CBCS SCHEME

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

BESCK204A/BESCKA204

Second Semester B.E./B.Tech. Degree Examination, Dec.2023/Jan.2024
Introduction to Civil 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.*

			M	L	C
		Module – 1			
Q.1	a.	Explain briefly the scope of following fields of civil engineering: (i) Environmental Engineering (ii) Geotechnical Engineering (iii) Structural Engineering (iv) Transportation Engineering (v) Water Resources Engineering	10	L1	CO1
	b.	Explicate pre-stressed concrete and its uses.	6	L1	CO1
	c.	What are the qualities of good bricks?	4	L1	CO1
		OR			
Q.2	a.	List the qualities of good building stone.	8	L1	CO1
	b.	Explain the following: (i) Reinforced Cement Concrete (RCC) (ii) Construction Chemical	6	L1	CO1
	c.	Explicate different type of foundation.	6	L1	CO1
		Module – 2			
Q.3	a.	Explicate the different sustainable development goal of 2030.	8	L1	CO2
	b.	Explain the following: (i) Smart city (ii) Energy efficient building (iii) Temperature control in building	12	L1	CO2
		OR			
Q.4	a.	Explain the following: (i) Urban air pollution (ii) Solid waste management	8	L1	CO2
	b.	Explain the following: (i) Clean city concept (ii) Smart city concept (iii) Water supply system	12	L1	CO2
		Module – 3			
Q.5	a.	State and prove parallelogram law of force.	6	L3	CO3
	b.	Determine magnitude and direction of 'p' for the system of force shown in Fig.Q5(b). One of the forces is unknown. The resultant is acting along X-axis.	6	L3	CO3

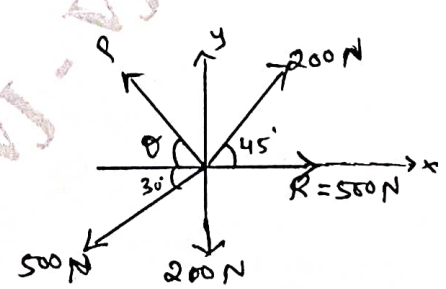
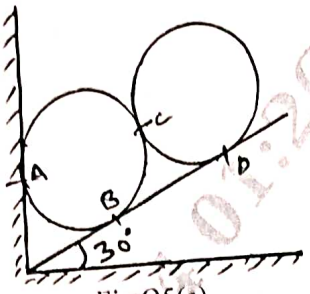
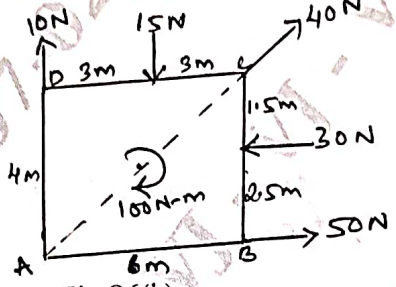
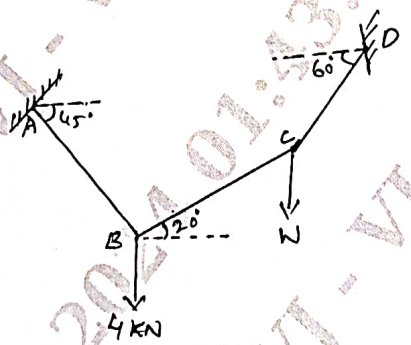
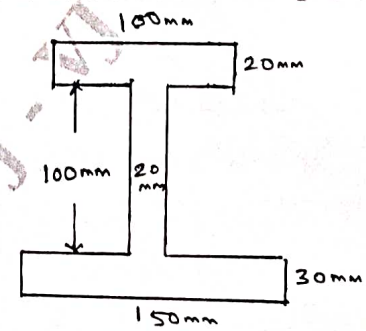
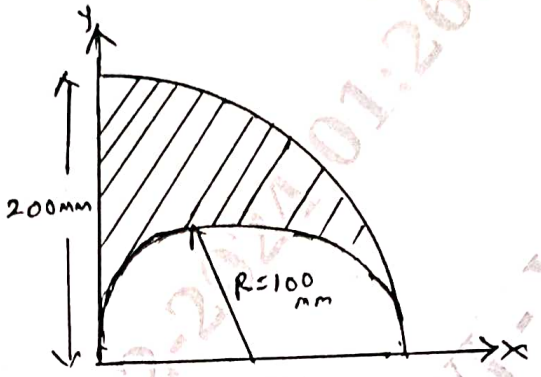
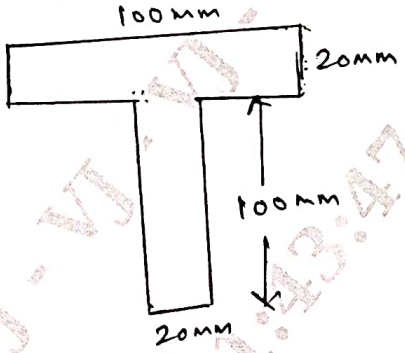
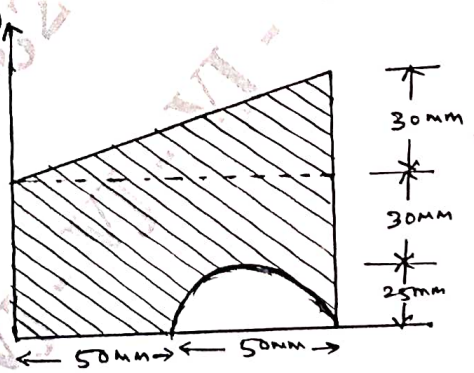


Fig.Q5(b)

	c.	Two identical rollers, each weighing 200 N as shown in Fig.Q5(c). Assume all contact surface are smooth. Find the reaction develop at contact surface.  Fig.Q5(c)	8	L3	CO3
		OR			
Q.6	a.	State and prove Verignon's theorem.	6	L3	CO3
	b.	Determine the magnitude, direction and position of resultant force with respect to point 'A' shown in Fig.Q6(b).  Fig.Q6(b)	7	L3	CO3
	c.	A string is subjected to the force 4 kN and W as shown in Fig.Q6(c). Determine the magnitude of 'W' and the tension induced in various portion of the string.  Fig.Q6(c)	7	L3	CO3
		Module – 4			
Q.7	a.	Difference between centroid and centre of gravity.	4	L2	CO4
	b.	Derive expression for centroid of a semi-circle of radius 'R' from first principle.	8	L2	CO4
	c.	Locate the centroid of the I-section shown in Fig.Q7(c).  Fig.Q7(c)	8	L3	CO4

		OR			
Q.8	**a.**	Differentiate between axis of symmetry and axis of reference.	**4**	**L2**	**CO4**
	b.	Derive the position of centroid for a triangle by the first principle.	**8**	**L2**	**CO4**
	c.	Locate the centroid of the Lamina shown in Fig.Q8(c).  Fig.Q8(c)	**8**	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	State and prove parallel axis theorem.	**6**	**L2**	**CO5**
	b.	Derive the expression for M.I. of a triangle having base 'B' and height 'H'.	**6**	**L2**	**CO5**
	c.	Determine M.I. about horizontal centroidal axis for the Fig.Q9(c).  Fig.Q9(c)	**8**	**L3**	**CO5**
		OR			
Q.10	**a.**	State and prove perpendicular axis theorem.	**5**	**L2**	**CO5**
	b.	Derive expression for M.I. of a quarter-circle having radius 'R' from the first principle.	**6**	**L2**	**CO5**
	c.	Determine the M.I. of the section shown in Fig.Q10(c) with respect to horizontal centroidal axis.  Fig.Q10(c)	**9**	**L3**	**CO5**

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MAKE-UP EXAM

USN | | | | | | | | | |

BESCK204A / BESCKA204

Second Semester B.E./B.Tech. Degree Examination, Nov./Dec. 2023
Introduction to Civil 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.

			M	L	C
		Module – 1			
Q.1	a.	List the different fields of civil engineering and explain the scope of following fields, i) Geotechnical Engineering ii) Structural Engineering.	10	L1	CO1
	b.	Explain briefly with neat sketch : i) Foundation ii) Chajja and Lintel iii) Column and beam iv) Masonry wall v) Staircase.	10	L1	CO1
		OR			
Q.2	a.	Explain briefly : i) Environmental and sanitary engineering ii) GIS and Erath quake engineering.	10	L1	CO1
	b.	Explain Bricks and Enumerate the requirement of good brick.	5	L1	CO1
	c.	Explain the difference between RCC and PSC.	5	L1	CO1
		Module – 2			
Q.3	a.	Explain Infrastructure and types of infrastructure.	6	L1	CO2
	b.	Explain smart city concept, clean city concept and safe city concept.	10	L1	CO2
	c.	Explain briefly Energy efficient buildings.	4	L1	CO2
		OR			
Q.4	a.	Write a short note on Demolition and Recycled waste.	6	L1	CO2
	b.	Explain briefly solid waste management and urban air pollution management.	6	L1	CO2
	c.	Explain sustainable construction of buildings and sustainable development goals.	8	L1	CO2
		Module – 3			
Q.5	a.	State and Prove Parallelogram law of forces.	8	L2	CO3
	b.	Determine that magnitude, direction, X and Y intercept of the resultant force system acting on the lamina with respect to 0 as shown in Fig Q5(b). All dimensions are in mm, each unit is 100mm.	12	L3	CO3

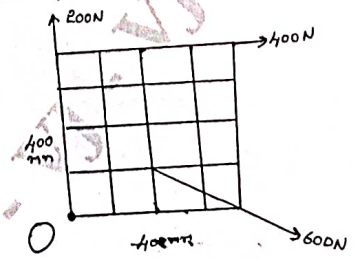
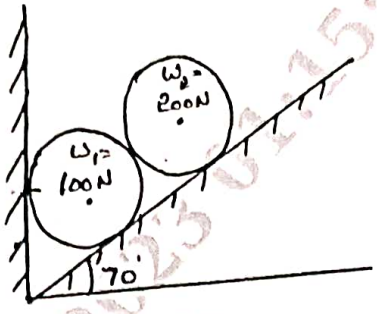
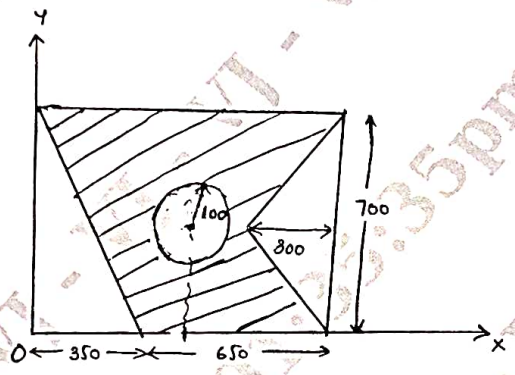
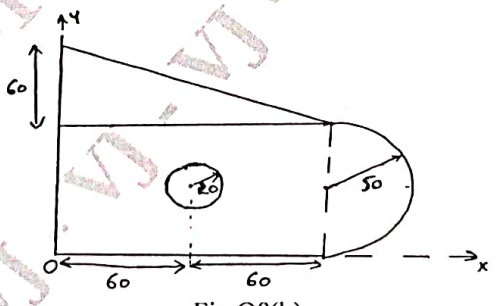
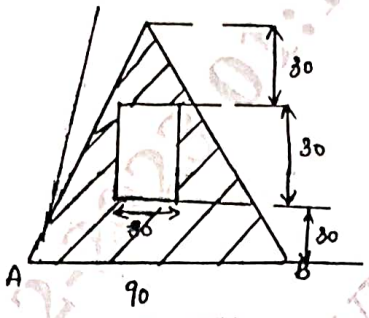
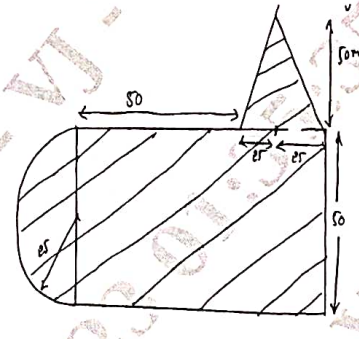


Fig Q5(b)

		OR			
Q.6	**a.**	State and Prove Varigon's theorem.	**8**	**L2**	**CO3**
	b.	2 cylinder each of weight 100N and 200N on an inclined plane, which makes an angle of 70° with the vertical wall as shown in Fig Q6(b). Find the reaction at all contact points, assuming all surfaces to be smooth.  Fig Q6(b)	**12**	**L3**	**CO3**
		Module – 4			
Q.7	**a.**	Define : i) Centroid ii) Centre of gravity iii) Axis of symmetry.	**6**	**L1**	**CO4**
	b.	Locate the centroid of the shaded area shown in Fig Q7(b) with respect to OX and OY, all dimension in mm.  Fig Q7(b)	**14**	**L3**	**CO4**
		OR			
Q.8	**a.**	Derivation of expression for centroid of Equilateral triangle.	**6**	**L2**	**CO4**
	b.	Determine the centroid with respect to origin 0 for the section as shown in Fig Q8(b). All dimensions are in mm.  Fig Q8(b)	**14**	**L3**	**CO4**

		Module – 5			
Q.9	**a.**	State and prove Parallel axis theorem.	**6**	**L2**	**CO5**
	b.	Determine the MOI and radius of gyration of the area shaded shown in Fig Q9(b) about the base AB and cetnroidal axis parallel to AB, All dimensions are in mm.  Fig Q9(b)	**14**	**L3**	**CO5**
		OR			
Q.10	**a.**	Define : i) Radius of gyration ii) Product of inertia	**6**	**L1**	**CO5**
	b.	Determine the MOI for the shaded area shown in Fig Q10(b) below above horizontal axis passing through centroidal area. all dimensional are in mm  Fig.Q10(b)	**14**	**L3**	**CO5**

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CBCS SCHEME

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

BETCK205I/BETCKI205

Second Semester B.E./B.Tech. Degree Examination, Dec.2023/Jan.2024
Introduction to Cyber Security

Time: 3 hrs. Max. Marks: 100

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

			M	L	C
		Module – 1			
Q.1	a.	With an example, explain the diffident classification of cyber crimes.	10	L2	CO1
	b.	Define Child Pornography. List the steps that pedophiles use to operate with respect to child pornography offenses.	7	L1	CO1
	c.	Define spammer and describe spamming attack with an example.	3	L1	CO1
		OR			
Q.2	a.	Define a Cyber Criminal. List and discuss the different types of cyber criminals with example for each.	10	L2	CO1
	b.	Explain salami attack, password sniffing and mail bombs with example.	6	L1	CO1
	c.	Discuss about cyber defamation in detail.	4	L2	CO1
		Module – 2			
Q.3	a.	Explain how criminals plan the attacks? List and discuss the phases involved in planning cyber crimes.	10	L2	CO2
	b.	What is cyber stalking? Mention its types and explain how stalking works.	10	L2	CO2
		OR			
Q.4	a.	Define Social Engineering. Explain the impact of social engineering on cyber crime.	10	L2	CO2
	b.	Define attack vector? Discuss the various attack vector used for launching cyber attack.	10	L2	CO2
		Module – 3			
Q.5	a.	Explain the different ways of password cracking system with suitable example.	10	L2	CO3
	b.	Discuss the basic stages of an attack used to understand how an attacker can compromise a network.	6	L2	CO3
	c.	Differentiate between virus and worms.	4	L2	CO3
		OR			
Q.6	a.	Define Virus. Mention different types of viruses in detail.	10	L2	CO3

	b.	Define Trojan Horse and Back doors? What are the steps to be followed for protection against Trojan horse and back doors?	6	L2	CO3
	c.	List and discuss different types of mobile workers used to launch attacks on wireless networks.	4	L2	CO3
		Module – 4			
Q.7	a.	Define Phishing. Discuss the various techniques used by Phishers to launch phishing attacks.	10	L2	CO4
	b.	Discuss briefly the various types of ID Theft techniques.	10	L2	CO4
		OR			
Q.8	a.	Draw flow chart of phishing attack, also write characteristics of Sanitizing Proxy System (SPS).	10	L2	CO4
	b.	Describe the security measures used to prevent being victim of Identify theft.	10	L2	CO4
		Module – 5			
Q.9	a.	Define Computer Forenscis and Digital Forencscis. Discuss the role of digital forensics and scenarios involved in Digital forensic science.	10	L2	CO5
	b.	What are the different types of digital analysis that can be performed on the captured forensic evidence?	10	L2	CO5
		OR			
Q.10	a.	What are the various phases and activities involved in the life cycle of a forensics investigation process? Support your answer through various relevant examples in preparation and reporting phase.	12	L2	CO5
	b.	Explain how the "chain of custody" (COC) concept applied in computer/ digital forensics.	8	L2	CO5

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MAKE-UP EXAM

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

BMATE201

Second Semester B.E/B.Tech. Degree Examination, Nov./Dec. 2023
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. M : Marks , L: Bloom's level , C: Course outcomes.
3. VTU formula hand book is permitted.

			M	L	C
		Module – 1			
1	a.	If $\phi = x^2 + y - z - 1$ find grad ϕ at (1, 0, 0). Also find its magnitude.	6	L3	CO1
	b.	Find the divergence and curl of the vector : $\vec{F} = (xyz)\hat{i} + (3x^2y)\hat{j} + (xz^2 - y^2z)\hat{k}$ at (2, –1, 1).	7	L2	CO1
	c.	Show that $\vec{F} = (y^2 - z^2 + 3yz - 2x)\hat{i} + (3xz + 2xy)\hat{j} + (3xy - 2xz + 2z)\hat{k}$ is both solenoidal and irrotational.	7	L2	CO1
		OR			
2	a.	Suppose $\vec{F} = x^3\hat{i} + y\hat{j} + z\hat{k}$ is the force field. Find the work done by $\vec{F}$ along the line from (1, 2, 3) to (3, 5, 7).	6	L2	CO1
	b.	Verify Green's theorem in the xy – plane for $\int_c (xy + y^2)dx + x^2dy$, 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 divergence of $\vec{F} = x^2y\hat{i} + yz^2\hat{j} + x^2z\hat{k}$.	7	L3	CO5
		Module – 2			
3	a.	Define a subspace. Show that a subset $S = \{x_1, x_2, x_3 \mid x_1 + x_2 + x_3 = 0\}$ of $V_3(R)$ is a subspace of $V_3(R)$.	6	L2	CO2
	b.	Prove that in $V_3(R)$ the vectors {(1, 2, 1) (3, 1, 5), (3,–4, 7)} are linearly independent.	7	L2	CO2
		Find <p, q> and ||P||. Given $P(x) = x^2 - x$, $q(x) = x + 1$, the innerproduct space $\langle p, q\rangle = \int_{-1}^{1} P(x);q(x)dx$.	7	L2	CO2

		OR			
4	a.	Let T : U → V be a linear transformation defined by, T(x, y, z) = {(x + y, x − y, 2x + z)/x, y, z, ∈ R). Verify Rank Nullity theorem.	6	L2	CO2
	b.	Explain the vector (2, −5, −1) as a linear combination of the vectors (1, 2, 3)(2, 1, 1) (1, 3, 2) of $V_3(R)$.	7	L2	CO2
	c.	Using the modern mathematical tool write the code to represent the reflection transformation T : $R^1 \rightarrow R^2$ and to find the image of vector (10, 0) when it reflected about the y – axis.	7	L3	CO5
		Module – 3			
5	a.	Find the Laplace transform of $\left(\frac{\sin 2t}{\sqrt{t}}\right)^2$.	6	L2	CO3
	b.	Find $L^{-1}\left\{\frac{1}{s(s^2+1)}\right\}$ using convolution theorem.	7	L2	CO3
	c.	Express $f(t) = \begin{cases} \cos t & 0 < t < \pi \\ \cos 2t & \pi < t < 2\pi \\ \cos 3t & t > 2\pi \end{cases}$ interms of unit step function and find L{f(t)}.	7	L3	CO3
		OR			
6	a.	Find the inverse Laplace transform of i) $\frac{(s+2)^3}{s^6}$ ii) $\frac{2s+5}{4s^2+25}$.	6	L2	CO3
	b.	Solve by Laplace transform method : $y'' + 4y' + 3y = e^{-t}$; $y(0) = 1 = y'(0)$.	7	L2	CO3
	c.	Find the Laplace transform of the square wave function of period a, defined by $f(t) = \begin{cases} K & 0 < t < a/2 \\ -K & a/2 < t < a \end{cases}$.	7	L2	CO3
		Module – 4			
7	a.	Evaluate $\int_2^7 \left(\frac{1}{x}\right) dx$, using Trapezodial rule, taking n = 5.	6	L3	CO4
	b.	Find the real toot of the equation $e^x - 3x - \sin x = 0$ by the Regula – Falsi method between 0 and 1. (carry out three iterations) x is in radions.	7	L2	CO4
	c.	Find y at x = 1 using Newton divided difference formula for the following data :	7	L2	CO4

x	0	2	3	4	7	9
y	4	26	58	112	466	922

OR

8	a.	Evaluate : $\int_{2}^{\pi/2} \cos x \, dx$, using Simpson's $(1/3)^{rd}$ rule with n = 8 [x in radian].	6	L3	CO4
	b.	Construct Newton's forward interpolation polynomial for the data : x: 0, 1, 2, 3, 4 f(x): 3, 6, 11, 18, 27	7	L2	CO4
	c.	Find y when x = 10 for the following data by using Kagrange's interpolation formula : x: 5, 6, 9, 11 y: 12, 13, 14, 16	7	L2	CO4

Module – 5

9	a.	Using Taylor's method to find y(0.2) by considering the terms upto 4^{th} degree, given $\frac{dy}{dx} - 2y - 3e^x = 0$; y(0) = 0.	6	L3	CO4
	b.	Given $\frac{dy}{dx} = x + y$; y(0) = 1. Compute y(0.2) using Runge – Kutta 4^{th} order method [h = 0.2].	7	L2	CO4
	c.	Apply Milne's predictor and corrector method find y at x = 2 given $\frac{dy}{dx} = \frac{2y}{x} (x \neq 0)$ x: 1, 1.25, 1.5, 1.75 y: 2, 3.13, 4.5, 6.13	7	L2	CO4

OR

10	a.	Using Modified Euler's method to find y at x = 0.2 given $y' = \frac{x-y}{2}$; y(0) = 1 [h = 0.1].	6	L3	CO4
	b.	Find y(1.1) by using Runge-Kutta method of fourth order. Given $\frac{dy}{x} = x(y)^{1/3}$; y(1) = 1 [take h = 0.1].	7	L2	CO4
	c.	Using modern mathematical tools, write a code to find y(0.1) given $\frac{dy}{dx} = x - y$, y(0) = 1, by Taylor's series.	7	L3	CO5

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CS & AI, CI

MAKE-UP EXAM

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

BMATS201

Second Semester B.E./B.Tech. Degree Examination, Nov./Dec. 2023

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 $\int_{-c}^{c}\int_{-b}^{b}\int_{-a}^{a}(x^2+y^2+z^2)dz\,dy\,dx$	7	L2	CO1
	b.	Evaluate $\int_{0}^{\infty}\int_{0}^{\infty}e^{-(x^2+y^2)}dx\,dy$ by changing into polar coordinates.	7	L2	CO1
	c.	Prove that $\beta(m,n)=\frac{\Gamma m-\Gamma n}{\Gamma m+n}$.	6	L2	CO1
		OR			
Q.2	a.	Evaluate $\int_{0}^{1}\int_{x}^{\sqrt{x}}xy\,dy\,dx$ by changing the order of integration.	7	L3	CO1
	b.	Prove that $\int_{0}^{\pi/2}\sqrt{\cot\theta}\,d\theta=\frac{\pi}{\sqrt{2}}$	7	L2	CO1
	c.	Using mathematical tools, write the code to find the area of an ellipse by double integration $A=4\int_{0}^{a}\int_{0}^{\frac{b}{a}\sqrt{a^2-x^2}}dy\,dx$	6	L3	CO5
		Module – 2			
Q.3	a.	Find div $\vec{F}$ and curl $\vec{F}$, If $\vec{F}=\nabla(x^3+y^3+z^3-3xyz)$	7	L2	CO2
	b.	Find the directional derivative of $\phi=x^2yz+4xz^2$ at (1, –2, –1) Along the direction of the vector $(2i-j-2K)$.	7	L2	CO2
	c.	Prove that the spherical coordinate system is orthogonal.	6	L3	CO2
		OR			
Q.4	a.	Find the angle between the surfaces $x^2+y^2+z^2=9$ and $z=x^2+y^2-3$ at the point (2, –1, 2).	7	L3	CO2
	b.	Show that $\vec{F}=(y^2-z^2+3yz-2x)i+(3xz+2xy)j+(3xy-2xz+2z)K$ is both solenoidal and irrotational	7	L2	CO2
	c.	Using the mathematical tools, write the codes to find the divergence of $\vec{F}=x^2yi+yz^2j+x^2zK$.	6	L3	CO5

		Module – 3			
Q.5	**a.**	Prove that the subset $W = \{(x, y, z) / x - 3y + 4z = 0\}$ of the vector space R^3 is a subspace of R^3.	**7**	**L3**	**CO3**
	b.	Determine whether the matrix $A = \begin{bmatrix} 3 & -1 \\ 1 & -2 \end{bmatrix}$ is a linear combination of $B = \begin{bmatrix} 1 & 1 \\ 0 & -1 \end{bmatrix}$, $C = \begin{bmatrix} 1 & 1 \\ -1 & 0 \end{bmatrix}$ and $D = \begin{bmatrix} 1 & -1 \\ 0 & 0 \end{bmatrix}$ in the vector space M_{22} of 2×2 matrices.	**7**	**L2**	**CO3**
	c.	Find the linear transformation $T : V_2(R) \rightarrow V_3(R)$ such that $T(1, 1) = (0, 1, 2)$, $T(-1, 1) = (2, 1, 0)$.	**6**	**L2**	**CO3**
		OR			
Q.6	**a.**	Determine whether the vectors $V_1 = (1, 2, 3)$, $V_2 = (3, 1, 7)$ and $V_3 = (2, 5, 8)$ are linearly dependent or linearly independent.	**7**	**L2**	**CO3**
	b.	Find the dimension and basis of the subspace spanned by the vectors $(2, 4, 2)$, $(1, -1, 0)$, $(1, 2, 1)$ and $(0, 2, 1)$ in $V_3(R)$	**7**	**L2**	**CO3**
	c.	Verify the rank-nullity theorem for the linear transformation $T : V_3(R) \rightarrow V_3(R)$ defined by $T(x, y, z) = (x + 2y - z, y + z, x + y - 2z)$.	**6**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	Find the root of the equation $xe^x = 2$ that lies between 0 and 1. Using Regula- Falsi method. Carryout Four iterations. Correct to 3 – decimal places.	**7**	**L2**	**CO4**
	b.	Use Newton's divided difference formula. Find f(q), given the data : x : 5 7 11 13 17 f(x) : 150 392 1452 2366 5202	**7**	**L3**	**CO4**
	c.	Evaluate $\int_0^1 \frac{dx}{1+x^2}$ by using Simpson's $\frac{1}{3}^{rd}$ rule taking 4 equal parts.	**6**	**L3**	**CO4**
		OR			
Q.8	**a.**	Find the real root of the equation $3x - \cos x - 1 = 0$. Correct to 3-decimal places. Using Newton's Raphson method carryout 3 – iteration.	**7**	**L2**	**CO4**
	b.	Find Tan(0.26) given that Tan (0.10) = 0.1003 Tan (0.15) = 0.1511, Tan (0.20) = 0.2077, Tan (0.25) = 0.2553, Tan(0.30) = 0.3093. Using Newton's Backward interpolation formula.	**7**	**L2**	**CO4**
	c.	Evaluate $\int_4^{5.2} \log x \, dx$ taking 6 equal parts. Using Simpson's $3/8^{th}$ rule.	**6**	**L2**	**CO4**

		Module – 5			
Q.9	**a.**	Employ Taylor's series method find y at x = 0.1 and 0.2 given that $\frac{dy}{dx} = 2y + 3e^x$; y(0) = 0. Up to fourth degree terms.	**7**	**L2**	**CO4**
	b.	Using Runge Kutta a method of forth order to find an approximate value of y(0.2) given that $\frac{dy}{dx} = (x^2 + y)$ with y(0) = 1. Taking h = 0.2.	**7**	**L2**	**CO4**
	c.	Given $y' = (x - y^2)$ and the data y(0) = 0, y(0.2) = 0.02, y(0.4) = 0.0795, y(0.6)=0.1762. Compute y(0.8) by Milne's method.	**6**	**L2**	**CO4**
		OR			
Q.10	**a.**	Using modified Euler method find y(0.1) given that $\frac{dy}{dx} = (x + y)$, with y(0) = 1, Taking h = 0.1. Carryout 3-modification.	**7**	**L2**	**CO4**
	b.	Using Runge kutta method of fourth order, find the value of (0.2). Given that $\frac{dy}{dx} = \left(3x + \frac{y}{2}\right)$ with y(0) = 1. Taking h = 0.2.	**7**	**L2**	**CO4**
	c.	Using Mathematical tools, write the code solve the differential equation $\frac{dy}{dx} = 3e^x + 2y$ with y(0) = 0, using the Taylor's series method at x = 0.1 (0.1) 0.3.	**6**	**L3**	**CO5**

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CBCS SCHEME

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BMATS201

Second Semester B.E./B.Tech. Degree Examination, Dec.2023/Jan.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.

			M	L	C
		Module – 1			
Q.1	a.	Evaluate $\int_{-1}^{1}\int_{0}^{z}\int_{x-z}^{x+z}(x+y+z)\,dydxdz$.	7	L2	CO1
	b.	Evaluate $\int_{0}^{\infty}\int_{0}^{\infty}e^{-(x^2+y^2)}\,dxdy$ by changing into polar coordinates.	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 $\int_{0}^{1}\int_{y}^{\sqrt{y}}(x^2y+xy^2)dxdy$ by changing the order of integration.	7	L3	CO1
	b.	Show that $\int_{0}^{\pi/2}\frac{d\theta}{\sqrt{\sin\theta}}\times\int_{0}^{\pi/2}\sqrt{\sin\theta}\,d\theta=\pi$	7	L2	CO1
	c.	Using mathematical tools, write the code to find the area of an ellipse by double integration $A=4\int_{0}^{a}\int_{0}^{\frac{b}{a}\sqrt{a^2-x^2}}dydx$, taking a = 4, b = 6.	6	L3	CO5
		Module – 2			
Q.3	a.	Find the directional derivative of $\phi=4xz^3-3x^2y^2z$ at (2, -1, 2) along vector $2i-3j+6k$.	7	L2	CO2
	b.	Show that the vector $\vec{F}=\frac{xi+yi}{x^2+y^2}$ is both solenoidal and irrotational.	7	L2	CO2
	c.	Prove that the spherical coordinate system is orthogonal.	6	L3	CO2
		OR			
Q.4	a.	Find the angle between the surfaces $x^2+y^2+z^2=9$ and $z^2+y^2-x=3$ at (2, -1, 2).	7	L2	CO2
	b.	Express the vector $\vec{A}=z\hat{i}-2x\hat{j}+y\hat{k}$ in cylindrical coordinates.	7	L2	CO2
	c.	Using mathematical tools, write the code to find the curl of $\vec{F}=x^2yz\hat{i}+y^2zx\hat{j}+z^2xy\hat{k}$.	6	L3	CO5

Module – 3

Q.5	a.	Prove that the subset $W = \{(x, y, z) : ax + by + cz = 0; x, y, z \in R\}$ of the vector space R^3 is a subspace of R^3.	7	L2	CO3
	b.	Determine the following vectors are linearly independent or not, $x_1 = (2, 2, 1)$, $x_2 = (1, 3, 7)$ and $x_3 = (1, 2, 2)$ in R^3.	7	L2	CO3
	c.	Show that the function $T : R^2 \rightarrow R^3$ given by $T(x, y) = (x + y, x - y, y)$ is a linear transformation.	6	L2	CO3
		OR			
Q.6	a.	Determine whether the vectors $v_1 = (1, 2, 3)$, $v_2 = (3, 1, 7)$ and $v_3 = (2, 5, 8)$ are linearly dependent or linearly independent.	7	L2	CO3
	b.	Verify the Rank-Nullity theorem for the linear transformation $T : R^3 \rightarrow R^3$ defined by $T(x, y, z) = (x + 2y - z, y + z, x + y - 2z)$.	7	L2	CO3
	c.	Consider the vectors $u = (1, 2, 4)$, $v = (2, -3, 5)$, $w = (4, 2, -3)$ in R^3. Find: i) $\langle u.v \rangle$ ii) $\langle u.w \rangle$ iii) $\langle v.w \rangle$ iv) $\langle (u + v).w \rangle$	6	L2	CO3
		Module – 4			
Q.7	a.	Find an approximate value of the root of the equation $x^3 - x^2 - 1 = 0$, using the Regula-Falsi method upto four decimal places of accurancy, where root lies between 1.4 and 1.5.	7	L2	CO4
	b.	Using Newton's divided difference formula evaluate f(4) from the following: | x | 0 | 2 | 3 | 6 | | f(x) | -4 | 2 | 14 | 158 |	7	L2	CO4
	c.	Evaluate $\int_0^6 \frac{1}{1+x^2} dx$ by using Trapezoidal rule by taking 7 ordinates.	6	L3	CO4
		OR			
Q.8	a.	Find an approximate root of the equation $x \log_{10} x - 1.2 = 0$ corrected to five decimal places where root lies near 2.5 by Newton-Raphson method.	7	L2	CO4
	b.	The area A of a circle of diameter d is given for the following values. Calculate the area of a circle of diameter 82 by using Newton's forward interpolation formula. | d | 80 | 85 | 90 | 95 | 100 | | A | 5026 | 5674 | 6362 | 7088 | 7854 |	7	L2	CO4
	c.	Use Simpson's 1/3rd rule to find $\int_0^{0.6} e^{-x^2} dx$ by taking seven ordinates.	6	L2	CO4

		Module – 5			
Q.9	**a.**	Find by Taylor's series method the value of y at x = 0.1 to five places of decimals from $\frac{dy}{dx} = x^2y - 1$ with an initial condition y(0) = 1.	7	L2	CO4
	b.	Using the Runge-Kutta method of fourth order solve $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$ with y(0) = 1 at x = 0.2 taking h = 0.2.	7	L2	CO4
	c.	Given that $\frac{dy}{dx} = x^2(1+y)$ and y(1) = 1, y(1.1) = 1.233, y(1.2) = 1.548 and y(1.3) = 1.979. Compute y at x = 1.4 by applying Milne's method.	6	L2	CO4
		OR			
Q.10	**a.**	Using modified Euler's method, solve $\frac{dy}{dx} = 3x + \frac{y}{2}$ at x = 0.1 corrected to four decimal places by taking h = 0.1, with initial condition y(0) = 1.	7	L2	CO4
	b.	Given that $\frac{dy}{dx} = x - y^2$ and y(0) = 0, y(0.2) = 0.02, y(0.4) = 0.0795, y(0.6) = 0.1762. Compute y(0.8) by Milne's method.	7	L2	CO4
	c.	Using mathematical tools, write the code to find the solution of $\frac{dy}{dx} = 1 + \frac{y}{x}$ at y(2) taking h = 0.2. Given that y(1) = 2 by Runge-Kutta method of 4th order.	6	L3	CO5

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CBCS SCHEME

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BESCK204E/BESCKE204

Second Semester B.E./B.Tech. Degree Examination, Dec.2023/Jan.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. VTU Formula Hand Book is permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes.

			M	L	C
		Module – 1			
Q.1	a.	Explain the structure of C program with example.	10	L2	CO1
	b.	Define variable and explain the rules for defining variable and classify the following as valid and invalid variables. Num1, 1num, $sum, _Area, Area_Circle, +add, #12, 199_Spam_apple, a_2?	10	L2	CO1
		OR			
Q.2	a.	Explain the steps for compiling and executing C program with neat flowchart.	10	L2	CO1
	b.	Explain the formatted input and output statements in 'C' with neat syntax and example.	10	L2	CO1
		Module – 2			
Q.3	a.	List the different types of operators and explain each of them.	10	L2	CO2
	b.	Explain if, if...else and ladder if...else statement with syntax and example program.	6	L2	CO2
	c.	Demonstrate the use of switch statement with syntax and example.	4	L2	CO2
		OR			
Q.4	a.	Demonstrate the use of breaks and continue statement with suitable example program. Write a 'C' program to check if a given number is prime order.	8	L3	CO2
	b.	Generate the following pyramid with a C code A A B A A B C B A A B C D C B A	5	L3	CO2
	c.	Differentiate between while and do...while loop. Write a 'C' program to find the number of digits in a given number.	7	L3	CO2
		Module – 3			
Q.5	a.	Explain the various storage class specifiers used in C.	6	L2	CO5
	b.	Distinguish between call by value and call by reference using suitable example.	10	L2	CO5
	c.	Write the array declaration and initialization with examples.	4	L2	CO3

		OR			
Q.6	**a.**	Develop a C program to multiply the two matrices and validate the rules of multiplication.	**10**	**L3**	**CO3**
	b.	Write a C program to generate Fibonacci series using recursion.	**6**	**L3**	**CO5**
	c.	Write a C program to find factorial of a given number using recursion.	**4**	**L3**	**CO5**
		Module – 4			
Q.7	**a.**	Explain with a neat syntax string I/O functions.	**6**	**L2**	**CO3**
	b.	Explain the use of scanset function.	**4**	**L2**	**CO3**
	c.	Write the functions to implement string operations such as compare, concatenate, string length with parameter passing technique.	**10**	**L2**	**CO3**
		OR			
Q.8	**a.**	Explain the string handling functions with neat syntax. (Minimum 5).	**10**	**L2**	**CO3**
	b.	Demonstrate the two dimensional array declaration and initialization.	**4**	**L2**	**CO3**
	c.	Write a C program that reads a matrix and display the sum of all the elements of matrix.	**6**	**L3**	**CO3**
		Module – 5			
Q.9	**a.**	Define pointer. And explain how the pointers are declared and initialized.	**7**	**L2**	**CO4**
	b.	Define structure. And explain how the structures and structure variables are declared.	**7**	**L2**	**CO4**
	c.	List and explain the character handling functions with example.	**6**	**L2**	**CO3**
		OR			
Q.10	**a.**	Write a 'C' program to swap two integers using pointers.	**6**	**L3**	**CO4**
	b.	Differentiate between arrays and structures with suitable example.	**6**	**L2**	**CO4**
	c.	Implement a C program on structure to read, write and compute average marks and the students scoring above and below the average marks for a class of 'N' students.	**8**	**L3**	**CO3**

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MAKE-UP EXAM

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BESCK204E/BESCKE204

Second Semester B.E./B.Tech. Degree Examination, Nov./Dec.2023
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.

			M	L	C
		Module – 1			
Q.1	a.	Explain the basic organization of computer with neat labeled diagram.	12	L2	CO1
	b.	With a diagram explain the working of CRT monitor.	8	L2	CO1
		OR			
Q.2	a.	Explain the structure of a C program.	7	L2	CO2
	b.	What is an identifier? What are the rules to form identifier names?	7	L2	CO2
	c.	Explain printf and scanf statements with syntax.	6	L2	CO2
		Module – 2			
Q.3	a.	Explain switch statement with syntax and example.	10	L2	CO2
	b.	Explain the logical operators in C.	5	L2	CO2
	c.	Write a program to find the largest of three numbers.	5	L2	CO2
		OR			
Q.4	a.	Explain while and do-while loops with syntax.	10	L2	CO2
	b.	Write a C program to find factorial of a number using for loop.	6	L2	CO2
	c.	Explain break and continue statements.	4	L2	CO2
		Module – 3			
Q.5	a.	Define function. Explain the elements of user defined functions.	8	L2	CO4
	b.	Develop a C program to add two integers using function.	6	L3	CO4
	c.	Define recursion. What are the advantages of recursion?	6	L2	CO4
		OR			
Q.6	a.	Define array. Explain declaration and initialization of one dimensional array.	10	L2	CO3
	b.	Develop a C program to sort the given 'n' numbers is ascending order using bubble sort.	10	L3	CO3

		Module – 4			
Q.7	**a.**	Develop a C program to multiply two matrices of order m × n.	**12**	**L3**	**CO3**
	b.	Write a C program to concatenate two strings without using library function.	**8**	**L3**	**CO3**
		OR			
Q.8	**a.**	Develop a C program to sort the names in ascending order.	**10**	**L3**	**CO3**
	b.	Write a C program to transpose a matrix of order 3 × 3.	**10**	**L2**	**CO3**
		Module – 5			
Q.9	**a.**	Explain any five string manipulation functions.	**10**	**L2**	**CO3**
	b.	Develop a program to compute the mean, variance and standard deviation of 'n' numbers using pointer.	**10**	**L3**	**CO5**
		OR			
Q.10	**a.**	Explain the structure concepts and illustrate the declaration and initialization of structure with example for each.	**10**	**L2**	**CO3**
	b.	Develop a C program to read and display the information consisting of Roll Number, Name, Age and Marks of 'n' students in a class.	**10**	**L3**	**CO5**

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