Roll No. | | | | | | | | | | | | |

Total No. of Pages: 2 **Total No. of Questions: 09**

B.Tech (CSE/ IT/ ME/ ECE/ IOT/ CS/ RAI/ AIML/ AIDS/ CSE DS), Semester: 1st

Subject Code: 25C1EMU-101

M.Code:

Date of Examination: 12-12-2025

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Define D'Alembert's Ratio Test.	CO-1	L1
b.	Interpret whether the sequence $\{a_n\}$, where $a_n = \frac{2n-1}{(n+1)^{\frac{3}{2}}}$ is convergent or divergent.	CO-1	L2
c.	Explain Maclaurin's Theorem in one variable.	CO-1	L2
d.	Define Beta and Gamma function with their examples.	CO-2	L1
e.	Show that: $\int_0^\infty e^{-x^2} dx = \frac{\sqrt{\pi}}{2}$	CO-2	L2
f.	Show that: $\beta(m,n) = \beta(m,n+1) + \beta(m+1,n)$.	CO-2	L2
g.	Find stationary points of the function: $f(x,y) = x^2 + y^2 + 6x + 12$	CO-3	L1
h.	Explain the conditions for maxima and minima of a function of two variables.	CO-3	L2
i.	Find the value of : $\int_0^3 \int_0^1 (x^2 + 3y^2)\, dy\, dx$	CO-4	L1
j.	Infer the value of the integral: $\int_0^2 \int_1^2 \int_0^{yz} xyz\, dx\, dy\, dz$	CO-4	L2
	SECTION-B		
2.	Examine the convergence/divergence of the series:	CO-1	L4

	$a_n = \sum\sqrt{\frac{n}{n^2+1}}$		
3.	Solve for the length of an arc of the cycloid: $x = a(\theta - \sin\theta)$ and $y = a(1 - \cos\theta)$	CO-2	L3
4.	If $u = x^y$, Prove that: $\frac{\partial^3 u}{\partial x^2 \partial y} = \frac{\partial^3 u}{\partial x \partial y \partial x}$	CO-3	L5
5.	Solve $\iint_A y\,dx\,dy$ where **A** is the region bounded by the parabolas $y^2 = 4x$ and $x^2 = 4y$	CO-4	L3
6.	If $z = \log(u^2 + 3v)$, $u = e^{5x^2+y^2}, v = e^{2x^2+7y}$, Determine $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$	CO-3	L5
	SECTION-C		
7.	(a) Analyse the length of the curve: $x = t^3, y = 2t^2$ on $[0, 1]$. (b) Simplify the integral: $\int_0^1 x^5\ (1 - x^3)^3\,dx$	CO-2	L4
8.	Solve $x^2\frac{\partial^2 u}{\partial x^2} + 2xy\frac{\partial^2 u}{\partial x \partial y} + y^2\frac{\partial^2 u}{\partial y^2}$, where $u = \tan^{-1}(\frac{y^2}{x})$	CO-3	L3
9.	Evaluate $\iiint \frac{dx\,dy\,dz}{\sqrt{1-x^2-y^2-z^2}}$ over the positive octant of the sphere $x^2 + y^2 + z^2 = 1$	CO-4	L5

Note: Disclosure of identity by writing mobile number or making of passing request on any paper of Answer Sheet will lead to UMC against the student.

Roll No. | | | | | | | | | | | | |

Total No. of Questions: 09

Total No. of Pages: 02

B.Tech (CSE/IOT/ME), Semester 1st

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Subject Code: 25C1ECU-101

M.Code:

Date of Examination: 15-12-2025

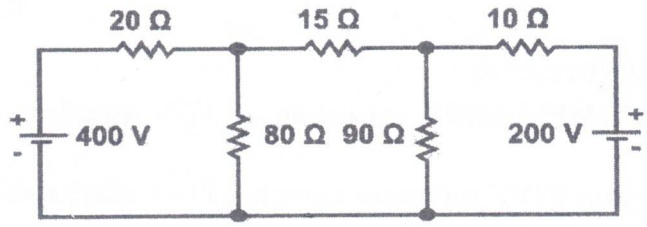
Time: 3 Hrs.

Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Explain active and passive elements with examples?	CO-1	L2
b.	Illustrate Norton's Theorem.	CO-1	L2
c.	Compare ideal and practical voltage sources.	CO-1	L2
d.	Define RMS value of an AC voltage.	CO-2	L1
e.	Summarize the difference between AC and DC circuit.	CO-2	L2
f.	Compare Real Power and Reactive Power.	CO-2	L2
g.	What are the properties of an ideal fuse?	CO-3	L1
h.	Explain voltage regulation with respect to transformer.	CO-3	L2
i.	A BJT has a β (current gain) of 100. If base current is 10 μA, Find collector current.	CO-4	L1
j.	Explain the V-I characteristics of PN junction diode.	CO-4	L2
	SECTION-B		
2.	State Kirchhoff's current and voltage law and apply them to any electric circuit. Also, mention the sign conventions used in Kirchhoff's laws.	CO-1	L3
3.	Examine the relation between line values and phase values of voltage and current for a 3-phase balanced star connected system. Draw the phasor diagram of these quantities.	CO-2	L4
4.	The iron loss and full load copper losses of 25KVA, 2000/200V single phase transformer are 200 watts and 400 watts. Determine a) the efficiency at full load and half load at 0.8 power factor lag. b)maximum efficiency and corresponding load at same power factor.	CO-3	L5

5.	Analyze the input and output characteristics of a BJT in Common Base (CE) configuration with the help of neat diagrams.	CO-4	L4
6.	Explain the important characteristics of Batteries. Also, explain the types of batteries with the help of suitable diagrams.	CO-3	L5
	SECTION-C		
7.	Utilize Thevenin's Theorem to find the current in 15Ω resistor of network as shown in figure below.  	CO-1	L3
8.	Make use of suitable diagrams to show the working of following electrical components a) MCB b) SFU	CO-3	L3
9.	Explain the working principle of thermistor and thermocouple with suitable diagrams.	CO-4	L5

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Roll No. | | | | | | | | | | | | |

Total No. of Pages: 02

Total No. of Questions: 09

B.Tech (All Branches), (Sem-1)

ENGINEERING MATHEMATICS - I

Subject Code: BTAM – 101 -23

M.Code: 93796

Date of Examination: 21-11-2025

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying two marks each.**
2. **SECTION-B & C have FOUR questions each.**
3. **Each question of SECTION B & C consists of eight marks.**
4. **Attempt any FIVE questions from SECTION B & C, taking at least two questions from each section.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Explain the necessary condition for the convergence of positive term series.	CO1	L2
b.	Define Ratio test for infinite series.	CO1	L1
c.	What is the formula for the volume of revolution about the initial line and pole perpendicular to the initial line.	CO2	L1
d.	Define Improper integrals of first kind.	CO2	L1
e.	If $u = x^y$, then show that $\frac{\partial^2 u}{\partial x \partial y} = \frac{\partial^2 u}{\partial y \partial x}$	CO3	L2
f.	~~Show~~ find that $\lim_{(x,y)\to(1,2)} \frac{2x^2y}{x^2+y^2+1}$	CO3	L2
g.	Find $\int_1^2 \int_1^3 x\, y^2\, dx\, dy$	CO4	L1
h.	Interpret the value of the integral $\int_0^2 \int_1^3 \int_0^{yz} x\, dx\, dy\, dz$.	CO4	L2

i.	Define absolute convergence with the help of an example.	CO1	L1
j.	Show that Beta function is symmetric.	CO2	L1
	SECTION-B		
2.	Analyse the convergence or divergence of the series $\sum\left(\sqrt[3]{(n^3+1)}-n\right)$.	CO1	L4
3.	Solve the cardiod r = a (1- cos θ) for finding the perimeter	CO2	L3
4.	If u $=sin^{-1}\left(\frac{x^2+y^2}{x+y}\right)$, prove that $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=tan\,u$.	CO3	L5
5.	Solve $\iint_A y\,dx\,dy$ where A is the region bounded by the parabolas $y^2=4x$ and $x^2=4y$.	CO4	L3
	SECTION-C		
6.	Examine the convergence of the series $\sum\frac{(-1)^{n-1}n}{5n+1}$.	CO1	L4
7.	Prove the relation between Beta and Gamma functions.	CO2	L5
8.	If $u=f\left(\frac{y-x}{xy},\frac{z-x}{xz}\right)$, then solve $x^2\frac{\partial u}{\partial x}+y^2\frac{\partial u}{\partial y}+z^2\frac{\partial u}{\partial z}$	CO3	L3
9.	Simplify $\iiint(x+y+z)dx\,dy\,dz$ over the tetrahedron bounded by the planes $x=0, y=0, z=0, x+y+z=1$.	CO4	L4

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Roll No. | | | | | | | | | | | | | Total No. of Pages: 02

Total No. of Questions: 09

B.Tech (All Branches), (Sem.-1, 2)

CHEMISTRY-I

Subject Code: BTCH101-18

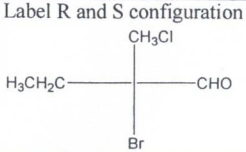
M.Code: 75343

Date of Examination: 02-12-2025

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying two marks each.**
2. **SECTION-B & C have FOUR questions each.**
3. **Each question of SECTION B & C consists of eight marks.**
4. **Attempt any FIVE questions from SECTION B & C, taking at least two questions from each section.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	What are chromophores? Give example.	CO3	L1
b.	Outline dry corrosion of metals.	CO2	L2
c.	Recall the term penetration of orbitals.	CO4	L1
d.	Why Electron gain enthalpy of noble gases comes out to be positive?	CO4	L1
e.	Show dipole-dipole interactions through example.	CO1	L2
f.	List differences between enantiomers and diasteromers.	CO6	L1
g.	Show Anti-Markovnikoff addition of water in alkenes.	CO5	L2
h.	Label R and S configuration to the following: 	CO6	L1
i.	Summarize about optical activity of organic compounds.	CO3	L2
j.	Classify and name various types of organic reactions.	CO5	L2
	SECTION-B		
2.	Assess Crystal field splitting in tetrahedral complexes through proper diagram. Also calculate CFSE for d^4 and d^6 configurations for tetrahedral complexes.	CO1	L5
3.	(a) Solve the Nernst equation for the electrochemical cell. Also give its various applications.		
	(b) Model working of ion-exchange process for water softening.	CO2	L3
4.	(a) Explain electrochemical wet theory of corrosion along with appropriate reactions. (b) Describe the Van der Waals constants and critical constants, and illustrate the relationship between them along with the importance of Van der Waals constants.	CO2	L2
5.	(a) Analyze and illustrate the expected ^{1H}NMR spectra of butan-2-ol and 2-chloropropane, interpreting the splitting patterns. (b) Examine different tranistions possible in UV spectroscopy through suitable examples.	CO3	L4
	SECTION-C		
6.	a) Deduce different conformations of propane molecule through Newmann projection formulae. b) Compare meso compounds and racemic mixtures giving suitable examples.	CO6	L5
7.	Solve Schrodinger wave equation for particle in 1-dimentional box. Also discuss its applications for calculating ΔE of conjugated dienes.	CO1	L3
8.	(a) Examine the shapes of NH_3 and H_2O as predicted by VSEPR theory, and analyze the factors responsible for their differert geometries. (b) Analyze the HSAB principle and polarizability, explaining how they help in understanding the nature of soft and hard acids and bases.	CO4	L4
9.	Apply your understanding of organic reaction mechanisms to explain the stepwise processes involved in E1 and E2 substitution reactions, including their influencing factors such as the nature of the substrate, solvent, nucleophile strength, and leaving group ability, with suitable examples.	CO5	L3

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Total No. of Pages: 02

Total No. of Questions: 09

B.Tech (All Branches), (Sem. -1, 2)

CHEMISTRY-I

Subject Code: BTCH101-23

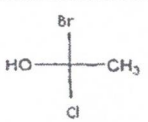
M.Code: 93800

Date of Examination: 02-12-2025

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying two marks each.**
2. **SECTION-B & C have FOUR questions each.**
3. **Each question of SECTION B & C consists of eight marks.**
4. **Attempt any FIVE questions from SECTION B & C, taking at least two questions from each section.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Why is TMS used as an internal standard in NMR spectroscopy.	CO3	L1
b.	Outline dry corrosion of metals.	CO2	L2
c.	Recall effective nuclear charge term.	CO4	L1
d.	Why halogens have highest electron affinity in the periodic table?	CO4	L1
e.	How atomic radii varies along the period in the periodic table?	CO1	L1
f.	Outline position isomerim with an example.	CO6	L1
g.	Infer about electrophiles through examples.	CO5	L2
h.	Label R and S configuration to the following: 	CO6	L1
i.	Illustrate the terms: Bathochromic shift and Hypsochromic shift.	CO3	L2
j.	Demonstrate free radical substitution reaction in alkanes.	CO5	L2
	SECTION-B		
2.	Construct the molecular orbital diagram for N_2 molecule and by making use of MOT compare (a) stability (b) Bond order (c) bond length (d) magnetic behavior of N^2, N^{2+} and N^{2-} species.	CO1	L5

3.	(a) The e.m.f of a cell reaction $3Sn^{4+} + 2Cr \rightarrow 2Cr^{3+} + 3Sn^{2+}$ is 0.89. Determine the standard Free energy for this reaction. (b) Model working of lime-soda process for water softening.	CO2	L3
4.	(a) Explain the mechanism of Electrochemical wet theory of corrosion along with appropriate reactions. (b) Describe the methods of prevention of corrosion.	CO2	L2
5.	(a) Analyze the number of signals for the following compounds: (i) CH_3-CH_2-O-CH_3 (ii) CH_3-CH_2-CH_2-OH (b) Examine different types of molecular vibrations in IR spectroscopy.	CO3	L4
	SECTION-C		
6.	(a) Deduce different conformations possible for propane molecule and also discuss their stability. (b) Explain meso compounds? Give atleast one example.	CO6	L5
7.	Solve Schrodinger wave equation upto laplacian operator. Also discuss the physical significance of ψ and ψ^2.	CO1	L3
8.	Analyze the (a) geometry (b) shape (c) bond angle (d) number of bond pairs and (e) lone pairs of these following molecules: H_2O, SF_6, CH_4 and NH_3 by applying VSEPR theory.	CO4	L4
9.	Construct the pathway for the synthesis of Aspirin from salicylic acid. Also, give applications of aspirin drug molecule.	CO5	L3

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Roll No. | | | | | | | | | | | | | Total No. of Pages: 02

Total No. of Questions: 09

B.Tech (All Branches), (Sem.–1, 2)

BASIC ELECTRICAL ENGINEERING

Subject Code: BTEE101-18

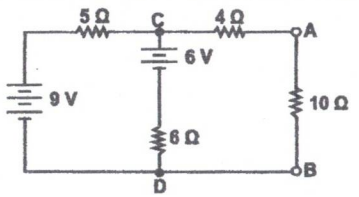
M.Code: 93797/75339

Date of Examination: 26-11-2025

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying two marks each.**
2. **SECTION-B & C have FOUR questions each.**
3. **Each question of SECTION B & C consists of eight marks.**
4. **Attempt any FIVE questions from SECTION B & C, taking at least two questions from each section.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Compare active and passive elements.	CO1	L2
b.	Explain superposition's theorem.	CO1	L2
c.	What is the effect of frequency on inductive reactance?	CO2	L1
d.	Compare DC and AC.	CO2	L2
e.	Define magnetic materials and provide examples.	CO3	L1
f.	Illustrate the significance of torque-slip characteristics in case of an electrical machine.	CO3	L2
g.	What is the difference between wire & cable?	CO4	L1
h.	List the properties of ideal fuse wire.	CO4	L1
i.	What is the importance of power factor?	CO2	L1
j.	Define voltage regulation for a transformer.	CO3	L1
	SECTION-B		
2.	Examine the transient analysis of first order RL series circuit. Also sketch the graphical representation of RL series circuit.	CO1	L4
3.	Solve for current through 10 Ω using Norton's theorem. 	CO1	L3

4.	Explain the series resonance and its effects in RLC series circuit with suitable diagrams.	CO2	L5
5.	A resistance of 12Ω and inductance of 0.1H are connected in series across a 220V, 100Hz supply. Solve for a) Impedance of the circuit. b) Current flowing through the circuit. c) Power factor. d) Power consumed in the circuit.	CO2	L3
	SECTION-C		
6.	The iron loss and full load copper losses of 25KVA, 2000/200V, single phase transformer are 200 watts and 400 watts respectively. Solve (a) the efficiency at full load and half load at 0.8 power factor lag. (b) maximum efficiency and corresponding load at same power factor.	CO3	L3
7.	Explain the construction and working principle of 3-phase induction motor with the help of neat diagram.	CO3	L5
8.	Analyze the important characteristics of batteries in electrical installation. Using suitable diagrams, explain the different types of batteries.	CO4	L4
9.	Examine the function of a miniature circuit breaker with the help of neat schematic diagram.	CO4	L4

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Roll No. | | | | | | | | | | | | | Total No. of Pages: 02

Total No. of Questions: 09

B.Tech. (All Branches), (Sem.-1, 2)

PROGRAMMING FOR PROBLEM SOLVING

Subject Code: BTPS101-18

M.Code: 75346/ 93803

Date of Examination: 05-12-2025

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying two marks each.**
2. **SECTION-B & C have FOUR questions each.**
3. **Each question of SECTION B & C consists of eight marks.**
4. **Attempt any FIVE questions from SECTION B & C, taking at least two questions from each section.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	**Answer briefly:**		
a.	List the difference between RAM and ROM.	CO1	L1
b.	Illustrate the algorithm to find greatest of two integers' numbers.	CO2	L2
c.	Define the working of switch statement.	CO3	L1
d.	Outline the syntax of while loop.	CO3	L2
e.	Show the working of character array to print name in upper case letter.	CO4	L1
f.	Explain the working of 1D array	CO4	L2
g.	Tell the best case time complexity of linear search.	CO5	L1
h.	Show the example of user defined function.	CO5	L2
i.	Relate the "r" and "w modes " of file handling using C.	CO6	L1
j.	Illustrate the syntax of pointer.	CO6	L2
	SECTION-B		
2.	Build using C programming the source code and algorithm to check enter number is even or not.	CO2	L3
3.	Examine the working of arithmetic pointer using c programming.	CO6	L4
4.	Explain the memory structure of computer system with example.	CO1	L5
5.	Analyze the working of 2D array to add two matrices.	CO4	L4

	SECTION-C		
6.	Develop the structure of C programming in detail by considering the problem to find the factorial of 10 numbers.	CO1	L3
7.	Explain the working of Bubble sort using source code.	CO5	L5
8.	Categorize the various decision making statements in detail with example.	CO3	L4
9.	Evaluate the quadratic equation to find roots are real or imaginary using algorithm and source code.	CO2	L5

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Total No. of Questions: 09 Total No. of Pages: 02

B.Tech (CSE/IOT/ME), Semester 1st

ENGINEERING PHYSICS

Subject Code: 25C1PHU-101

M.Code:

Date of Examination: 23-12-2025

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Define space lattice.	CO-1	L1
b.	Explain the term Doping.	CO-1	L2
c.	List two properties of X-rays.	CO-1	L2
d.	List key properties of superconductors.	CO-2	L1
e.	Explain the physical significance curl of a vector.	CO-2	L2
f.	Define electromagnetic spectrum.	CO-2	L2
g.	What do you mean by free particle?	CO-3	L1
h.	Outline the properties of carbon nanotubes.	CO-3	L2
i.	Define spontaneous and stimulated emission.	CO-4	L1
j.	"Ultra-pure silica should be used as optical fibre material". Explain the statement.	CO-4	L2
	SECTION-B		
2.	In a Bragg's spectrometer experiment, X-rays of wavelength 1.2 Å are diffracted by a crystal. The first-order reflection is observed at 10.2°. (a) Identify the interplanar spacing, d. (b) Dissect the maximum order of diffraction possible for this wavelength.	CO-1	L3
3.	Make use of Maxwell's equations, derive London Equation I and London Equation II.	CO-2	L3
4.	Determine the expression for group velocity.	CO-3	L5
5.	Apply your understanding of optical fibre connectors to describe its different types, structure and applications.	CO-4	L3
6.	Determine the ratio of transition rates of spontaneous emission to the stimulated emission for light of wavelength	CO-4	L5

	10^{-6} m and cavity temperature T = 100K and hence evaluate which type of emission will dominate.		
	SECTION-C		
7.	Compare the operational characteristics of various diode types—(a) PN diode (b) Zener (c) LED (d) Photodiode—in terms of their forward voltage, breakdown behavior.	CO-1	L4
8.	(a) Utilize Schrodinger's wave equation for finding the energy of a free particle in a one-dimensional box. (b) Find the value of wave function using normalization condition.	CO-3	L3
9.	Explain the working, construction and energy level diagram for He-Ne laser. Also explain its advantages and applications.	CO-4	L5

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Total No. of Pages: 2

Total No. of Questions: 09

B.Tech (All Branches), (Sem. -1, 2)

ENGINEERING PHYSICS

Subject Code: BTPH101-23

M.Code: 93794

Date of Examination: 18-11-2025

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying two marks each.**
2. **SECTION-B & C have FOUR questions each.**
3. **Each question of SECTION B & C consists of eight marks.**
4. **Attempt any FIVE questions from SECTION B & C, taking at least two questions from each section.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Define a Unit Cell.	CO1	L1
b.	What do you mean by extrinsic semiconductor?	CO2	L1
c.	List two unusual properties of nanomaterials.	CO3	L1
d.	Find the gradient of $1/\vec{r}$ where $\vec{r}=x\hat{i}+y\hat{j}+z\hat{k}$.	CO4	L1
e.	Explain the physical significance of a wave function.	CO5	L2
f.	What is Holography?	CO6	L1
g.	Illustrate the properties of X-rays.	CO1	L2
h.	Explain Magnetic anisotropy.	CO3	L2
i.	Compare the condition for the vector F to be solenoidal and vector F to be irrotational.	CO4	L2
j.	What is Uncertainty Principle?	CO5	L1
	SECTION-B		
2.	Identify the wavelength of X-ray using Bragg's Spectrometer. Also find the minimum wavelength of continuous X-ray emitted from an X-Ray tube with operating voltage of 24kV.	CO1	L3
3.	Examine the function of Zener diode as a voltage regulator.	CO2	L4
4.	Utilize the principles of superconductivity to compare the behavior of Type-I and Type-II superconductors and explain their soft and hard nature.	CO3	L3
5.	Explain the construction and working of Ruby laser with the help of energy level diagram. Also explain spiking in ruby laser.	CO6	L5

	SECTION-C		
6.	Solve the Schrodinger wave equation for particle in 1-D box and show that energy of particle in a box is quantized.	CO5	L3
7.	Distinguish between step index and graded index optical fiber.	CO6	L4
8.	a) Classify the four Maxwell equation in their differential and integral form. Also give the physical significance of each equation. b) Dissect the concepts of dielectric polarization and displacement current.	CO4	L4
9.	Explain the construction and working of Photodiode. Give its disadvantages.	CO2	L5

NOTE: Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the student.

Roll No. | | | | | | | | | | | | | | Total No. of Pages:02

Total No. of Questions: 09

B.Tech (CSE,IOT,ME), Semester 1st

Programming for Problem Solving using C

Subject Code: 25C1CSU-101

M.Code:

Date of Examination: 17-12-2025

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	What is the role of Compiler in a Programming?	CO-1	L1
b.	What is the difference between RAM and ROM?	CO-1	L1
c.	What is the purpose of the printf() function in C Progamming? Write a brief definition.	CO-2	L1
d.	Illustrate two reserved keywords with an example.	CO-2	L1
e.	List any two iteration statements used in C programming along with syntax.	CO-3	L1
f.	Illustrate the usage of if-else statement with an example.	CO-3	L2
g.	Contrast between 1-D array and 2-D array.	CO-4	L2
h.	Contrast the key difference between linear and binary search.	CO-5	L2
i.	Illustrate the declaration of a structure.	CO-6	L2
j.	Give the syntax of calloc().	CO-6	L1
	SECTION-B		
2.	Distinguish between Primary memory and Secondary memory.	CO-1	L4
3.	a. Develop a flowchart by modeling the process of adding two numbers in C programming. b. Plan and explain the use of each flowchart symbol involved in the representation.	CO-2	L3
4.	Evaluate the concept of palindrome by writing a C program to check whether the entered number is palindrome or not using do-while loop in C programming.	CO-3	L5
5.	Categorize the various string manipulation functions in C and demonstrate their use through a syntax.	CO-4	L4
6.	Develop a C program using recursion to generate the Fibonacci series.	CO-6	L3
	SECTION-C		
7.	a. Support through a C program to demonstrate various pointer arithmetic. Choose appropriate data types and pointers	CO-6	L5

	for the input values, and construct the logic to display the result using pointer operations. b. Explain pointer and its functionality.		
8.	Explain bubble sort as a comparison-based sorting technique and write its algorithm and working with an example program in C.	CO-5	L3
9.	Choose and explain an appropriate structure in C to represent 15 student's record containing roll number, name, and marks. Determine how to input and store details of 15 students, then evaluate the correctness by displaying the stored data. Select the proper use of structures and loops to implement the solution.	CO-6	L4

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Roll No. | | | | | | | | | | | | | |

Total No. of Pages: 2

Total No. of Questions: 09

B. Tech (All branches)(Sem.-2)

ENGINEERING MATHEMATICS-2

Subject Code: BTAM201-23

M. Code: 93811

Date of Examination: 20-12-2025

Time: 3 Hrs. Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying two marks each.
2. SECTION-B & C have FOUR questions each.
3. Each question of SECTION B & C consists of eight marks.
4. Attempt any FIVE questions from SECTION B & C, taking at least two questions from each section.

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Find the row echelon form of matrix $\begin{bmatrix} 2 & 3 & 4 \\ 4 & 3 & 1 \\ 1 & 2 & 4 \end{bmatrix}$.	CO1	L1
b.	Illustrate the Rank Nullity theorem with an example.	CO2	L2
c.	Examine whether $T: R^2 \rightarrow R^3$ defined by $T(x, y) = (x + y, x - y, y)$ is a linear transformation or not.	CO2	L2
d.	Find the general solution of differential equation $\sec^2 x \tan y dx + \tan x \sec^2 y dy = 0$.	CO4	L1
e.	Find sum and product of Eigen values of the matrix $\begin{bmatrix} -2 & 1 \\ -3 & 1 \end{bmatrix}$.	CO3	L1
f.	Interpret whether the given equation $(1 + x^2)\, dy + 2xydx = 0$ is exact.	CO4	L2
g.	What is an auxiliary equation of Charpit's method ?	CO6	L1
h.	Explain how to obtain the complete solution of $(D^2 + 6D + 9)y = 0$.	CO4	L2
i.	Show that the orthogonal trajectories of the curve $y^2 = 4ax$ is $2x^2 + y^2 = c$.	CO5	L2
j.	Define Similar and diagonalizable matrices.	CO1	L1
	SECTION-B		
2.	Apply the method of variation of parameters to solve $y'' - 6y' + 9y = \frac{e^{3x}}{x^2}$.	CO4	L3

3.	Test for the matrix $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 3 & -1 \\ 0 & -1 & 3 \end{bmatrix}$ is diagonalizable or not.	CO3	L4
4.	Solve the partial differential equation $r - 4s + 4t = e^{2x+y}$.	CO6	L3
5.	Analyze the system of linear equations $x + y + z = 6, x + 2y + 3z = 10, x + 2y + kz = \lambda$ by examining the relationships among the coefficients, for which values of k and λ possesses (i) No solution (ii) Unique solution (iii) Infinite number of solutions.	CO1	L4
	SECTION-C		
6.	Let $V(R)$ be the vector space of all 2×2 matrices and T be a linear operator on $V(R)$ such that $T(v) = Mv$, where $v \in V(R)$ and $M = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$. Construct the matrix of T relative to standard basis of $V(F)$.	CO2	L3
7.	Evaluate the matrices P and Q such that PAQ is in the normal form where A is the matrix $\begin{bmatrix} 1 & 1 & 2 \\ 1 & 2 & 3 \\ 0 & -1 & -1 \end{bmatrix}$.	CO1	L5
8.	Inspect the form of equation $(p + q)(px + qy) = 1$ and identify the reasoning that leads to complete solution.	CO4	L4
9.	If the displacement of a particle moving at any time t is given by $x = a\cos kt + b\sin kt$, show that the point executes simple harmonic motion. Also determine i) amplitude ii) the maximum velocity iii) the maximum acceleration iv) the periodic time.	CO5	L5

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Roll No. | | | | | | | | | | | | | | Total No. of Pages: 2

Total No. of Questions: 09

B. Tech (All branches)(Sem.-2)

ENGINEERING MATHEMATICS-2

Subject Code: BTAM201-23

M. Code: 93811

Date of Examination: 20-12-2025

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying two marks each.**
2. **SECTION-B & C have FOUR questions each.**
3. **Each question of SECTION B & C consists of eight marks.**
4. **Attempt any FIVE questions from SECTION B & C, taking at least two questions from each section.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Find the row echelon form of matrix $\begin{bmatrix} 2 & 3 & 4 \\ 4 & 3 & 1 \\ 1 & 2 & 4 \end{bmatrix}$.	CO1	L1
b.	Illustrate the Rank Nullity theorem with an example.	CO2	L2
c.	Examine whether $T: R^2 \rightarrow R^3$ defined by $T(x, y) = (x + y, x - y, y)$ is a linear transformation or not.	CO2	L2
d.	Find the general solution of differential equation $\sec^2 x \tan y dx + \tan x \sec^2 y dy = 0$.	CO4	L1
e.	Find sum and product of Eigen values of the matrix $\begin{bmatrix} -2 & 1 \\ -3 & 1 \end{bmatrix}$.	CO3	L1
f.	Interpret whether the given equation $(1 + x^2)\, dy + 2xydx = 0$ is exact.	CO4	L2
g.	What is an auxiliary equation of Charpit's method ?	CO6	L1
h.	Explain how to obtain the complete solution of $(D^2 + 6D + 9)y = 0$.	CO4	L2
i.	Show that the orthogonal trajectories of the curve $y^2 = 4ax$ is $2x^2 + y^2 = c$.	CO5	L2
j.	Define Similar and diagonalizable matrices.	CO1	L1
	SECTION-B		
2.	Apply the method of variation of parameters to solve $y'' - 6y' + 9y = \frac{e^{3x}}{x^2}$.	CO4	L3

3.	Test for the matrix $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 3 & -1 \\ 0 & -1 & 3 \end{bmatrix}$ is diagonalizable or not.	CO3	L4
4.	Solve the partial differential equation $r - 4s + 4t = e^{2x+y}$.	CO6	L3
5.	Analyze the system of linear equations $x + y + z = 6, x + 2y + 3z = 10, x + 2y + kz = \lambda$ by examining the relationships among the coefficients, for which values of k and λ possesses (i) No solution (ii) Unique solution (iii) Infinite number of solutions.	CO1	L4
	SECTION-C		
6.	Let $V(R)$ be the vector space of all 2×2 matrices and T be a linear operator on $V(R)$ such that $T(v) = Mv$, where $v \in V(R)$ and $M = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$. Construct the matrix of T relative to standard basis of $V(F)$.	CO2	L3
7.	Evaluate the matrices P and Q such that PAQ is in the normal form where A is the matrix $\begin{bmatrix} 1 & 1 & 2 \\ 1 & 2 & 3 \\ 0 & -1 & -1 \end{bmatrix}$.	CO1	L5
8.	Inspect the form of equation $(p + q)(px + qy) = 1$ and identify the reasoning that leads to complete solution.	CO4	L4
9.	If the displacement of a particle moving at any time t is given by $x = acoskt + bsinkt$, show that the point executes simple harmonic motion. Also determine i) amplitude ii) the maximum velocity iii) the maximum acceleration iv) the periodic time.	CO5	L5

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Total No. of Pages: 02

Total No. of Questions: 09

B.Tech (IT/CSE/AIML/AIDS/IOT/CSE DS/CS/RAI), Semester 3rd

MATHEMATICS-III

Subject Code: BTAM302-23

M.Code: 94630

Date of Examination: 03-12-2025

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	What do you mean by Kurtosis?	CO-1	L1
b.	If arithmetic mean is 56.50, median is 59.50 and standard deviation is 12.40. Find the skewness.	CO-1	L2
c.	Two cards are drawn at random from a well-shuffled pack of 52 cards. What is the probability of drawing two aces?	CO-2	L1
d.	If A, B and C are three mutually exclusive and exhaustive events associated with random experiments. Find P(A) given that $P(B)=\frac{3}{2}P(A), P(C)=\frac{1}{2}P(B)$	CO-2	L2
e.	Explain any two properties of Binomial Distribution.	CO-3	L1
f.	If the probability of defective bolt is 0.1, find the S.D. for the defective bolt in a total of 400.	CO-3	L2
g.	Define Correlation.	CO-4	L1
h.	If the regression coefficient of Y on X is 0.8 and that of X on Y is 0.5, find the correlation coefficient.	CO-4	L2
i.	Define Type-I and Type-II errors.	CO-5	L1
j.	A sample of 400 male students is found to have a mean height of 67.47 inches. Can it be reasonably regarded as sample from a large population with mean height 67.39 inches and S.D. 1.30 inches?	CO-5	L2
	SECTION-B		
2.	Calculate the first four moments about mean for the following data:	CO-1	L4

X:	1	2	3	4	5	6	7	8	9
F:	1	6	13	25	30	22	9	5	2

3.	A random variable X has the following probability distribution X: 0 | 1 | 2 | 3 | 4 | 5 | 6 P(X): k | 3k | 5k | 7k | 9k | 11k | 13k Solve: (a) the value of k (b) $P(X \geq 4)$ and $P(2 < X \leq 5)$	CO-2	L3
4.	In a normal distribution 31% of items are under 45 and 8% of items are over 64. Evaluate mean and standard deviation of the distribution.	CO-3	L5
5.	Calculate rank correlation coefficient from the following data X: 12 | 15 | 18 | 20 | 16 | 15 | 18 | 22 | 15 | 21 | 18 | 15 Y: 10 | 18 | 19 | 12 | 15 | 19 | 17 | 19 | 16 | 14 | 13 | 17	CO-4	L4
6.	Two types of drugs were used to control the high blood pressures on 6 and 8 patients and decreases in systolicblood pressres (upper limit of B.P.) are as below: Drug A: 12 | 18 | 30 | 15 | 7 | 14 | | Drug B: 15 | 16 | 12 | 10 | 21 | 25 | 28 | 17 Interpret if there is any significant difference in the efficiency of drugs?	CO-5	L5
	SECTION-C		
7.	From the following data calculate Karl Pearson's coefficient of skewness: Marks (more than): 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 No. of students: 150 | 140 | 100 | 80 | 80 | 70 | 30 | 14 | 0	CO-1	L4
8.	If the probability that an individual suffers a bad reaction from a certain injection is 0.001. Evaluate the probability that out of 2000 individuals. (a) exactly 3 individuals will suffer a bad reaction (b) none will suffer a bad reaction (c) more than one individual will suffer (d) more than two individual will suffer	CO-3	L5
9.	Given the following data on sales and purchase Sales: 91 | 97 | 108 | 121 | 67 | 124 | 51 | 73 | 111 | 57 Purchase: 71 | 75 | 69 | 97 | 70 | 91 | 39 | 61 | 80 | 47 (a) Obtain regression equations Y on X and X on Y. (b) Calculate coefficient of correlation. (c) Estimate Y when X is 88 and X when Y is 56.	CO-4	L3

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Roll No. | | | | | | | | | | | | | Total No. of Pages: 02

Total No. of Questions:09

B.Tech (CSE/AIML/AIDS/IOT/CSE-DS/CYBER SECURITY/RAI), Semester- 3rd

OBJECT ORIENTED PROGRAMMING

Subject Code: - BTCS302-18

M.Code: 76437

Date of Examination: 12-12-2025

Time: 3 Hrs. Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	What is the use of the modulus (%) operator in C++?	CO-1	L1
b.	Explain the difference between while loop and do while loop with syntax.	CO-1	L2
c.	Show how a parameterized constructor can be used to initialize the objects.	CO-2	L1
d.	Explain a constructor in C++.	CO-2	L2
e.	Define ambiguity in inheritance.	CO-3	L1
f.	Demonstrate how a derived class access private members of a base class? Justify your answer.	CO-3	L2
g.	When is early binding used in C++?	CO-4	L1
h.	Compare compile-time and run-time polymorphism.	CO-4	L2
i.	Define a stream and explain how it simplifies I/O operations.	CO-5	L1
j.	Demonstrate the role of fstream in performing both input and output.	CO-5	L2
	SECTION-B		
2.	Compare significance of the public, private, and protected access specifiers in a class? Explain with an example.	CO-1	L4
3.	Construct a Counter class with a static data member to keep track of the number of objects created.	CO-2	L3
4.	Evaluate the different types of inheritance, why hybrid inheritance is considered more complex than other types.	CO-3	L5
5.	Examine the concept of late binding in C++, explaining how it operates when a derived class overrides a base class function.	CO-4	L4
6.	Explain File pointer and various functions for manipulation of file pointer. Justify your explanation with a program.	CO-5	L5

SECTION-C			
7.	Justify the use of friend functions over member functions in operator overloading. Support your justification with a suitable C++ example and evaluate the situations where friend functions provide greater flexibility.	CO-2	L5
8.	Analyze the effect of access specifiers (public, protected, private) on reusability, flexibility, and extensibility of derived classes. In your opinion, which access mode leads to better design practices? Justify your evaluation with reasons.	CO-3	L4
9.	Evaluate the role of polymorphism in C++ by comparing early and late binding with examples.	CO-4	L5

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Total No. of Pages: 02 **Total No. of Questions: 09**

B.Tech (CSE/AIML/AIDS/IOT/CSE DS/CS/RAI), Semester 3rd

DATA STRUCTURE & ALGORITHMS

Subject Code: BTCS-301-18

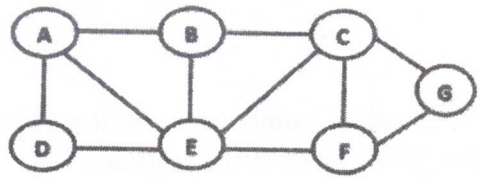
M.Code: 76436

Date of Examination: 09-12-2025

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	List basic operations performed on data structures.	CO-1	L1
b.	Explain what a Priority Queue is and describe how it differs from a normal queue.	CO-1	L2
c.	List how Stacks and Queues are represented in data structure.	CO-2	L1
d.	Explain why stack is called a LIFO data structure.	CO-2	L2
e.	State the properties of a Binary Search Tree (BST).	CO-3	L1
f.	Differentiate between min-heap and max-heap with an example.	CO-3	L2
g.	Define chaining as a method for handling collisions in hashing with example.	CO-4	L1
h.	Contrast and compare between Linear Search and Binary Search .	CO-4	L2
i.	Define path and loop in a graph.	CO-5	L1
j.	Illustrate two real-world applications of graphs with example.	CO-5	L2
	SECTION-B		
2.	Construct a stack using a linked list. Push 10, 20, 30, 40 and show the step by step insertion structure with diagram along with the corresponding algorithm.	CO-1	L3
3.	Solve the given array with quick sort and write algorithm to explain all steps. 55, 47, 88, 12, 30, 99, 23, 65, 71	CO-2	L3
4.	Elaborate the concept of BFS traversal of the following graph with 'A' as the source vertex and also write algorithm for it. 	CO-3	L5

5.	Analyze how Insertion Sort works by illustrating each iteration on given elements [8, 3, 5, 4, 7, 6, 2] and explain with algorithm how elements are compared and shifted.	CO-4	L4
6.	Develop an algorithm to insert an element into a queue, in which the queue is implemented as linked list.	CO-5	L6
	SECTION-C		
7.	Categorize the various arithmetic expressions using example. Convert the following infix expression into postfix notation using stack and write algorithm to explain all steps. (A + B) * (C ^ D - E) ^ (F + G * H) - I	CO-1	L4
8.	Compare and contrast stack and queue data structures. Explain their working principles, operations (push, pop, enqueue, dequeue) and applications with neat diagrams.	CO-3	L4
9.	Explain collision resolution in hashing using the separate chaining technique. Using a hash table of size 10 and the hash function h(k) = k mod 10, insert the keys: 12, 22, 32, 42, 15. Draw the hash table showing how collisions are handled. Discuss the advantages and disadvantages of separate chaining.	CO-4	L5

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Total No. of Pages: 02 Total No. of Questions: 09

B.Tech (AIDS/AIML/CSE/CSE DS/CS/IOT/IT/RAI), Semester-3rd

DIGITAL ELECTRONICS

Subject Code: BTES 301-18

M.Code:76435

Date of Examination: 06-12-2025

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Find the hexadecimal equivalent of octal number $(651.124)_8$.	CO-1	L1
b.	Illustrate addition of $(1101)_2$ and $(1010)_2$ using 1's complement method.	CO-1	L2
c.	List any 4 type of min-term implicants and write down examples for each.	CO-2	L1
d.	Show a logic circuit for expression A'BC +A C.	CO-2	L2
e.	What is the use of a de-multiplexer as a logic element?	CO-3	L1
f.	Explain the main role and the use of parity checker.	CO-3	L2
g.	Explain in brief about asynchronous counter.	CO-4	L2
h.	Illustrate the difference between volatile and Non-Volatile Memory.	CO-5	L2
i.	Classify various D/A conversion techniques.	CO-6	L2
j.	Define the term quantization error in ADC.	CO-6	L1
	SECTION-B		
2.	Solve XS-3 addition of these two decimal numbers 56 and 31.	CO-1	L3
3.	Simplify the following function in SOP form $f(A,B,C,D)=\Pi M(0,2,4,6,8,10,12,14) + d(1,11,13,15)$	CO-2	L4
4.	Solve the following function with 8:1 MUX $F(A,B,C,D)=\sum m(1,3,4,11,12,13,14,15)$.	CO-3	L3

5.	Identify the operation of JK flip flop using excitation table.	CO-4	L3
6.	Apply the concept of quantization error in ADCs.	CO-6	L3
	SECTION-C		
7.	Simplify $(1000111.10011)_2$ binary number into decimal, then back to binary. Analyze and compare whether the result is identical to the original.	CO-1	L4
8.	Discuss and design the working of mod-6 counter in detail using K map.	CO-4	L6
9.	Elaborate the organization, working principle, and applications of ROM, PROM, EPROM, and EEPROM.	CO-5	L6

Note: Disclosure of identity by writing mobile number or making of passing request on any paper of Answer Sheet will lead to UMC against the student.

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Total No. of Pages: 02 **Total No. of Questions: 09**

B.Tech (CSE/RAI/IOT/AIDS/AIML/CSE DS/CS), Semester 3rd

DEVELOPMENT OF SOCIETIES

Subject Code: HSMC101-18

M.Code: 76439

Date of Examination: 29-11-2025

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	"Clan is a group of people having similar thought process". Recall it.	CO-1	L1
b.	Explain how the family system contributed to the development of clans.	CO-1	L2
c.	What do you understand by the industrial social system?	CO-2	L1
d.	Demonstrate briefly how clans gave rise to larger societies.	CO-2	L2
e.	How does a one-party system affect the freedom of citizens?	CO-3	L1
f.	Compare Bureaucracy and Aristocracy with respect to governing system.	CO-3	L2
g.	List any two characteristics of marxism given by Karl Marx.	CO-4	L1
h.	Compare Pre-British and British economic structures in India.	CO-4	L2
i.	List the features of socialist economy.	CO-5	L1
j.	Explain human scale development with example.	CO-5	L2
	SECTION-B		
2.	"Individuals are charcterized as patterns of society." Discover it.	CO-1	L4
3.	Identify how the biological needs of human beings contributed to the formation of families.	CO-2	L3
4.	Determine the concept of governance in bureaucracy and explain in detail its advantages and disadvantages.	CO-3	L5
5.	Categorize Gandhian decentralization and swaraj with current centralized planning models.	CO-4	L4
6.	Compare buddhist economics and traditional economics with respect to economic development.	CO-5	L5
	SECTION-C		
7.	Analyze how kinship and blood relations shaped the transition from families to clans.	CO-1	L4

8.	Analyze the key differences between capitalist, socialist, and mixed models of governance in terms of political and economic control.	CO-3	L4
9.	Interpret the effectiveness of India's post-independence industrial strategies in transforming a colonial economy into a self-reliant and diversified economic system.	CO-4	L5

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Roll No. | | | | | | | | | | | | | | Total No. of Pages: 02

Total No. of Questions: 09

B.Tech (CSE /AIML / AIDS /IOT /DS), Semester: 4th

OPERATING SYSTEMS

Subject Code: BTCS-402-18

M. Code: 77628

Date of Examination: 29-11-2025

Time: 3 Hrs. Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

Q. No.	Questions	Course Outcomes	Bloom's Level
	SECTION-A		
1.	**Answer briefly:**		
a.	Define soft RTS.	CO1	L1
b.	Outline any two advantages of LINUX operating systems.	CO1	L2
c.	What do you mean by PCB?	CO2	L1
d.	Illustrate the critical section problem in brief.	CO2	L2
e.	What is convoy effect?	CO3	L1
f.	Compare and Contrast between preemptive and non-preemptive scheduling?	CO3	L2
g.	Explain any two characteristics of virtual memory concept.	CO4	L2
h.	Explain the term file system in brief.	CO5	L2
i.	Summarize the need of I/O traffic controller.	CO6	L2
j.	What is meant by seek time and rotational latency in case of disk drive?	CO6	L1

	SECTION-B		
2.	Make use of a block diagram to discuss the layered structure of an Operating System.	CO1	L3
3.	Examine the role of scheduler in detail. Differentiate among short, medium and long term scheduler.	CO2	L4
4.	Explain the concept of deadlock in Operating System and interpret the four necessary conditions for a deadlock situation to arise.	CO3	L5
5.	A block manager for a variable size region strategy has a free list of blocks of size 600, 1400, 1000, 2200, 1600 and 1050 bytes. Elaborate, which block size will be selected to honor a request for 1605 bytes using best fit policy.	CO4	L6
6.	Analyze the concept of disk scheduling by discussing SSTF, C-SCAN disk scheduling algorithm with the help of an example.	CO6	L4
	SECTION-C		
7.	Consider the following set of processes, with the length of the CPU-burst time given in milliseconds: Process | Burst Time | Arrival time P1 | 5 | 0 P2 | 3 | 1 P3 | 1 | 2 P4 | 3 | 3 P5 | 5 | 4 The processes are assumed to have arrived in the order P1, P2, P3, P4, and P5. a. Apply FCFS and preemptive SJF (Shortest Job First) to draw two Gantt charts illustrating the execution of these processes. b. What is the turnaround time of each process for each of the scheduling algorithms in part a? c. What is the waiting time of each process for each of the scheduling algorithms in part a?	CO3	L3
8.	Discover the number of page faults using First in First Out (FIFO) and Least Recently Used(LRU) page replacement algorithm for given series of page references if the size of frame is 4. 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1	CO4	L4
9.	Explain the Contiguous, Linked and Indexed methods of file allocation in detail with the help of an example.	CO5	L5.

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Roll No. | | | | | | | | | | | |

Total No. of Pages: 02

Total No. of Questions: 09

B.Tech (CSE/AIML/AIDS/DS/IoT), Semester: 4th

COMPUTER ORGANIZATION AND ARCHITECTURE

Subject Code: BTES - 401-18

M. Code: 77627

Date of Examination: 24-11-2025

Time: 3 Hrs.

Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

Q. No.	Questions	Course Outcomes	Bloom's Level
	SECTION-A		
1.	**Answer briefly:**		
a.	What is an interrupt?	CO1	L1
b.	Illustrate the significance of address and data bus.	CO1	L2
c.	What is the advantage of using carry look-ahead adder?	CO2	L1
d.	What is the role of cache memory?	CO5	L1
e.	Define the function of flag register in 8085 MP.	CO1	L1
f.	Explain the concept of memory interleaving.	CO5	L2
g.	Infer how many address lines are required to address the 1000 memory locations.	CO5	L2
h.	What is a control unit ?	CO3	L1
i.	Outline the usage of parallel processing.	CO4	L2
j.	What is a privileged instruction?	CO3	L1

	SECTION-B		
2.	Analyze the Flynn's classification of the processors with appropriate diagrams.	CO4	L4
3.	Evaluate the micro programmed and hardwired design approaches of a control unit.	CO3	L5
4.	Identify the various addressing modes of microprocessor 8085 and select an appropriate instruction to explain each.	CO2	L3
5.	Examine any four memory replacement algorithms with appropriate examples.	CO5	L4
6.	By examining the instruction format and its constituent parts, categorise the instructions according to their size.	CO2	L4
	SECTION-C		
7.	Construct an architectural diagram of microprocessor 8085 and explain in detail.	CO1	L3
8.	Choose an appropriate diagram to design a hypothetical CPU and also identify the role of each part.	CO3	L6
9.	Explain the basic concept of pipelining with a real life example and derive the expressions for throughput and speedup.	CO4	L5

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Roll No. | | | | | | | | | | | | | | Total No. of Pages: 2

Total No. of Questions: 09

B.Tech (CSE/IT/AIML/AIDS/DS/IOT), Semester- 4th

DISCRETE MATHEMATICS

Subject Code: BTCS-401-18

M.Code: 77626

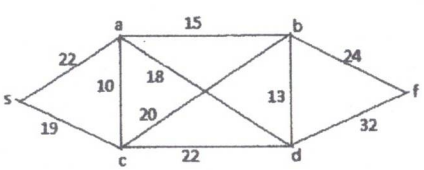
Date of Examination: 11-12-2025

Time: 3 Hrs. Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying two marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

Q. No.	Questions	Course Outcome	Bloom's Level
	SECTION-A		
1.	**Answer briefly:**		
a.	Define equivalent sets with example.	CO1	L1
b.	Explain the domain and range of the relation $R=\{(x,y):x\in N, x<5, y=3\}$.	CO1	L2
c.	From 5 consonants and 4 vowels, how many words can be constructed using 3 consonants and 2 vowels?	CO2	L1
d.	Explain pigeonhole principle.	CO2	L2
e.	Show that $(p\wedge q)\rightarrow p$ is a tautology.	CO3	L1
f.	Explain the Converse and Contrapositive of the implication "if it snows tonight, then I will stay at home".	CO3	L2
g.	Define an abelian group.	CO4	L1
h.	Explain commutative ring with unity with example.	CO4	L2
i.	Does there exists a simple graph with six vertices of degrees 1,1,3,4,6,7? Explain.	CO5	L2
j.	What will be the chromatic number of complete graph with n - vertices?	CO5	L1

	SECTION-B		
2.	Examine whether intersection of two partial order relations is a partial order relation. But union of two partial order relations need not be a partial order relation. Give suitable example.	CO1	L4
3.	a) Examine how many people must you have to guarantee that at least 12 of them will have birthday on the same day of the week? b) Find the number of positive integers from 1 to 1000 which are divisible by none of 5,6 and 8.	CO2	L4
4.	a)Construct the truth table for $(p\wedge q)\vee r=(p\vee r)\wedge(q\vee r)$ b) Test the validity of the following argument: If a man is bachelor, he is unhappy. If a man is unhappy, he dies young. Therefore bachelors die young.	CO3	L3
5.	Solve the set C* of all non-zero complex numbers form an infinite abelian group under the operation of multiplication of complex numbers.	CO4	L3
6.	a) Prove that sum of degree of all vertices in a graph is equal to twice the number of edges in G b) Prove that in a graph the number of vertices of odd degree is even.	CO5	L5
	SECTION-C		
7.	Let $f:R\rightarrow R$ and $g:R\rightarrow R$ be a real valued functions defined by $f(x)=2x^3-1, x\in R$ and $g(x)=\left(\frac{x+1}{2}\right)^{1/3}, x\in R$. Examine whether f and g is inverse of each other?	CO1	L4
8.	Prove that a finite integral domain is a field.	CO4	L5
9.	Estimate shortest path from s to f for the following graph: 	CO5	L6

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Total No. of Questions: 11

B. Tech (CSE/ECE/AIML/AIDS/DS/IOT), Semester 4th

UNIVERSAL HUMAN VALUES/ UNIVERSAL HUMAN VALUES-II

Subject Code: HSMC-122-18

M. Code: 77630/91979

Date of Examination: 19-11-25

Time: 3 Hrs. Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying ONE marks each.
2. SECTION-B contains FIVE questions carrying FOUR marks each and students have to attempt all the questions.
3. SECTION C contains FIVE questions carrying SIX marks each and students have to attempt all the questions.

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	How can you maintain harmony in relationship? आप रिश्ते में सामंजस्य कैसेबनाए रख सकते हैं? ਤੁਸੀਂ ਰਿਸ਼ਤੇ ਵਿੱਚ ਸਦਭਾਵਨਾ ਕਿਵੇਂਬਣਾਈ ਰੱਖ ਸਕਦੇ ਹੋ?	CO1	L1
b.	Outline the basic guidelines for value education. मूल्य शिक्षा के लिए बुनियादी दिशा-निर्देशों की रूपरेखा तैयार करें। ਮੁੱਲ ਸਿੱਖਿਆ ਲਈ ਬੁਨਿਆਦੀ ਦਿਸ਼ਾ-ਨਿਰਦੇਸ਼ਾਂ ਦੀ ਰੂਪ ਰੇਖਾ ਤਿਆਰ ਕਰੋ।	CO1	L2
c.	List the problems that we are facing today because of operating on the basis of pre-conditioned desires and sensation. पूर्व-निर्धारित इच्छाओं और संवेदना के आधार पर काम करने के कारण आज हम जिन समस्याओं का सामना कर रहे हैं, उन्हें सूचीबद्ध करें। ਉਨ੍ਹਾਂ ਸਮੱਸਿਆਵਾਂ ਦੀ ਸੂਚੀ ਬਣਾਓ ਜਿਨ੍ਹਾਂ ਦਾ ਅਸੀਂ ਅੱਜ ਸਾਹਮਣਾ ਕਰ ਰਹੇ ਹਾਂ ਕਿਉਂਕਿ ਅਸੀਂ ਪਹਿਲਾਂ ਤੋਂ ਨਿਰਧਾਰਤ ਇੱਛਾਵਾਂ ਅਤੇ ਸੰਵੇਦਨਾ ਦੇ ਅਧਾਰ 'ਤੇ ਕੰਮ ਕਰ ਰਹੇ ਹਾਂ।	CO2	L1
d.	Interpret, how do we go into conflicts when our activities are not guided by our natural acceptance. व्याख्या करें, हम संघर्षों में कैसे जाते हैं जब हमारी गतिविधियाँ हमारी स्वाभाविक स्वीकृति से निर्देशित नहीं होती हैं। ਵਿਆਖਿਆ ਕਰੋ, ਅਸੀਂ ਟਕਰਾਅ ਵਿੱਚ ਕਿਵੇਂ ਜਾਂਦੇ ਹਾਂ ਜਦੋਂ ਸਾਡੀਆਂ ਗਤੀਵਿਧੀਆਂ ਸਾਡੀ ਕੁਦਰਤੀ ਪ੍ਰਵਾਨਗੀ ਦੁਆਰਾ ਨਿਰਦੇਸ਼ਿਤ ਨਹੀਂ ਹੁੰਦੀਆਂ।	CO2	L2

e.	What is prosperity? Is it different from happiness? समृद्धि क्या है? क्या यह खुशी से अलग है? ਖੁਸ਼ਹਾਲੀ ਕੀ ਹੈ? ਕੀ ਇਹ ਖ਼ੁਸ਼ੀ ਤੋਂ ਵੱਖਰਾ ਹੈ?	CO3	L1
f.	Infer natural acceptance of human values. मानवीय मूल्यों की स्वाभाविक स्वीकृति। ਮਨੁੱਖੀ ਕਦਰਾਂ-ਕੀਮਤਾਂ ਦੀ ਕੁਦਰਤੀ ਪ੍ਰਵਾਨਗੀ।	CO3	L2
g.	Summarize what humanistic education is all about. संक्षेप में बताइए कि मानवतावादी शिक्षा क्या है। ਸੰਖੇਪ ਵਿੱਚ ਦੱਸੋ ਕਿ ਮਨੁੱਖਤਾਵਾਦੀ ਸਿੱਖਿਆ ਕੀ ਹੈ।	CO4	L2
h.	Explain natural acceptance of human values. मानवीय मूल्यों की स्वाभाविक स्वीकृति की व्याख्या कीजिए। ਮਨੁੱਖੀ ਕਦਰਾਂ-ਕੀਮਤਾਂ ਦੀ ਕੁਦਰਤੀ ਪ੍ਰਵਾਨਗੀ ਦੀ ਵਿਆਖਿਆ ਕਰੋ।	CO4	L2
i.	Illustrate the term self-regulation in nature. प्रकृति में स्व-नियमन शब्द का चित्रण करें। ਕੁਦਰਤ ਵਿੱਚ ਸਵੈ-ਨਿਯੰਤ੍ਰਣ ਸ਼ਬਦ ਦੀ ਵਿਆਖਿਆ ਕਰੋ।	CO5	L2
j.	Define Ethical Human Conduct. नैतिक मानव आचरण को परिभाषित कीजिए। ਨੈਤਿਕ ਮਨੁੱਖੀ ਆਚਰਣ ਨੂੰ ਪਰਿਭਾਸ਼ਿਤ ਕਰੋ।	CO5	L1
	SECTION-B		
2.	Utilize harmony in nature and identify the meaning of co-existence with nature. प्रकृति में सामंजस्य का उपयोग करें और प्रकृति के साथ सह-अस्तित्व के अर्थ की पहचान करें। ਕੁਦਰਤ ਵਿੱਚ ਸਦਭਾਵਨਾ ਦੀ ਵਰਤੋਂ ਕਰੋ ਅਤੇ ਕੁਦਰਤ ਦੇ ਨਾਲ ਸਹਿ-ਹੋਂਦ ਦੇ ਅਰਥ ਦੀ ਪਛਾਣ ਕਰੋ।	CO1	L3
3.	"Skills and Human Values are Complementary". Analyze this statement with example. "कौशल और मानवीय मूल्य पूरक हैं।" उदाहरण के साथ इस कथन का विश्लेषण करें। "ਹੁਨਰ ਅਤੇ ਮਨੁੱਖੀ ਕਦਰਾਂ-ਕੀਮਤਾਂ ਪੂਰਕ ਹਨ"। ਉਦਾਹਰਣ ਦੇ ਨਾਲ ਇਸ ਕਥਨ ਦਾ ਵਿਸ਼ਲੇਸ਼ਣ ਕਰੋ।	CO2	L4
4.	Elaborate the five dimensions of human endeavor and how they are helpful in achieving comprehensive human goals. Also explain the state of society today in terms of fulfilment of comprehensive human goal. मानव प्रयास के पाँच आयामों का विस्तार से वर्णन करें कि वे व्यापक मानव लक्ष्यों को प्राप्त करने में कैसे सहायक हैं। व्यापक मानव लक्ष्य की पूर्ति के संदर्भ में आज समाज की स्थिति की भी व्याख्या करें। ਮਨੁੱਖੀ ਯਤਨਾਂ ਦੇ ਪੰਜ ਪਹਿਲੂਆਂ ਅਤੇ ਉਹ ਵਿਆਪਕ ਮਨੁੱਖੀ ਟੀਚਿਆਂ ਨੂੰ ਪ੍ਰਾਪਤ ਕਰਨ ਵਿੱਚ ਕਿਵੇਂ ਮਦਦਗਾਰ ਹਨ, ਬਾਰੇ ਵਿਸਤਾਰ ਨਾਲ ਦੱਸੋ।	CO3	L5

	ਵਿਆਪਕ ਮਨੁੱਖੀ ਟੀਚੇ ਦੀ ਪੂਰਤੀ ਦੇ ਸੰਦਰਭ ਵਿੱਚ ਅੱਜ ਸਮਾਜ ਦੀ ਸਥਿਤੀ ਦੀ ਵੀ ਵਿਆਖਿਆ ਕਰੋ।		
5.	List the four orders of nature. Also, analyze the interconnectedness and mutual fulfilment in four orders of nature with examples. प्रकृति के चार क्रमों की सूची बनाएँ। इसके अलावा, उदाहरणों के साथ प्रकृति के चार क्रमों में परस्पर जुड़ाव और आपसी पूर्ति का विश्लेषण करें। ਕੁਦਰਤ ਦੇ ਚਾਰ ਆਦੇਸਾਂ ਦੀ ਸੂਚੀ ਬਣਾਓ। ਨਾਲ ਹੀ, ਉਦਾਹਰਣਾਂ ਦੇ ਨਾਲ ਕੁਦਰਤ ਦੇ ਚਾਰ ਕ੍ਰਮ ਵਿੱਚ ਪਰਸਪਰ ਸੰਬੰਧਾਂ ਅਤੇ ਆਪਸੀ ਪੂਰਤੀ ਦਾ ਵਿਸ਼ਲੇਸ਼ਣ ਕਰੋ।	CO4	L4
6.	Apply ethical principles to identify current issues in professional ethics and list five unethical practices along with the methods used to curb them. पेशेवर नैतिकता में वर्तमान मुद्दों की पहचान करने के लिए नैतिक सिद्धांतों को लागू करें और उन पर अंकुश लगाने के लिए उपयोग किए जाने वाले तरीकों के साथ पांच अनैतिक प्रथाओं को सूचीबद्ध करें। ਪੇਸ਼ੇਵਰ ਨੈਤਿਕਤਾ ਵਿੱਚ ਮੌਜੂਦਾ ਮੁੱਦਿਆਂ ਦੀ ਪਛਾਣ ਕਰਨ ਲਈ ਨੈਤਿਕ ਸਿਧਾਂਤਾਂ ਨੂੰ ਲਾਗੂ ਕਰੋ ਅਤੇ ਉਨ੍ਹਾਂ ਨੂੰ ਰੋਕਣ ਲਈ ਵਰਤੇ ਜਾਣ ਵਾਲੇ ਤਰੀਕਿਆਂ ਦੇ ਨਾਲ ਪੰਜ ਅਨੈਤਿਕ ਅਭਿਆਸਾਂ ਦੀ ਸੂਚੀ ਬਣਾਓ।	CO5	L3
	SECTION-C		
7.	Explain in detail various basic requirements to fulfil human aspiration. मानव आकांक्षाओं को पूरा करने के लिए विभिन्न बुनियादी आवश्यकताओं को विस्तार से समझाइए। ਮਨੁੱਖੀ ਇੱਛਾਵਾਂ ਨੂੰ ਪੂਰਾ ਕਰਨ ਲਈ ਵੱਖ-ਵੱਖ ਬੁਨਿਆਦੀ ਜ਼ਰੂਰਤਾਂ ਬਾਰੇ ਵਿਸਥਾਰ ਵਿੱਚ ਦੱਸੋ।	CO2	L5
8.	Identify the differences between human and animal consciousness, and how 'shiksha' and 'sanskar' help transform a person toward human consciousness. मानव और पशु चेतना के बीच अंतर की पहचान करें, और कैसे 'शिक्षा' और 'संस्कार' एक व्यक्ति को मानव चेतना की ओर बदलने में मदद करते हैं। ਮਨੁੱਖੀ ਅਤੇ ਪਸ਼ੂ ਚੇਤਨਾ ਦਰਮਿਆਨ ਅੰਤਰਾਂ ਦੀ ਪਛਾਣ ਕਰੋ, ਅਤੇ ਕਿਵੇਂ 'ਸਿੱਖਿਆ' ਅਤੇ 'ਸੰਸਕਾਰ' ਇੱਕ ਵਿਅਕਤੀ ਨੂੰ ਮਨੁੱਖੀ ਚੇਤਨਾ ਵੱਲ ਬਦਲਣ ਵਿੱਚ ਮਦਦ ਕਰਦੇ ਹਨ।	CO3	L3
9.	Determine the concept of an undivided society and the universal order and explain how both these can help to create a world family. एक अविभाजित समाज और सार्वभौमिक व्यवस्था की अवधारणा का निर्धारण करें और समझाएं कि ये दोनों कैसे एक विश्व परिवार बनाने में मदद कर सकते हैं।	CO4	L5

	ਇੱਕ ਅਟੁੱਟ ਸਮਾਜ ਅਤੇ ਸਰਬਵਿਆਪੀ ਵਿਵਸਥਾ ਦੀ ਧਾਰਨਾ ਨੂੰ ਨਿਰਧਾਰਤ ਕਰੋ ਅਤੇ ਸਮਝਾਓ ਕਿ ਇਹ ਦੋਵੇਂ ਇੱਕ ਵਿਸ਼ਵ ਪਰਿਵਾਰ ਬਣਾਉਣ ਵਿੱਚ ਕਿਵੇਂ ਮਦਦ ਕਰ ਸਕਦੇ ਹਨ।		
10.	Analyze the universal human order and examine your role in progressing toward it. सार्वभौमिक मानव व्यवस्था का विश्लेषण करें और इस दिशा में आगे बढ़ने में अपनी भूमिका की जांच करें। ਸਰਬਵਿਆਪੀ ਮਨੁੱਖੀ ਵਿਵਸਥਾ ਦਾ ਵਿਸ਼ਲੇਸ਼ਣ ਕਰੋ ਅਤੇ ਇਸ ਵੱਲ ਵਧਣ ਵਿੱਚ ਆਪਣੀ ਭੂਮਿਕਾ ਦੀ ਜਾਂਚ ਕਰੋ।	CO5	L4
11.	Explain self-organization and health. Evaluate their role in achieving the harmony in nature. स्व-संगठन और स्वास्थ्य की व्याख्या कीजिए। प्रकृति में सामंजस्य प्राप्त करने में उनकी भूमिका का मूल्यांकन करें। ਸਵੈ-ਸੰਗਠਨ ਅਤੇ ਸਿਹਤ ਦੀ ਵਿਆਖਿਆ ਕਰੋ। ਕੁਦਰਤ ਵਿੱਚ ਸਦਭਾਵਨਾ ਪ੍ਰਾਪਤ ਕਰਨ ਵਿੱਚ ਉਹਨਾਂ ਦੀ ਭੂਮਿਕਾ ਦਾ ਮੁਲਾਂਕਣ ਕਰੋ।	CO1	L5

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Total No. of Pages: 02 **Total No. of Questions: 09**

B.Tech (AIML/AIDS/ IOT/CSE-DS), Semester 5th

PROGRAMMING IN PYTHON

Subject Code: BTAIML 501-20

M.Code: 93173/93939/92370/92344

Date of Examination: 04 -12-2025

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Outline the practical applications of Python in Data Science and Machine Learning.	CO-1	L2
b.	Compare mutable and immutable data types with examples.	CO-1	L2
c.	Show the use of the input() function in Python.	CO-2	L1
d.	Demonstrate the syntax of a nested for loop in Python.	CO-2	L2
e.	Show Python code for extracting all digits from a given a string "Python123is45fun".	CO-3	L1
f.	Explain the term lambda function with a basic example.	CO-3	L2
g.	Define exception handling.	CO-4	L1
h.	Compare text mode and binary mode in file handling.	CO-4	L2
i.	Explain the role of self in designing Python classes.	CO-5	L2
j.	Show Python code to display the current system date and time.	CO-5	L2
	SECTION-B		
2.	Develop a Python program that determines whether an integer is even, odd, zero or negative using operators and conditional statements.	CO-1	L3
3.	Analyse *if*, *if-else*, and *if-elif-else* statements in Python by supporting your explanation with code illustrations.	CO-2	L4
4.	Build a Python program to implement a simple calculator using functions for addition, subtraction, multiplication, and division. Identify how function decomposition helps in code modularity.	CO-3	L3

5.	Explain the concept of Object-Oriented Programming (OOP) by writing code in Python with focus on classes and objects. Determine how attributes and methods are defined, accessed and modified.	CO-4	L5
6.	Explain the concept of data compression in Python. Examine the commonly used modules for compression and decompression of files.	CO-5	L5
	SECTION-C		
7.	Analyse Python operators and expressions by building code for computing the total bill amount for the given scenario: An electricity board charges: ₹5 per unit for the first 100 units, ₹8 per unit for the next 100 units and ₹10 per unit for units above 200. Print the total bill amount for a household consuming 275 units.	CO-1	L4
8.	Identify the difference between pass by value and pass by reference in Python by writing a program that modifies a List and Tuple inside a function.	CO-3	L3
9.	Compare the difference between built-in exceptions and user-defined exceptions in Python. Write examples for both and explain situations where user-defined exceptions are preferable.	CO-4	L5

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Total No. of Pages: 02

Total No. of Questions: 09

B.Tech (CSE/IOT), Semester-5th

COMPUTER NETWORKS

Subject Code: BTCS-504-18

M.Code: 78323/92362

Date of Examination: 27-11-2025

Time: 3 Hrs.

Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Define Frequency division multiplexing (FDM) and Wave division multiplexing (WDM).	CO-1	L1
b.	Summarize the purpose of spread spectrum techniques in communication.	CO-1	L2
c.	Define Byte stuffing. Given the stuffed frame, Frame: FLAG A B DLE DLE C D FLAG. Apply byte unstuffing to recover the original data sequence.	CO-2	L1
d.	How does a MAC address differ from an IP address in computer networks?	CO-2	L2
e.	Define Subnetting and Supernetting with an example.	CO-3	L1
f.	How can a system administrator use the loopback address to troubleshoot local networking issues?	CO-3	L2
g.	Write about link state routing.	CO-4	L2
h.	Illustrate checksum in the context of UDP, and write its function.	CO-5	L2
i.	What is the purpose of the Domain Name System?	CO-6	L2
j.	Outline the difference between HTTP and HTTPS.	CO-6	L1
	SECTION-B		
2.	Identify the strengths and weaknesses of different network topologies and justify which one is most suitable for a large-scale enterprise?	CO-1	L3
3.	Compare symmetric and asymmetric cryptography with examples. Explain how each type performs encryption and decryption, and describe scenarios where each is preferred?	CO-6	L4
4.	Interpret the structure and classes of IPv4 addressing and justify their effectiveness in modern networking.	CO-3	L5

5.	Determine the responsibilities of the transport layer in the OSI model and explain how it ensures reliable process-to-process communication?	CO-4	L5
6.	A sender wants to transmit the dataword 101110 using the generator polynomial $G(x) = x^3 + x + 1$ (binary 1011). Apply binary division to compute the CRC remainder. Write the final transmitted codeword. Verify at the receiver side whether the received codeword 101110111 contains any error.	CO-2	L3
	SECTION-C		
7.	Identify the concept of Pure ALOHA and Slotted ALOHA protocols for channel access in networks. Compare their efficiency, throughput, and collision handling, and justify which protocol performs better under heavy network traffic with an example?	CO-2	L3
8.	Examine the key network problems that can be addressed by congestion control algorithms. Explain how these algorithms help prevent packet loss, reduce delays, and maintain network performance, and provide examples of scenarios where they are applied?	CO-4	L4
9.	Assess the effectiveness of UDP in process-to-process communication. Judge its advantages and limitations compared to TCP, and justify why it is preferred for certain applications like VoIP or video streaming?	CO-5	L5

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Total No. of Pages: 2 Total No. of Questions: 09

B.Tech IOT, Semester-5th

INFORMATION THEORY AND CODING

Subject Code: BTES 504-20

M.Code: 92358

Date of Examination: 22-11-2025

Time: 3 Hrs. Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	What is meant by mutual information in Information Theory?	CO-1	L1
b.	Infer the entropy value for a binary source that produces symbols with probabilities 0.6 and 0.4, showing the calculation steps.	CO-1	L2
c.	How is the error-correcting capability of a code mathematically related to its minimum distance?	CO-2	L1
d.	Summarize the applications of block codes in error control.	CO-2	L2
e.	Define error-trapping decoding applied in cyclic codes to identify errors.	CO-3	L1
f.	How does Go-Back-N ARQ protocol ensure reliable communication in case of errors?	CO-3	L2
g.	List the main advantages of convolutional coding adopted in modern communication systems.	CO-4	L1
h.	Outline the state diagram for a (2,1,3) convolutional code.	CO-4	L2
i.	What is a primitive polynomial in BCH coding related to code construction over Galois fields?	CO-5	L1
j.	Explain the concept of the generator polynomial of BCH codes used in encoding.	CO-5	L2
	SECTION-B		
2.	Analyze the mathematical model of information and inspect how it represents the communication process.	CO-1	L4
3.	Identify the concept of a generator matrix in coding theory and its role in generating valid code words for block and cyclic codes.	CO-2	L3

4.	Deduct a (7,4) cyclic code using the generator polynomial g(x) = x^3 + x + 1. Encode the message 1101.	CO-3	L5
5.	Analyze all output steps for a convolutional encoder with generators g1=(1,1,1) and g2=(1,0,1). Encode the input sequence 1101.	CO-4	L4
6.	Interpret how to decode a received word with one error using the standard BCH decoding steps for a (7, 4) BCH code.	CO-5	L5
	SECTION-C		
7.	Inference different types of errors in digital communication (random, burst) and discuss error detection/correction strategies with examples.	CO-1	L4
8.	Inspect the concept of majority-logic decoding in cyclic codes and examine its practical use in identifying and correcting errors in received codewords.	CO-3	L4
9.	Perceive Viterbi decoding using branch metrics and determine the most likely input sequence for a rate 1/2 convolutional code with g1=(1,1,1), g2=(1,0,1) if it receives the sequence: (11,10,01).	CO-4	L5

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Total No. of Pages:02 **Total No. of Questions: 09**

B.Tech (IOT), Semester 5th

INTERNET OF THINGS

Subject Code: BTITCS-501-20

M.Code: 92361

Date of Examination: 01-12-2025

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Recall the primary role of cloud in IoT.	CO-1	L1
b.	Explain the role of software components in IoT .	CO-1	L2
c.	Illustrate two IoT security aspects by showing how authentication and encryption protect device data.	CO-1	L2
d.	Define UDP in the context of IoT.	CO-2	L1
e.	Explain TCP with an example.	CO-2	L2
f.	Compare MQTT and CoAP protocols.	CO-2	L2
g.	Recall the purpose of data acquisition in IoT applications.	CO-3	L1
h.	Outline remote device control techniques by focusing on how cloud dashboards and mobile apps send commands to IoT devices in real time.	CO-3	L2
i.	Define home automation using IoT by mentioning smart lighting and temperature control.	CO-4	L1
j.	Compare IoT mini projects in transportation and agriculture.	CO-4	L2
	SECTION-B		
2.	Organize the main components of IoT architecture and briefly explain each.	CO-1	L3
3.	Classify I/O interfaces in IoT based on wired and wireless connectivity and provide examples for each.	CO-2	L4
4.	Explain the importance of data integration in enabling remote control of IoT devices.	CO-3	L5
5.	Identify the key components, such as sensors, actuators, and controllers, used in an IoT-based smart factory case study.	CO-4	L3

6.	Justify the use of cloud storage for managing unstructured data in IoT applications.	CO-3	L5
	SECTION-C		
7.	Identify the key functions of communication modules in interfacing sensors with IoT networks for a smart home lighting system and their roles in this system.	CO-2	L3
8.	Distinguish between cloud-based and local server storage for IoT device data management for a smart energy monitoring system and their contributions to data access.	CO-3	L4
9.	Explain the significance of IoT in transportation for a smart speed monitoring system and its role with traditional speed tracking methods.	CO-4	L5

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Total No. of Pages: 02 Total No. of Questions: 09

B.Tech (CSE/AIDS/AIML/IOT/CSE-DS), Semester 5th

FORMAL LANGUAGES AND AUTOMATA THEORY

Subject Code: BTCS502-18

M.Code: 78321/93172/93938/92360/92343

Date of Examination: 17-11-2025

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Recall about the acceptability of a string using DFA.	CO-1	L1
b.	Classify four tuples of a grammar G with the help of an example.	CO-1	L2
c.	Recall the difference between DFA and NFA. Give an example.	CO-2	L1
d.	Outline the steps for minimizing a finite automaton and summarize why minimization is required.	CO-2	L2
e.	When is a CFG said to be in GNF?	CO-3	L1
f.	Consider the grammar $S \rightarrow aAS \mid a$ $A \rightarrow SbA \mid SS \mid ba$ Show how the string aabbaa is generated and illustrate its derivation tree.	CO-3	L2
g.	Explain the importance of LBAs in formal language theory.	CO-4	L2
h.	Outline the closure properties of Turing-recognizable languages.	CO-5	L2
i.	Compare SAT and 3-SAT and prove that 3-SAT is NP-complete.	CO-6	L2
j.	State Rice's Theorem.	CO-6	L1
	SECTION-B		
2.	Identify the language $L= \{a^n b^n c^m d^m \mid n \geq 1, m \geq 1\}$ and categorize its structure by analyzing an appropriate grammar representation.	CO-1	L3
3.	Explain about Arden's theorem, for constructing the RE from given FA.	CO-2	L4
4.	Consider grammar with productions $E \rightarrow I$ $E \rightarrow E + E$ $E \rightarrow E * E$ $E \rightarrow (E)$ $I \rightarrow \varepsilon \mid 0 \mid 1 \mid \ldots \mid 9$ Determine whether the above grammar is ambiguous for the given string $\omega = 3*2+5$	CO-3	L5

5.	Construct a LBA which can accept L = $\{ww^R \mid w \text{ belongs to } \{0,1\}^*\}$	CO-4	L6
6.	Appraise the importance of polynomial reductions in classifying problems.	CO-6	L3
	SECTION-C		
7.	Identify the automata machines that accept different languages according to the Chomsky hierarchy.	CO-1	L3
8.	What is PDA? Identify how does a PDA handle the recognition of context free languages and what role does its stack play in this process.	CO-4	L3
9.	Evaluate a Turing Machine that recognizes all strings having equal numbers of 0's and 1's and conclude its correctness.	CO-5	L5

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