stream

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. VTU Formula Hand Book is permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Find the angle between the surfaces $xy^2y = 3x + z^2$ and $3x^2 - y^2 + 2z = 1$ at the point (1, -2, 1).	7	L2	CO1
	b.	If $\vec{F} = \nabla(x^3 + y^3 + z^3 - 3xyz)$, find div $\vec{F}$ and curl $\vec{F}$.	7	L2	CO1
	c.	Show that the vector $\vec{F} = \frac{x\hat{i} + y\hat{j}}{x^2 + y^2}$ is both solenoidal and irrotational.	6	L3	CO1
		OR			
Q.2	a.	Find the total work done by the force $\vec{F} = 3xy\hat{i} - 5z\hat{j} + 10x\hat{k}$ along the curve $x = t^2 + 1$; $y = 2t^2$, $z = t^3$ from $t = 1$ to $t = 2$.	7	L2	CO1
	b.	Using Green's theorem, evaluate $\int_c (xy + y^2)dx + x^2dy$ where 'c' is the closed curve of the region bounded by $y = x$ and $y = x^2$.	7	L3	CO1
	c.	Using modern mathematical tools, write the code to find the find the gradient of $\phi = x^2y + 2xz - 4$.	6	L2	CO5
		Module – 2			
Q.3	a.	Define a Subspace. Show that the intersection of two subspaces of a vector V is also a subspace of V.	7	L2	CO2
	b.	Show that $T : R^3 \rightarrow R^3$ defined by $T(x, y, z) = (x, y, -z)$ is linear transformation.	7	L3	CO2
	c.	If $u = [2, -5, -1]^T$, $V = [-7, -4, 6]^T$, compute : i) $\langle u, v \rangle$ ii) $\|u\|^2$ iii) $\|v\|^2$ iv) $\|u + v\|^2$.	6	L2	CO2
		OR			
Q.4	a.	Define linearly independent and linearly dependent set of vectors. Test the vectors $v_1 = [3, 0, -6]^T$, $v_2 = [-4, 1, 7]^T$ and $v_3 = [-2, 1, 5]^T$ forms a basis.	7	L2	CO2
	b.	State Rank – Nullity Theorem. For the matrix $A = \begin{bmatrix} 1 & -4 & 9 & -7 \\ -1 & 2 & -4 & 1 \\ 5 & -6 & 10 & 7 \end{bmatrix}$, Find : i) Rank of A ii) Dim (Nul A) iii) Bases	7	L3	CO2

	c.	Using the modern mathematical tool, write the code to represent the reflection transformation T : $R^2 \rightarrow R^2$ and to find the image of vector (10, 0) when it is reflected about y – axis.	6	L2	CO5
		Module – 3			
Q.5	a.	Find the Laplace Transform of (i) $e^{-3t}\cos 2t$ ii) $\frac{\cos at - \cos bt}{t}$.	7	L2	CO3
	b.	Find the Laplace Transform of the square wave function of period Za, defined by $f(t) = \begin{cases} k & 0 < t < a \\ -k & a < t < 2a \end{cases}$.	7	L2	CO3
	c.	Explain $f(t) = \begin{cases} \cos t & 0 < t < \pi \\ \cos 2t & \pi < t < 2\pi \\ \cos 3t & t > 2\pi \end{cases}$ in term of the unit step function and hence find L[f(t)].	6	L3	CO3
		OR			
Q.6	a.	Find the inverse Laplace transformer of i) $\frac{2s-1}{s^2+4s+29}$ ii) $\frac{1}{(s-4)^2}$.	7	L2	CO3
	b.	Using the convolution theorem, find the inverse Laplace transform of $\frac{1}{(s-1)(s^2+1)}$.	7	L3	CO3
	c.	Solve by the Laplace transforms $y'' + k^2y = 0$, given that $y(0) = 2$, $y'(0) = 0$.	6	L2	CO3
		Module – 4			
Q.7	a.	Find the real root of $x \log_{10} x = 1.2$ by Regula – Falsi method correct to 2 decimal places the root lies between (2, 3).	7	L2	CO4
	b.	Find interpolating polynomical by Newton's divided difference formula for the data f(1) = 4, f(3) = 32, f(4) = 55 and f(6) = 119.	7	L2	CO4
	c.	Evaluate using Simpson's $\frac{1}{3}^{rd}$ rule $\int_0^6 \frac{e^x}{1+x} dx$ by taking six equal parts.	6	L2	CO4
		OR			
Q.8	a.	Find the real root of the equation $\cos x = xe^x$, using Newton's – Raphson method, correct to 3 decimal places taking $x_0 = 0.5$.	7	L2	CO4
	b.	Use Newton's backward interpolation formula to compute the value of y when x = 6, given that	7	L3	CO4

x	1	2	3	4	5
y	1	–1	1	–1	1

	c.	Evaluate $\int_0^5 \frac{dx}{4x+5}$, by Trapezoidal rule, taking 6 ordinates.	6	L2	CO4
		Module – 5			
Q.9	a.	Employ Taylors series method to find y(0.2), given that $\frac{dy}{dx} = 2y + 3e^x$, y(0) = 0.	7	L3	CO4
	b.	Using Modified Euler's method, find y(0.1) correct to 4 decimal places, given that $y' = x - y^2$, y(0) = 1, h = 0.1, perform 2 iterations.	7	L2	CO4
	c.	Employ Milne's predictor – corrector method given that $y' = x^2(1 + y)$ y(1) = 1, y(1.1) = 1.233, y(1.2) = 1.548, y(1.3) = 1.979 to find y(1.4).	6	L3	CO4
		OR			
Q.10	a.	Solve $y' = \log_{10}(x + y)$, by modified Euler's method at x = 0.2 and x = 0.4 with h = 0.2, perform 2 iterations at each stage.	7	L2	CO4
	b.	Use 4th order Runge – Kutta method to solve $(x + y)\, y' = 1$ with y(0.4) = 1, at x = 0.5 correct to 4 decimal places.	7	L2	CO4
	c.	Using modern mathematical tools, write a code to find y(0.1), given $y' = x - y$, y(0) = 1 by Taylors series.	6	L3	CO5

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CBCS SCHEME

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BMATM201

Second Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Mathematics – II for Mechanical Engineering Stream

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. VTU Formula Hand Book is permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Evaluate $\int_{-1}^{1}\int_{0}^{z}\int_{x-z}^{x+z}(x+y+z)\,dy\,dx\,dz$	7	L3	CO1
	b.	Evaluate $\int_{0}^{3}\int_{0}^{\sqrt{4-y}}(x+y)\,dx\,dy$ by changing the order of integration.	7	L3	CO1
	c.	Show that $\int_{0}^{\infty}\sqrt{y}\,e^{-y^2}\,dy\times\int_{0}^{\infty}\frac{e-y^2}{\sqrt{y}}\,dy=\frac{\pi}{2\sqrt{2}}$	6	L2	CO1
		OR			
Q.2	a.	Show that $\beta(m,n)=\frac{\Gamma_{(m)}\cdot\Gamma_{(n)}}{\Gamma_{(m+n)}}$	7	L2	CO1
	b.	Evaluate $\int_{0}^{a}\int_{0}^{\sqrt{a^2-y^2}} y\sqrt{x^2+y^2}\,dx\,dy$ by changing into polars.	7	L3	CO1
	c.	Write a modern mathematical tool program to find the volume of the tetrahedron bounded by the planes x = 0, y = 0 and $\frac{x}{a}+\frac{y}{b}+\frac{z}{c}=1$.	6	L3	CO5
		Module – 2			
Q.3	a.	Find the angle between the surfaces $x^2+y^2+z^2=9$ and $z=x^2+y^2-3$ at (2, -1, 2).	7	L2	CO2
	b.	If $\vec{F}=(3x^2y-z)\hat{i}+(xz^3+y)\hat{j}-2x^3z^2\,k$, find div $\vec{F}$ and curl $\vec{F}$.	7	L2	CO2
	c.	Find the constants a, b and c such that the vector $\vec{F}=(x+y+az)\hat{i}+(bx+2y-z)\hat{j}+(x+cy+2z)\hat{k}$ is irrotational.	6	L2	CO2
		OR			
Q.4	a.	Using Grun's theorem, evaluate $\int_C(2x^2-y^2)\,dx+(x^2+y^2)\,dy$, where C is the boundary of the region in the xy-plane enclosed by the x-axis and the upper-half of the circle $x^2+y^2=a^2$.	7	L3	CO2

	b.	If $\vec{F} = 2xy\hat{i} + yz^2\hat{j} + xz\hat{k}$ and S is the rectangular parallelopiped bounded by $x = 0, y = 0, z = 0, x = 2, y = 1, z = 3$. Find the Flux across S.	7	L3	CO2
	c.	Write the modern mathematical tool program to find the divergence of the vector field $\vec{F} = (3x^2 - 3yz)i + (3y^2 - 3xz)j + (3z^2 - 3xy)k$	6	L3	CO5
		Module – 3			
Q.5	a.	Form the partial differential equation by eliminating the arbitrary function ϕ from $\ell x + my + nz = \phi(x^2 + y^2 + z^2)$.	7	L2	CO3
	b.	Solve $\frac{\partial^2 z}{\partial x \partial y} = \frac{x}{y}$, subject to the conditions that $\frac{\partial z}{\partial x} = \log_e x$ when $y = 1$ and $z = 0$ when $x = 1$.	7	L3	CO3
	c.	Derive the dimensional heat equation in the standard form $\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x^2}$.	6	L2	CO3
		OR			
Q.6	a.	Form the partial differential equation by eliminating the arbitrary constants a and b from $2z = \frac{x^2}{a^2} + \frac{y^2}{b^2}$.	7	L2	CO3
	b.	Solve $\frac{\partial^2 z}{\partial x^2} = a^2 z$ given that when $x = 0$, $\frac{\partial z}{\partial x} = a \sin y$ and $\frac{\partial z}{\partial y} = 0$.	7	L3	CO3
	c.	Solve $(y - z)p + (z - x)q = (x - y)$.	6	L2	CO3
		Module – 4			
Q.7	a.	Find an approximate value of the root of the equation $\cos x = 3x - 1$ that lies between 0.5 and 1 correct to three decimal places using Regula false method.	7	L3	CO4
	b.	The following table gives the distances (in miles) of the visible horizon for the given heights (in feet) above the earth's surface. x: 200, 250, 300, 350, 400 F(x): 15.04, 16.81, 18.42, 19.9, 21.27 Find y for $x = 218$.	7	L3	CO4
	c.	Evaluate $\int_0^{\pi} e^{\sin\theta}\, d\theta$ by using Simpson's $\left(\frac{1}{3}\right)^{rd}$ rule by taking 7 ordinates.	6	L3	CO4
		OR			
Q.8	a.	Using the Newton-Raphson method, find the real root of the equation $e^x \sin x = 1$. (Here x is in radians).	7	L3	CO4

	b.	Using Newton's divided difference formula, evaluate F(9) from the following table. x: 5, 7, 11, 13, 17 F(x): 150, 392, 1452, 2366, 5202	7	L2	CO4
	c.	If y(0) = -12, y(1) = 0, y(3) = 6 and y(4) = 12, find the value of y at x = 2 using Lagranges method.	6	L3	CO4
		Module – 5			
Q.9	a.	Find by Taylor's series method the value of y at x = 0.1 to 4 decimal places from $\frac{dy}{dx} = x - y^2$, y(0) = 1.	7	L2	CO4
	b.	Using the Runge-Kutta method of fourth order, find y(1.1) given that $\frac{dy}{dx} = xy^{1/3}$ taking h = 0.1.	7	L3	CO4
	c.	Given that $\frac{dy}{dx} = 2e^x - y$ and the data y(0) = 2, y(0.1) = 2.010, y(0.2) = 2.040, y(0.3) = 2.090. Compute y at x = 0.4 by applying Milne's method.	6	L3	CO4
		OR			
Q.10	a.	Using the modified Euler's method, find y(20.2) given that $\frac{dy}{dx} = \log_{10}(x/y)$ with y(20) = 5 taking h = 0.2.	7	L3	CO4
	b.	Apply the Runge-Kutta method of fourth order, to find an approximate value of y at x = 0.1, given that $\frac{dy}{dx} = 3e^x + 2y$ with y(0) = 0 and h = 0.1	7	L3	CO4
	c.	Using modern mathematical tools write a program to find y at x = 1.4, given $\frac{dy}{dx} = x^2 + \frac{y}{2}$, y(1) = 2, y(1.1) = 2.2156, y(1.2) = 2.4649, y(1.3) = 2.7514. Use corrector formula thrice using Milne's method.	6	L3	CO5

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CBCS SCHEME

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BMATC201

Second Semester B.E/B.Tech. Degree Supplementary Examination, June/July 2024

Mathematics – II for Civil Engineering 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 Formula Hand Book is permitted.

		Module – 1	M	L	C
1	a.	Evaluate : $\int_0^1 \int_0^{x^2} \int_0^{x+y} (x-2y+z)\,dz\,dy\,dx$.	7	L3	CO1
	b.	Evaluate : $\int_0^1 \int_1^{2-x} xy\,dy\,dx$ by changing the order of integration.	7	L3	CO1
	c.	Show that : $\int_0^{\pi/2} \frac{d\theta}{\sqrt{\sin\theta}} \times \int_0^{\pi/2} \sin\theta\,d\theta = \pi$.	6	L2	CO1
		OR			
2	a.	Evaluate : $\int_0^1 \int_x^{\sqrt{2-x^2}} \frac{x}{\sqrt{x^2+y^2}}\,dy\,dx$ by changing into polars.	7	L3	CO1
	b.	Find the area of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ by double integration.	7	L3	CO1
	c.	Write a modern mathematical tool program to evaluate the double integral $\int_0^1 \int_x^{\sqrt{x}} (x^2+y^2)\,dy\,dx$.	6	L2	CO5
		Module – 2			
3	a.	Find the angle between the surfaces $x^2+y^2+z^2=9$ and $z=x^2+y^2-3$ at the point P(2, –1, 2).	7	L3	CO2
	b.	Show that $\vec{f}.\text{curl}\,\vec{f}=0$ where $\vec{f}=(x+y+1)\hat{i}+\hat{j}-(x+y)\hat{k}$.	7	L2	CO2
	c.	Find the constants 'a' and 'b' such that, $\vec{f}=(axy+z^3)\hat{i}+(3x^2-z)\hat{j}+(bxz^2-y)\hat{k}$ is irrotational. Then find ϕ such that $\vec{f}=\nabla\phi$.	6	L3	CO2

		OR			
4	a.	If $\vec{F} = (3x^2 + 6y)\hat{i} - 14yz\,\hat{j} + 20xz^2\,\hat{k}$. Evaluate $\int_C \vec{F} \cdot d\vec{r}$ along the curve given by $x = t$, $y = t^2$, $z = t^3$ from $t = 0$ to $t = 1$.	7	L3	CO2
	b.	Evaluate : $\int_C (xy - x^2)dx + x^2 ydy$ where 'C' is the closed curve formed by $y = 0$, $x = 1$ and $y = x$ by Green's theorem.	7	L3	CO2
	c.	Write a modern mathematical tool program to find the gradient of $\phi = xy^2 + 2yz - 7$.	6	L3	CO5
		Module – 3			
5	a.	Form the partial differential equation from $z = f(y + x) + g(y + 2x)$ by eliminating arbitrary functions.	7	L2	CO3
	b.	Solve $\frac{\partial^2 z}{\partial x^2} - 16z = 0$, given that $z = 0$, $\frac{\partial z}{\partial x} = 4\sin y$ when $x = 0$.	7	L3	CO3
	c.	With usual notations derive the dimensional heat equation.	6	L2	CO3
		OR			
6	a.	Form the partial differential equation by eliminating arbitrary function 'ϕ' from $\phi(x + y + z, x^2 + y^2 - z^2) = 0$.	7	L3	CO4
	b.	Solve $\frac{\partial^2 z}{\partial x \partial y} = \sin x \cos y$, given $\frac{\partial z}{\partial y} = -2\cos y$ when $x = 0$ and $z = 0$ when $y = n\pi$.	7	L3	CO4
	c.	Solve $x(y^2 - z^2)P + y(z^2 - x^2)\phi = z(x^2 - y^2)$.	6	L3	CO4
		Module – 4			
7	a.	Find the approximate value of the real root of the equation $x^3 - 3x = 4 = 0$ using Regula – Falsi method (carry out 3 iterations).	7	L3	CO4
	b.	Given f(40) = 184, f(50) = 204, f(60) = 226, f(70) = 250, f(80) = 276, f(90) = 304. Find f(85) using suitable interpolation formula).	7	L3	CO4
	c.	Evaluate $\int_0^1 \frac{dx}{1+x^2}$ by using Simpson's $1/3^{rd}$ rule taking four equal strips and hence deduce an approximate value of π.	6	L3	CO4

		OR			
8	a.	Use Newton – Raphson method to find a real root of $x \sin x + \cos x = 0$ near $x = \pi$ (carry out 3 iterations).	7	**L3**	**CO4**
	b.	Applying Lagrange's interpolation formula to find y when x = 4, given : x: 0, 2, 3, 6 y: 707, 819, 866, 966	7	**L3**	**CO4**
	c.	Evaluate $\int_4^{s2} \log_e^x dx$ taking six equal strips by applying Trapezoidal Rule.	6	**L3**	**CO4**
		Module – 5			
9	a.	Use Taylor's series method to find y(0.1) from $\frac{dy}{dx} = x^2 + y$ with y(0) = 10. (consider the terms upto fourth degree).	7	**L3**	**CO4**
	b.	Given $\frac{dy}{dx} = 1 + \frac{y}{x}$, $y = 2$ at $x = 1$. Find the approximate value of y at x = 1.2 by taking step size h = 0.2 applying modified Euler's method.	7	**L3**	**CO4**
	c.	Apply Milne's method to compute y(0.4) correct to four decimal places given $\frac{dy}{dx} = x^2 + \frac{y}{2}$ and the data y(1) = 2, y(1.1) = 2.2156, y(1.2) = 2.4659, y(1.3) = 2.7514.	6	**L3**	**CO4**
		OR			
10	a.	Using modified Euler's method, find y(0.2) by taking h = 0.2, given that $\frac{dy}{dx} = x + \lvert\sqrt{y}\rvert$ and y = 1 at x = 0 initially.	7	**L3**	**CO4**
	b.	Using Runge – Kutta method of fourth order, find y(0.2) for the equation : $\frac{dy}{dx} = \frac{y-x}{y+x}$, y(0) = 1 taking h = 0.2.	7	**L3**	**CO4**
	c.	Write a modern mathematical tool program to solve $\frac{dy}{dx} = 3e^x + 2y$, y(0) = 0 by Runge – Kutta fourth order method.	6	**L2**	**CO5**

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CBCS SCHEME

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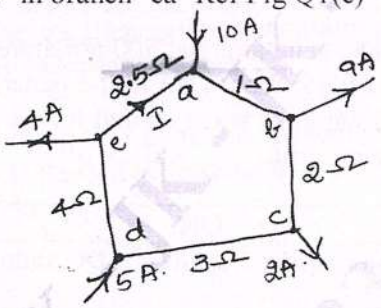
BESCK204B/BESCKB204

Second Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Introduction to Electrical Engineering

Time: 3 hrs. Max. Marks: 100

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

		Module – 1	M	L	C
Q.1	a.	With a neat single line diagram, explain various components of electrical power transmission and distribution system.	6	L2	CO1
	b.	State and explain Ohm's law with its limitations.	6	L2	CO1
	c.	Find the currents in all the branches of the network given below starting from branch current 'I' in branch 'ea' Ref Fig Q1(c)  Fig Q1(c)	8	L3	CO1
		OR			
Q.2	a.	With a neat block diagram, explain a Nuclear power plant.	6	L2	CO1
	b.	State and explain Kirchhoff's laws with relevant examples for each.	6	L2	CO1
	c.	A resistor of 12Ω is connected in series with a combination of 15Ω and 20Ω resistors in parallel. The supply voltage is 120V. Find the current flowing through the parallel branches and the circuit. Also find voltage across each of them.	8	L3	CO1
		Module – 2			
Q.3	a.	With the help of a circuit diagram and the phasor diagram, conclude about phase angle, impedance and power consumed by a series R-C circuit.	6	L2	CO2
	b.	If the details given are for a 3ϕ, 50Hz, 400V supply where $Z_{ph} = 25 + j22\Omega$ are connected in delta. Calculate the line current, phase current, power factor, active power, reactive power and apparent power.	8	L3	CO2
	c.	A series circuit consisting of R, L, C with respective voltage of 170V, 150V and 100V across them. The current flowing through them is 4A. Find the values of R, L, C, power factor and also the supply voltage. Assume f = 50Hz.	6	L3	CO2

		OR			
Q.4	**a.**	For single phase sinusoid generated emf, define : i) rms value ii) average value iii) form factor iv) peak factor v) phase vi) phase difference.	**6**	**L1**	**CO2**
	b.	Show that the current through a purely inductive circuit lags the applied voltage by 90°. Also discuss about the average power consumed. Draw the wave shapes of current, voltage and power.	**8**	**L2**	**CO2**
	c.	A circuit consists of a resistance of 10Ω and an inductance of 16mH and a capacitor of 150μF in series across a supply of 240V, 50Hz. Find : i) current ii) power factor iii) power consumed. Draw the phasor diagram.	**6**	**L3**	**CO2**
		Module – 3			
Q.5	**a.**	With a neat diagram, explain the construction of a DC machine.	**8**	**L2**	**CO3**
	b.	Derive an expression for armature torque developed in a DC motor.	**6**	**L2**	**CO3**
	c.	An 8 pole lap wound DC generator has 500 armature conductors and has a useful flux per pole of 0.065Wb. What is the generated emf, if it runs at 1000rpm? When the armature is wave wound for the same, what will be its speed to generate the same emf.	**6**	**L3**	**CO3**
		OR			
Q.6	**a.**	Explain various methods of speed control of DC shunt motor.	**6**	**L2**	**CO3**
	b.	With usual notations, derive emf equation of a DC generator.	**8**	**L2**	**CO3**
	c.	A 6 pole, lap connected DC shunt motor has 492 armature conductors having resistance of 0.2Ω. The flux per pole available is 50mWb. The motor runs at 20rps across a supply of 500V at full load. What will be the speed of motor when the load is reduced by 50%. Neglect all drops connected to brush and armature reaction.	**6**	**L3**	**CO3**
		Module – 4			
Q.7	**a.**	Explain various losses incurred in a single phase transformer. Also discuss about technique used to minimize them.	**6**	**L2**	**CO3**
	b.	With neat vectorial representation, explain rmf theory.	**8**	**L2**	**CO3**
	c.	The primary winding of a 25KVA, single phase transformer has 200 turns and is connected to a 230V, 50Hz supply. The secondary number of turns is 50. Calculate : i) No load secondary emf ii) Primary and secondary currents iii) Flux density in the core, if the area of cross section is 60cm^2.	**6**	**L2**	**CO3**
		OR			
Q.8	**a.**	With neat schematic diagrams, compare core and shell type of transformer.	**6**	**L2**	**CO4**
	b.	With diagrams, explain the types of three phase induction motors.	**8**	**L2**	**CO4**

	c.	A 12 pole, 3 phase alternator runs at 500rpm is coupled to a 3 phase induction motor which runs at full load speed of 1440rpm. Comment on synchronous speed of the induction motor. Calculate percentage slip and number of poles of the induction motor.	6	L3	CO4
		Module – 5			
Q.9	a.	With neat circuit diagrams and switching tables, explain two way and three way control of a load.	8	L2	CO5
	b.	Explain plate earthing with a neat diagram.	6	L2	CO5
	c.	Explain working of a fuse. Also explain rated current, fusing current and fusing factor.	6	L2	CO5
		OR			
Q.10	a.	What is electric shock? List preventive measure against the shock.	8	L2	CO5
	b.	Explain "unit" used in electrical energy consumption. Also explain two part tariff with its advantages and disadvantages.	6	L2	CO5
	c.	Calculate the monthly billing of a domestic consumer whose load factor is 70% if a unit is charges at Rs. 3. The load detail are as below : 5 numbers of 10W LED lamps 2 numbers of 80W fans 1 number of 450W AC 1 number of 2kW Geyser 1 number of 800W Refrigerators.	6	L3	CO5

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CBCS SCHEME

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BESCK204D/BESCKD204

Second Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

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 Role of Mechanical Engineer in society.	5	L2	CO1
	b.	Explain the trends in mechanical engineering industry.	7	L2	CO1
	c.	Enumerate the importance of mechanical Engineer in Manufacturing and Automobile industry.	8	L2	CO1
		OR			
Q.2	a.	Briefly explain the causes for Global warming.	5	L2	CO1
	b.	Sketch and explain Wind mill working.	7	L2	CO1
	c.	Explain the construction of Hydel power plant with a neat sketch.	8	L2	CO1
		Module – 2			
Q.3	a.	Explain the knurling operation.	5	L2	CO2
	b.	Explain the Drilling and Boring operation with suitable sketches.	7	L2	CO2
	c.	Briefly explain the following milling operation : (i) Plane milling (ii) Slot milling	8	L2	CO2
		OR			
Q.4	a.	Write the advantages and applications of CNC.	5	L1	CO2
	b.	Explain briefly the CNC configuration with a block diagram.	7	L2	CO2
	c.	Discuss the steps in 3D printing.	8	L2	CO2
		Module – 3			
Q.5	a.	Sketch and explain the IC Engine components.	4	L2	CO3
	b.	Briefly explain 4-stroke petrol engine.	8	L2	CO3
	c.	Explain the 4-stroke diesel engine with appropriate sketches.	8	L2	CO3
		OR			
Q.6	a.	List the advantages, disadvantages and applications of EV.	6	L1	CO3
	b.	Explain briefly the components of EV with a sketch.	7	L2	CO3
	c.	Discuss the types of EV.	7	L2	CO3
		Module – 4			
Q.7	a.	Discuss the characteristics and applications of Aluminium alloy.	6	L1	CO4
	b.	Explain the following Engineering materials: (i) Ceramics (ii) Glass	7	L2	CO4
	c.	Write short note on : (i) Polymers (ii) SNA	7	L2	CO4

		OR			
Q.8	**a.**	Explain the types of flames in Gas Welding process.	**6**	**L2**	**CO4**
	b.	Differentiate between soldering, brazing and welding.	**7**	**L2**	**CO4**
	c.	With a neat sketch, explain Arc welding process.	**7**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	Differentiate open loop and closed loop control system.	**6**	**L2**	**CO5**
	b.	Explain the types of automation.	**7**	**L2**	**CO5**
	c.	Explain the types of Robt configurations (any 2) with sketches.	**7**	**L2**	**CO5**
		OR			
Q.10	**a.**	Explain the characteristics of IOT.	**6**	**L2**	**CO5**
	b.	Discuss with a block diagram, the physical design of IOT.	**7**	**L2**	**CO5**
	c.	Explain the types of communication models.	**7**	**L2**	**CO5**

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BPLCK205B/BPLCKB205

Second Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Introduction to 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 elif, for, while statement in python with example for each.	06	L2	CO1
	b.	List and explain math operators used in python with example.	06	L2	CO1
	c.	Develop a program to read the name and year of birth of a person. Print whether person is senior citizen or not.	08	L3	CO1
		OR			
Q.2	a.	Explain local and global scope with example.	06	L2	CO1
	b.	With an example, explain the following built in function : (i) print( ) (ii) input( ) (iii) len( )	06	L2	CO1
	c.	Develop a program to generate Fibonacci number of length (N). Read N from the console.	08	L3	CO1
		Module – 2			
Q.3	a.	Explain the following list methods with example : (i) append( ) (ii) insert( ) (iii) sort( )	08	L2	CO2
	b.	Differentiate List and dictionaries.	04	L1	CO2
	c.	Develop a program using dictionary to print Ten most frequently appearing word in a text file.	08	L3	CO2
		OR			
Q.4	a.	Explain the following method with example: (i) key( ) (ii) values( ) (iii) items( ) in dictionary	08	L2	CO2
	b.	Show that List are Mutable.	04	L1	CO2
	c.	Develop a program to compute Mean, Variance, Standard deviation with message.	08	L3	CO2
		Module – 3			
Q.5	a.	Explain the following string method with example: (i) isalpha( ) (ii) isalnum( ) (iii) isdecimal( ) (iv) isspace( )	08	L1	CO3

	b.	Differentiate between absolute and relative path in specify file path.	04	L2	CO3
	c.	Write a program to accept string and display total number of alphabet.	08	L3	CO3
		OR			
Q.6	a.	Explain the following method with example: (i) upper( ) (ii) lower( ) (iii) is_upper( ) (iv) is_lower( )	08	L2	CO3
	b.	Explain how to save variable with Shelve module.	04	L2	CO3
	c.	Develop a program to sort the content of a text file and write the sorted content into separate file.	08	L2	CO3
		Module – 4			
Q.7	a.	How do you copy files and folders using Shutil module? Explain in detail.	10	L2	CO3
	b.	With suitable code, explain Backup a folder into a Zip files, clearly mention steps in detail.	10	L3	CO3
		OR			
Q.8	a.	What are assertions? Write the content of an assert statement. Explain then with example.	10	L2	CO3
	b.	Explain logging module with example how files and folder can be permanently deleted.	10	L2	CO3
		Module – 5			
Q.9	a.	What is a class? How to define class in python? How to initiate a class and how the class members are accessed?	10	L2	CO4
	b.	What is polymorphism? Demonstrate polymorphism with function to find histogram to count the number of times each letter appears in a word and in sentences.	10	L3	CO4
		OR			
Q.10	a.	Discuss operator overloading. Mention any five operators with respective special function to be overloaded in python.	10	L2	CO4
	b.	Define pure function. Illustrate with an example.	10	L3	CO4

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BETCK205J/ BETCKJ205

Second Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Introduction to Embedded 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. Draw neat block diagram/ flow diagram/ wherever necessary.

		Module – 1	M	L	C
Q.1	a.	What is an embedded system? Explain the different applications of embedded systems.	7	L2	CO1
	b.	Differentiate between RISC and CISC processors.	6	L2	CO1
	c.	Explain the sequence of operation for communicating with an I2C slave device.	7	L2	CO1
		OR			
Q.2	a.	Differentiate between general purpose systems and embedded systems.	6	L2	CO1
	b.	What are sensors and actuators? Explain the operation of matrix key board.	7	L2	CO1
	c.	Explain the various purposes of embedded systems in detail with illustrative examples.	7	L2	CO1
		Module – 2			
Q.3	a.	What is operational quality attribute? Explain the important operational quality attributes to be considered in any embedded system design.	8	L2	CO2
	b.	Explain washing machine as application specific embedded system.	7	L2	CO2
	c.	The availability of an embedded product is 90%. The Mean Time Between Failure (MTBF) of the product is 30 days. What is the Mean Time To Repair (MTTR) in days/hours for the product?	5	L3	CO2
		OR			
Q.4	a.	What is non-operational quality attribute? Explain the important non-operational quality attributes to be considered in any embedded system design.	8	L2	CO2
	b.	Explain different Electronic Control Unit (ECU) and communication buses used in automotive applications.	7	L2	CO2
	c.	In brief explain characteristics of an embedded system.	5	L2	CO2
		Module – 3			
Q.5	a.	What is hardware software co-design? Explain the fundamental issues in hardware – software co-design.	7	L2	CO3

	b.	Explain the different computational models in embedded system design.	8	L2	CO3
	c.	What is Electronic Design Automation (EDA) tool? Explain the role of EOA tools in embedded system design.	5	L2	CO3
		OR			
Q.6	a.	What are combinational circuits and sequential circuits? Explain each with example.	7	L2	CO3
	b.	With a neat flow diagram, explain the various steps involved in VHDL based VLSI IC design process.	8	L3	CO3
	c.	Explain the different types of IC design. Give an example for each.	5	L2	CO3
		Module – 4			
Q.7	a.	Explain 'super loop' based and 'OS' based embedded firmware design approaches.	7	L2	CO4
	b.	With neat block diagram, explain the process of conversion from assembly language to machine language.	8	L2	CO4
	c.	What is the difference between complier and cross complier?	5	L3	CO4
		OR			
Q.8	a.	With neat block diagram, explain the process of conversion from high level language to machine language.	8	L2	CO4
	b.	In brief explain the different files generated during the cross – complication of an on embedded 'C' file?	7	L2	CO4
	c.	Define the following : i) Disassembler ii) Decompiler iii) Simulator.	5	L1	CO4
		Module – 5			
Q.9	a.	Explain the operating system architecture with neat diagram.	7	L2	CO5
	b.	Explain the basic functions of a real time kernel.	7	L2	CO5
	c.	Discuss the following terms with respect to operating system i) Task ii) Process iii) Thread.	6	L2	CO5
		OR			
Q.10	a.	Explain the structure of a process with memory organization diagram.	10	L2	CO5
	b.	Explain context switching, context saving and context retrieval.	10	L2	CO5

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