

[illegible]

Total No. of Questions : 09

Signal & Systems

M.Code : 96269

Date of Examination : 12-05-2026

Time : 3 Hrs.

Max. Marks : 60

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.

1. (a) Define deterministic and random signals.
- (b) Write the mathematical expression of a ramp signal.
- (c) What is the difference between power signal and energy signal?
- (d) Define a linear time-invariant (LTI) system.
- (e) What is Power Spectral Density (PSD)?
- (f) State any two properties of Fourier Transform.
- (g) Define Region of Convergence (ROC) in Z-transform.
- (h) What is a probability density function (PDF)?
- (i) Define stationary random process.
- (j) What is Z-transform of a discrete-time signal?



SECTION-B

2. Determine whether the given continuous-time signal is an energy signal or a power signal. Also compute its energy or power: $x(t) = 3e^{-2t}u(t) + 4\sin(100\pi t)u(t)$.
3. A periodic triangular wave has peak amplitude A , period T , and linear slope $\frac{4A}{T}$ over each half cycle. Determine the Fourier series coefficients of the signal. Sketch and analyze the frequency spectrum.
4. Calculate the Fourier Transform of the following discrete-time signals:
- (a) $u[n - 2] - u[n - 7]$
- (b) $\left(\frac{1}{4}\right)^{|n|} u[-n + 2]$
5. Determine the Z-transform and Region of Convergence (ROC) of the following sequences:
- (a) $x[n] = a^{-n}u[n], |a| < 1$
- (b) $x[n] = (-b)^n u[n], |b| > 1$
6. Determine the convolution sum $y[n] = x[n] * h[n]$ for the following discrete-time signal:
- $x[n] = \{1, 5, 3, 8\}, h[n] = \{1, 1, 1\}$.

SECTION-C

7. In a wireless communication system, the received signal strength X and noise power level Y are measured simultaneously and modeled as jointly continuous random variables. Their joint probability density function is given by:

$$f_{X,Y}(x,y) = \begin{cases} \frac{3}{2}(x+y), & \text{for } 0 < x < 1 \text{ and } 0 < y < 1, \\ 0, & \text{otherwise.} \end{cases}$$



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For this joint distribution, determine the marginal probability density functions $f_X(x)$ and $f_Y(y)$. Also, calculate the variances $\text{Var}(X)$ and $\text{Var}(Y)$.

8. A discrete-time LTI system is described by the difference equation:

$$y[n] + 0.5y[n-1] = x[n].$$

- (a) Determine the impulse response $h[n]$ of the system.
 - (b) Find the frequency response $H(e^{j\omega})$ using DTFT.
 - (c) Determine whether the system is stable.
 - (d) Compute the output $y[n]$ when the input is $x[n] = u[n]$.
9. Explain the time-scaling, frequency-shifting, differentiation, and integration properties of the Fourier Transform. Using appropriate properties, determine the Fourier Transform of the signal: $x(t) = te^{-at}u(t), a > 0$.

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Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

B.Tech. (AI & ML) (AI & DS) (CE) (CSE) (CSDn) (DS) (IOT) (EEE) (EE)
(ECE) (ETE) (ECS) (IT) (Robotics & Artificial Intelligence) (Cyber Security)
(Internet of Things and Cyber Security including Block Chain
Technology) (Block Chain) (ME) (FT) (Cyber Security) (Sem.-1)
ENGINEERING MATHEMATICS I

ENGINEERING MATHEMATICS-I

Subject Code : BTAM101-23

M.Code : 93796

Date of Examination : 01-06-2026

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. Attempt any **FIVE** questions from SECTION B & C carrying **EIGHT** marks each.
4. Select atleast **TWO** questions from SECTION - B & C.

SECTION - A

1. Answer briefly :

- (a) Define sequence and series with the help of an example.
- (b) Prove that the sequence $\left\{\frac{2n-7}{3n+2}\right\}$ is bounded.
- (c) What do you mean by absolutely convergent series?
- (d) State Comparison Test for infinite series.
- (e) Test for convergence of the integral $\int_1^{\infty} \frac{\sqrt{x}}{(1+x)^2} dx$
- (f) State any one property of Beta function.
- (g) Define homogeneous function with the help of an example.
- (h) Show that $\lim_{(x,y) \rightarrow (0,0)} \frac{x+y}{x-y}$ does not exist.
- (i) Evaluate $\int_1^2 \int_1^3 dx dy$
- (j) Evaluate $\int_{-1}^1 \int_0^z \int_{x-z}^{x+z} (x+y+z) dy dx dz$



SECTION-B

2. Prove that the sequence $a_n = \frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \dots + \frac{1}{n(n+1)}$ is convergent.
3. Discuss the convergence or divergence of the series $\sum \frac{x^{n+1}}{(n+1)\sqrt{n}}$
4. Find the length of the loop of the curve $9ay^2 = x(x - 3a)^2, a > 0$
5. By using the definition of Gamma function, evaluate $\int_0^{\frac{\pi}{2}} \sin^3 x \cos^{\frac{5}{2}} x \, dx$

SECTION-C

6. If $V = e^{xyz}$, show that $\frac{\partial^3 V}{\partial x \partial y \partial z} = (1 + 3xyz + x^2 y^2 z^2) e^{xyz}$.
7. Find the maximum and minimum values of the function $f(x, y) = x^3 + y^3 - 3axy$
8. Evaluate $\int_0^1 \int_{3y}^3 e^x \, dx \, dy$ by change of order of integration.
9. Find the volume of the ellipsoid $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$.

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Total No. of Questions: 09

MATHEMATICS-I (CALCULUS & LINEAR ALGEBRA)

M.Code: 75362

Time: 3 Hrs.

Max. Marks: 60

1. SECTION-A is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. SECTION - B & C have **FOUR** questions each.
3. Attempt any **FIVE** questions from SECTION B & C carrying **EIGHT** marks each.
4. Select atleast **TWO** questions **EACH** from SECTION - B & C.

1. (a) Construct a 3×3 matrix $A = [a_{ij}]$ whose elements are given by $a_{ij} = (i + j)^2$.

(b) If $\begin{vmatrix} 3 & m \\ 4 & 5 \end{vmatrix} = 3$, find the value of m .

(c) Evaluate $\int_0^1 \frac{dx}{\sqrt{x}}$.

(d) What do you mean by similar matrices.

(e) Write any two properties of the Gamma function.

(f) State the rank-nullity theorem.

(g) Define the basis of a vector space.

(h) State Taylor's theorem with remainder.

(i) What is the Gauss–Jordan elimination method.

(j) If A is a square matrix, show that $\frac{1}{2}(A + A')$ is a symmetric matrix.



SECTION-B

2. Find the points of local maxima and local minima, if any, of the function $f(x) = (x - 1)(x - 2)^2$.
3. Prove that the vectors $u = (1, 2, -3)$, $v = (1, -3, 2)$, and $w = (2, -1, 5)$ of $V_3(\mathbb{R})$ are linearly independent.
4. Solve the following system of equations using Cramer's rule:

$$x + y = 1$$

$$x + z = -6$$

$$x - y - 2z = 3$$

5. Verify Rolle's theorem for $f(x) = x^2 - 5x + 4$ on $[1, 4]$.

SECTION-C

6. Diagonalize the matrix $\begin{bmatrix} 2 & 1 \\ 4 & 2 \end{bmatrix}$.

7. For the transformation $T: \mathbb{R}^3 \rightarrow \mathbb{R}^3$ defined by

$T(x, y, z) = (x + 2y - z, y + z, x + y - 2z)$, find the basis and dimension of the null space of T and the range space of T .

8. Find the inverse of the matrix

$$A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$$

and verify that $A^{-1}A = I_3$.

9. Find the area bounded by the curve $x^2 = 4y$ and the straight line $x = 4y - 2$.

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Total No. of Questions : 09

SEMI-CONDUCTOR PHYSICS

Subject Code : BTPH-104-18

M.Code : 75360

Date of Examination : 20-05-2026

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. Attempt any **FIVE** questions from SECTION B & C carrying **EIGHT** marks each.
4. Select atleast **TWO** questions from SECTION - B & C.

SECTION - A

1. Write briefly :
- Define Effective mass.
 - State Bloch's theorem.
 - Show that the probability of finding an electron at an energy level below the Fermi energy level is 1 at 0 K.
 - Write a note on Diffusion current.
 - Discuss the problems related to intrinsic semiconductors.
 - What is the importance of Population inversion?
 - Explain the Photovoltaic effect.
 - A He-Ne laser emits radiation of wavelength 632.8 nm. Calculate the energy of the photon in electron volts (eV).
 - What information can be obtained using Capacitance-voltage measurement?
 - Draw and label V-I characteristics of a PN junction diode.



SECTION – B

2. What are the assumptions of the free electron theory of metals? Explain thermal conductivity using the classical free electron theory of metals.
3. Define density of states. Derive the expression for the density of states in a three-dimensional semiconductor and explain its physical significance.
4. With the help of a neat diagram, explain the V-I characteristics of a PN junction diode. Discuss the cut-in voltage, reverse saturation current, and breakdown voltage.
5. Obtain the expression for Fermi energy for an intrinsic semiconductor. Discuss the effect of temperature on Fermi energy.

SECTION – C

6. Define Einstein's coefficients for Stimulated absorption, Spontaneous emission, and Stimulated emission. Obtain the relation between different Einstein's coefficients and discuss the result.
7. What is Fermi's golden rule? Obtain the expression for Joint density of states.
8. Define beam spot and divergence of a laser. Explain the procedure for the measurement of laser divergence. If the beam spot of a laser beam is 1 mm and 4 mm at distances of 1 m and 2 m respectively, calculate the laser divergence.
9. What is the four-point probe method? Explain the measurement of Hall mobility using it.

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Total No. of Questions : 09

ENGINEERING PHYSICS

Subject Code : BTPH101-23

M.Code : 93794

Date of Examination : 20-05-2026

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. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
4. Select at least TWO questions from SECTION - B & C.

SECTION - A

1. Write short notes on :

- Define Bragg's law?
- What is the need of Extrinsic semiconductors.
- What are Ferrites?
- Calculate Curl of $\vec{r}$, where $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$.
- What do you understand from Born interpretation?
- Discuss the importance of Displacement current.
- What is Wave-particle duality?
- What is the basic principle of Fibre optics?
- Discuss important applications of nano-materials.
- Write a note on three levels laser.

SECTION-B

2. Explain the origin of Continuous and Characteristic X-rays. An X-ray tube operates at 40kV voltage, find the shortest wavelength of X-ray produced.
3. What is Light emitting diode (LED)? Explain the construction and working of LED.
Calculate the wavelength of light emitted by LED with band gap 2 eV.
4. a) Distinguish between Diamagnetic, Paramagnetic and Ferromagnetic materials.
b) What is Hysteresis loop?
5. Solve the electromagnetic wave equation for isotropic homogeneous medium and show that for a wave propagate through a conducting medium, amplitude decay exponentially.

SECTION-C

6. Explain the construction and working of He-Ne laser with the help of energy level diagram. What is the use of He in He-Ne laser?
7. Solve Schrodinger wave equation for particle in a box and obtain the expression for wave function.
8. a) Discuss different types of material dispersions.
b) Derive the expression for total number of reflections in a fibre of length L.
9. a) What are Carbon nanotubes? Differentiate between single-walled carbon nanotubes (SWCNTs) and multi-walled carbon nanotubes (MWCNTs)?
b) What is electron confinement?

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JUN 2026

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Total No. of Pages : 03

Total No. of Questions : 09

**B.Tech (AI&DS/AI&ML/Block Chain/CE/CSE/CS/IOT/DS/
CSD/EE/ECE/ETE/IT/ME/EEE/Industry Integrated/
Robotics & Artificial Intelligence / Internet of Things and
Cyber Security including Block Chain Technology (Sem.-1,2)
ENGINEERING GRAPHICS & DESIGN**

Subject Code : BTME-101-21

M.Code : 93799

Date of Examination : 13-05-2026

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. Attempt any **FIVE** questions from **SECTION B & C** carrying **EIGHT** marks each.
4. Select at least **TWO** questions from **SECTION - B & C**.

SECTION - A

1. Answer the following :

- Draw projections of a line lying on a Profile Plane whose top view is larger than its front view. Which angle is bigger " θ " or " ϕ "? Show with the help of a suitable free hand drawing.
- Show by means of traces, a plane perpendicular to both HP and VP.
- Explain isometric axis and isometric lines with a suitable drawing.
- Draw symbols used to represent first angle and third angle orthographic projections.
- Explain the importance of a title block.
- Draw projections of a line inclined to VP and parallel to HP with a suitable freehand drawing. Assume suitable dimensions. Also, show traces.
- How will you represent packing & insulating materials on a drawing sheet.



- h) Give examples (with suitable freehand drawing) of solids of revolution.
- i) Print the following statement with single stroke capital vertical letters of height 10mm:
"EXCUSES ARE THE NAILS THAT BUILD THE HOUSE OF FAILURE"
- j) Draw a regular Hexagonal Lamina of side 62 mm.

SECTION-B

2. Draw a scale of R.F 1/50 to read meters and decimeters and long enough to measure up to 6m. Show 5.7m and 4m 5dm on the scale.
3. A point "M" is 62 mm above HP and lying in 1st quadrant. Its shortest distance from the reference line is 75 mm. Draw its projections and find out its distance from VP.
4. Line "GK" 72 mm long; has its end "G" both in HP and VP. It is inclined at 45° to the "HP" and 32° to the "VP". Draw its projections when the line is lying in first quadrant.
5. End "B" of line BK is 13 mm above HP and 51 mm in front of VP and end "K" 12 mm behind the VP and 35 mm below the HP. The end projectors are 52 mm apart. Draw the projections and find TL, θ , Φ , HT and VT.

SECTION-C

6. A regular pentagonal thin plate of 45mm side is resting on one of its corners in HP with one side parallel to HP. Draw its projections when the plate surface is vertical and inclined to VP at 30°. Assume the said plate lying in first quadrant.
7. A circular lamina of diameter 54mm, having a central square hole of side 25mm, is resting on HP on a point on its circumference. The sides of the square hole are equally



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- i) Draw a regular Hexagonal Lamina of side 66mm.
- j) How will you represent Liquid and Glass on a drawing sheet?

SECTION-B

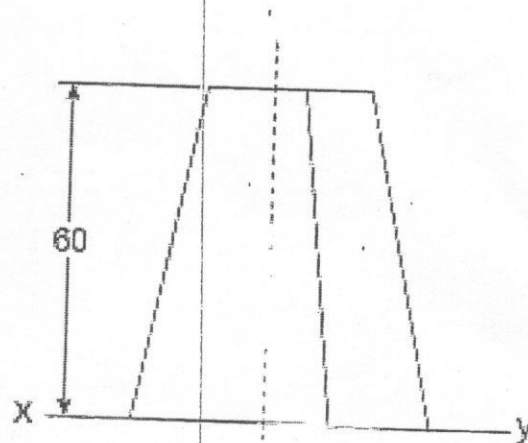
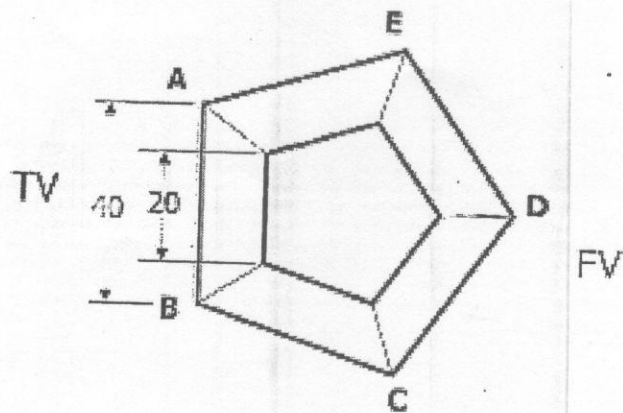
- 2. Construct a Plane Scale of R.F = 1:40 to read meters and decimeters. Indicate 3.9m on the scale.
- 3. A point "P" is 48mm in front of VP and 58 mm above HP. Draw its projections and find out its shortest distance from the reference line.
- 4. A line "AB" 70mm long is inclined at 45° to HP and 30° to VP. Its midpoint "P" is 30mm below the HP and 25mm behind the VP. Draw the projections of the line.
- 5. A line "KL" has its end "K" 15 mm above HP and 18 mm in front of VP. End "L" 49 mm above HP and 55 mm in front of VP. The distance between the end projectors is 58 mm. Draw the projections of the line and find out its true length, true inclinations with principle planes, HT and VT.

SECTION-C

- 6. A regular hexagonal lamina of side 48mm having a central circular hole of diameter 48mm is resting on one of its corners on HP such that one of its base edges is perpendicular to HP. Draw its projections when the said lamina is parallel to VP.
- 7. A right regular Hexagonal pyramid of base edge 48mm, axis 65mm is resting on HP on one of its base edges such that axis is parallel to both HP & VP.
- 8. A Pentagonal prism of side of base 32mm and length of axis 72mm lies on one of its rectangular faces on HP with axis Perpendicular to VP and parallel to HP. Draw its projections.



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9. Draw isometric view of the Frustum of a Pentagonal Pyramid whose orthographic projections are provided.



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Total No. of Pages: 02

Total No. of Questions: 09

B.Tech. (AE/AI&ML/AI&DS/DS/CE/CSE/ME/IOT/EEE/EE/ECE/FT/IT/Internet
of Things and Cyber Security including Block Chain Technology)
(Sem.-1,2)

BASIC ELECTRICAL ENGINEERING

Subject Code: BTEE/101/18

M.Code : 75339

Date of Examination: 15-05-2026

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. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Answer the following questions in brief :

- a) Draw the schematic of Norton's equivalent circuit.
- b) Enlist the various loss components of an induction motor.
- c) What are the merits of the improvement of power factor?
- d) Write the mathematical expression to find the RMS value of voltage.
- e) Differentiate between dependent and independent voltage and current sources.
- f) What is the operating principle of a single-phase induction motor?
Explain it.
- g) Write the voltage and current relations in star and delta connected loads.
- h) Classify the types of wires used in electric systems.
- i) Define the term transformation ratio of a single-phase transformer.
- j) State Kirchhoff's Voltage Law (KVL).



SECTION - B

2. With the help of a schematic, explain the working of a Miniature Circuit Breaker (MCB).
3. What is series resonance? Hence, derive an equation for resonant frequency, voltage, impedance, and current.
4. With the help of an example, state and explain the Superposition Theorem.
5. Determine the regulation of a transformer in which ohmic loss is 1% of the output and reactance drop is 5% of the voltage at 0.8 power factor for (a) lag and (b) lead.

SECTION - C

6. An 8-pole lap connected armature has 960 conductors, a flux of 40 mWb per pole, and a speed of 400 rpm. Determine the EMF generated (take $A = 8$).
7. Derive the first-order voltage and current equations for a series RC circuit excited by a DC source.
8. What is the purpose of earthing? Explain any one type of it.
9. The voltage applied to a circuit is $v = 230 \sin(\omega t + 30^\circ)$ and the current through the circuit is $i = 10 \sin(\omega t - 30^\circ)$. Determine the impedance, resistance, reactance, power consumed in the circuit, and the power factor of the circuit.

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Total No. of Questions : 09

Total No. of Pages : 02

**B.Tech.(AI&ML/Block Chain/CE/DS/CSE/CS/Cyber Security/
AI&DS/CSD/EE/FT/Industry Integrated/ECS/ETE/EEE/ECE/IT/ME/IOT/
Robotics & Artificial Intelligence/Internet of Things and Cyber Security
including Block Chain Technology) (Sem.-1,2)**

PROGRAMMING FOR PROBLEM SOLVING

Subject Code : BTPS-101-18

M.Code : 93803

Date of Examination : 15-05-2026

Time : 3 Hrs.

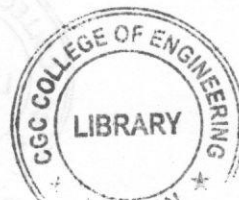
Max. Marks : 60

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. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

- I. Write short notes on :
 - a) Declare a float array of size 5 and assign 5 values to it.
 - b) Explain the use of fseek() function.
 - c) Illustrate the purpose of return statement using an example.
 - d) Differentiate between system software and application software.
 - e) How structure is different from union?
 - f) Draw a flowchart to find the factorial of a number.
 - g) What is the difference between assignment and equality operators?
 - h) Give two differences between while statement and do-while statement.
 - i) Differentiate between char name[] and char *name in C.



j) List the rules for naming a variable in C.

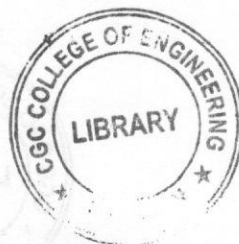
SECTION - B

2. Differentiate between "pass by value" and "pass by reference" with an example.
3. Illustrate the character and string array.
4. Write bitwise and logical operators available in C with suitable examples.
5. Develop a C program to generate and plot the Pascal triangle.

SECTION - C

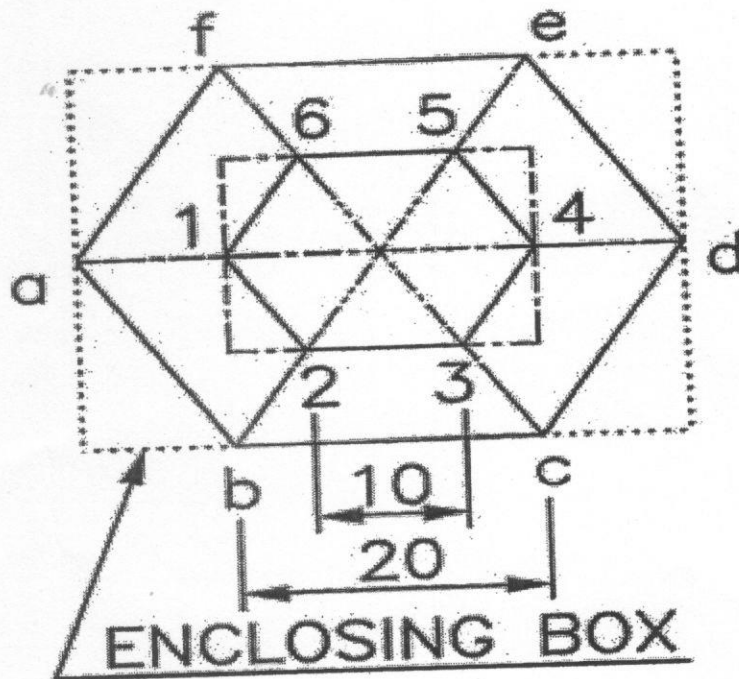
6. Explain structure within a structure with an example.
7. What is recursion? Write a C program to display Fibonacci series using recursive function.
8. What is a token? What are different types of tokens available in C language? Explain.
9. Write an algorithm and develop a C program to search an integer from N numbers in ascending order using binary searching technique.

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inclined to HP. Draw its projections when the said lamina is perpendicular to HP and parallel to and 20 mm from VP.

8. A right regular square pyramid of base edge 45 mm and axis 52 mm long; rests on its base on HP with one of its base edges parallel to VP. Draw its projections assuming the pyramid in 1st quadrant.
9. Draw the isometric drawing of the Frustum of a right regular hexagonal pyramid, side of the base hexagon is 20 mm, side of top hexagon is 10 mm, and the height of the frustum is 40 mm.



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Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

**B.Tech. (AI/AI&DS/Civil Engineering/CSE/AI&ML/DS/EEE/EE/ECE
IT/ME/CSE/Internet of things and cyber security including block chain
Technology/ Computer Engg.) (Sem.-1,2)**

PROGRAMMING FOR PROBLEM SOLVING
Subject Code : BTPS-101

Subject Code : BTPS-101-18

M.Code : 75346

Date of Examination : 13-05-2026

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. Attempt any **FIVE** questions from SECTION B & C carrying **EIGHT** marks each.
4. Select atleast **TWO** questions from SECTION - B & C.

SECTION-A

1. Write briefly :
 - a) Explain the difference between a for loop and a while loop.
 - b) What is the purpose of malloc()?
 - c) Give the syntax of declaring a string in C language.
 - d) How is the time complexity of an algorithm expressed?
 - e) In a flowchart, what is the shape of the decision box?
 - f) What is the difference between a static array and a dynamic array?
 - g) Give examples of any 2 operating systems.
 - h) What is the purpose of the & operator?
 - i) What is a null pointer?
 - j) How do you read a character from a file?

SECTION – B

2. Define a struct to represent a student with name, roll_number, and marks for three subjects. Write a C program to create an array of these structs for five students. The program should then calculate and print the total marks and average percentage for each student, and finally, display the details of the student who scored the highest total marks.
3. What is recursion? Explain the concept with a simple example. Then, write a C program using a recursive function to calculate the factorial of a given number entered by the user.
4. What is a function in C? Explain the difference between "call by value" and "call by reference" with code examples for both.
5. Explain the Bubble Sort algorithm and its working principle.

SECTION – C

6. Write a C program to sort an array of 10 integers in ascending order using Selection Sort.
7. Explain the concept of dynamic memory allocation in C and why it is essential.
8. Write any program illustrating the concept of an array of pointers.
9. What are the different components of a computer system? Provide latest examples of hardware components used in desktops and laptops.

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JUN 2026

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Total No. of Pages : 03

Total No. of Questions : 09

B.Tech.(AI&ML/AI&DS/DS/Block Chain/CE/CSE/
Cyber Security/Computer Science and Design)/EE/ECE/ETE/IT/
ME/IOT/ECE/(Industry Integrated) (Sem.-1, 2)

ENGLISH

Subject Code : BTHU101-18

M.Code : 93806

Date of Examination : 11-05-2026

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. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
4. Select at least TWO questions from SECTION - B & C.

SECTION - A

I. Answer briefly :

- a) Give antonyms for the following: CROOKED, CLUMSY
- b) Give synonyms for the following: DECEPTIVE, ENORMOUS
- c) Define modifiers.
- d) Make two words with prefix: inter
- e) Make two words with suffix: ive
- f) Give full form of the abbreviations: ICC, PSU
- g) Correct the following:
 - i. The resources was divided based on its expertise.
 - ii. If Jacob would have called me, I would have picked him up from the airport.
- h) Punctuate:



- i. did you sell buns at the fair
- ii. Sameera and i are going to town on Friday
- i) What is importance of proper punctuation?
- j) What are articles?

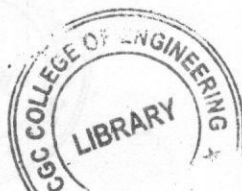
SECTION-B

- 2. Write an essay on "Corruption" OR "Internet and Our Lives".
- 3. Draft a business letter lodging a complaint against defective supply of certain computer items to your company.
- 4. Write a note on "Classifying".
- 5. Make a précis of the following passage:

One of our most difficult problems is what we call discipline and it is really very complex. You see, society feels that it must control or discipline the citizen, shape his mind according to certain religious, social, moral and economic patterns. Now, is discipline necessary at all? Please listen carefully. Don't immediately say YES or NO. Most of us feel, especially while we are young, that there should be no discipline, that we should be allowed to do whatever we like and we think that is freedom. But merely to say that we should be free and so on has very little meaning without understanding the whole problem of discipline. The keen athlete is disciplining himself the whole time, isn't he? His joy in playing games and the very necessity to keep fit makes him go to bed early, refrain from smoking, eat the right food and generally observe the rules of good health. His discipline and punctuality is not an imposition but a natural outcome of his enjoyment of athletics.

SECTION-C

- 6. Elaborate organizing principles of paragraphs in documents.



7. Read the following passage carefully and answer the questions that follow:

The greatest enemy of mankind, as people have discovered is not science, but war. Science merely reflects the social forces by which it is surrounded—it is found that when there is peace, science is constructive when there is war, and science is perverted to destructive ends. The weapons which science gives us do not necessarily create war; these make war increasingly more terrible. Until now, it has brought us to the doorstep of doom. Our main problem, therefore, is not to curb science, but to stop the war—to substitute law for force, and international government for anarchy in the relations of one nation with another. That is a job in which everybody must participate, including the scientists. But the bomb of Hiroshima suddenly woke us up to the fact that we have very little time. The hour is late and our work has scarcely begun. Now we are face to face with this urgent question: "Can education and tolerance, understanding and creative intelligence run fast enough to keep us abreast with our own mounting capacity to destroy?" That is the question which we shall have to answer one way or the other in this generation. Science must help us in the answer, but the main decision lies within ourselves.

- a. What does science reflect?
 - b. What do weapons do?
 - c. What question needs an answer?
 - d. Use the following words in your own sentences: anarchy, scarcely
8. Draft a report on save environment campaign organized by your company.
9. Draft a resume/CV for the post of an engineer.

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sphere, on the level of social structures. The colonized people find that they are reduced to a body of individuals who only find cohesion when in the presence of a colonizing nation. The fight carried on by a people for its liberation leads it, according to the circumstances, either to refuse or else to explode the so-called truths that have been established in its consciousness by the colonial civil administration, by the military occupation, and by economic exploitation. Armed conflict alone can drive out these falsehoods created in man which force into inferiority the liveliest minds among us and which mutilate us.

(b) Elaborate noun-pronoun agreement.

3. Read the passage carefully and answer the questions that follow:

Today's woman is a highly self-directed person, alive to the sense of her dignity and the importance of her functions in the private domestic domain and the public domain of the world of work. Women are rational in approach, careful in handling situations and want to do things as best as possible. The Fourth World Conference of Women held in Beijing in September 1995 had emphasized that no enduring solution of society's most threatening social, economic and political problems could be found without the participation and empowerment of the women. The 1995 World Summit for Social Development had also emphasised the pivotal role of women in eradicating poverty and mending the social fabric. The Constitution of India had conferred on women equal rights and opportunities political, social, educational and of employment with men. Because of oppressive traditions, superstitions, exploitation and corruption, a majority of women are not allowed to enjoy the rights and opportunities, bestowed on them. One of the major reasons for this state of affairs is the lack of literacy and awareness among women.

Education is the main instrument through which we can narrow down the prevailing



inequality and accelerate the process of economic and political change in the status of women. The role of women in a society is very important. Women's education is the key to a better life in the future. A recent World Bank study says that educating girls is not a charity, it is good economics and if developing nations are to eradicate poverty, they must educate the girls. The report says that the economic and social returns on investment in education of the girls considerably affect the human development index of the nation. Society would progress only if the status of women is respected and the presence of an educated woman in the family would ensure education of the family itself. Education and empowerment of women are closely related. Women's education has not received due care and attention from the planners and policymakers.

- (i) Mention any two attributes of a modern woman.
 - (ii) Why are women's participation and empowerment considered necessary?
 - (iii) Which factors adversely affect the education of girls?
 - (iv) Make sentences of your own: eradicate, pivotal.
 - (v) Give the central idea of the passage.
4. Write an essay in about 500 words on "Smart Phones" Or "Digitalization".
5. (a) Draft a business email to all employees asking them to increase productivity to boost prospects of the company.
- (b) Frame your resume/CV for the post of an engineer.

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Roll No.

Total No. of Pages : 03

**B.Tech. (EEE / AI&ML / AI&DS / DS / CE / CSE / EE / ECE / IT / ME
/ Internet of Things and Cyber Security including Block Chain
Technology) (Sem.-1, 2)**

CHEMISTRY-I

Subject Code : BTCH-101-18

M.Code : 75343

Date of Examination : 08-05-2026

Time : 3 Hrs.

Max. Marks : 60

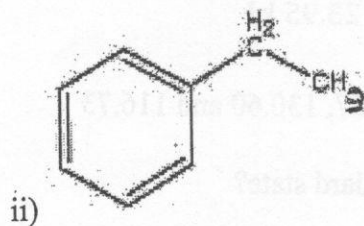
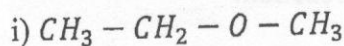
INSTRUCTIONS TO CANDIDATES:

- 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. Attempt any **FIVE** questions from **SECTION B & C** carrying **EIGHT** marks each.
 4. Select at least **TWO** questions from **SECTION - B & C**.

SECTION - A

1. Answer briefly :

- Calculate the bond order of N_2 and N_2^+ .
- What type of molecules show IR Spectra?
- Differentiate between dry corrosion and wet corrosion.
- What is the Van der Waals Interaction? Explain.
- Why is TMS used as an internal standard in NMR spectroscopy?
- How many signals are present in the following molecules?



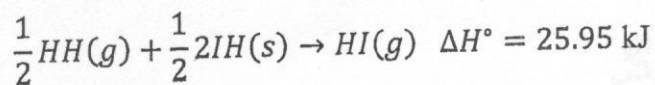
- g) Give one example of a cyclization reaction.
- h) What is temporary and permanent hardness?
- i) Define Coordination number and oxidation number.
- j) What is the HSAB principle? Give an example.

SECTION-B

- 2. (a) Discuss the Schrodinger wave equation for particle in one-dimensional box.
(b) What is the role of doping on the band structures?
- 3. (a) What are molecular vibrations? Explain.
(b) Discuss the application of fluorescence in medicines.
- 4. Draw the molecular energy level diagram of O_2 and O_2^- . Also calculate its bond order and explain its magnetic character.
- 5. (a) Define excluded volume. Show that excluded volume, designated as b , is four times the actual volume of gas molecules.
(b) Why do real gases deviate from ideality? Explain.

SECTION-C

- 6. (a) What is wet Corrosion? Discuss its mechanism?
(b) Calculate the standard free energy change (ΔG°) of the reaction:



The standard entropy of $HI(g)$, $H_2(g)$ and $I_2(s)$ are 206.27, 130.60 and 116.73 $JK^{-1}mol^{-1}$, respectively. Is this reaction feasible at standard state?



- b) Discuss the conformational analysis of butane?
9. a) What are electrophilic substitution reaction? explain with examples?
- b) What is Markovnikov's addition? Explain with example
- c). How paracetamol synthesized?

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JUN 2026

Roll No.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (EEE / AI&ML / AI&DS / DS / CE / CSE / EE / ECE / IT / ME / FT
/ CSE (Internet of Things and Cyber Security including Block Chain /
Block Chain Technology) (Sem.-1,2)

BASIC ELECTRICAL ENGINEERING

Subject Code : BTEE-101-18

M.Code : 93797

Date of Examination : 08-05-2026

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 FOUR questions carrying EIGHT marks each.
3. SECTION-C contains FOUR questions carrying EIGHT marks each.
4. Students have to attempt any FIVE questions from SECTION B AND SECTION C, Selecting at least TWO from each of these BOTH section.

SECTION-A

1. Write briefly :

- a) Write the voltage and current equations for star and delta connected loads.
- b) Enlist the types of wires.
- c) What is specific resistance of a resistor? Write the formula for it.
- d) Draw the electric circuit of a step-down auto transformer.
- e) Explain the operating principle of a synchronous generator.
- f) What is the difference between maximum value and instantaneous value of voltage?
- g) What is the purpose of earthing?
- h) What is the difference between a dependent and independent current source?
- i) Draw the electric circuit of a star-delta three-phase transformer.
- j) How are AC loads classified based on power factor?



SECTION – B

2. A $4700\ \Omega$ resistor and a $2\ \mu\text{F}$ capacitor are connected in parallel across a $240\ \text{V}$, $60\ \text{Hz}$ AC supply. Determine the circuit impedance and the line current.
3. Derive the 1st order voltage and current equations for a resistance-inductance (RL) load connected in series when a sudden DC voltage source is applied across it.
4. Explain any one type of single-phase induction motor. Draw its schematic.
5. Explain the types and applications of cables with respect to operating voltage.

SECTION – C

6. Classify the types of batteries. Explain their operating characteristics.
7. The impedance of a circuit placed across a $120\ \text{V}$, $50\ \text{Hz}$ source is $(10 + j20)\ \Omega$. Find the current, phase angle, and the real power.
8. Derive the equation for voltage regulation for a single-phase transformer at lagging and leading power factor loads.
9. With the help of an electric circuit example, state and prove the Superposition theorem.

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JUN 2026

Roll No.

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Total No. of Pages : 03

Total No. of Questions : 09

B.Tech. (AI&DS / AI&ML / Block chain / CE / IOT / CSDn / DS / ECS / CSE / EE / ECE / EEE / FT / IT / ME / Cyber Security / Industry Integrated/ Internet of Things and Cyber Security including Block Chain Technology) (Sem.-1,2)

CHEMISTRY-I

Subject Code : BTCH-101-23

M.Code : 93800

Date of Examination : 05-05-2026

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

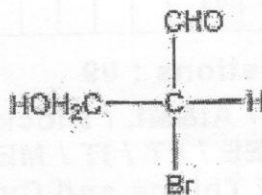
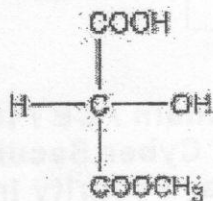
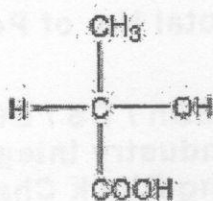
1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
4. Select at least TWO questions from SECTION - B & C.

SECTION - A

1. Write briefly :

- a) Define crystal field splitting energy (Δ)
- b) What is bending vibration?
- c) Explain the MO energy level diagram of NO
- d) What is spin spin coupling?
- e) Explain the physical significance of van der Waals constants a and b.
- f) What are the factor which affect rate of corrosion?
- g) What is the molecular geometry of PCl_5
- h) What are structural isomers?
- i) Designate to the following molecule for either R and S





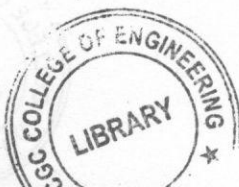
j) Explain halogenation of alkanes?

SECTION-B

2. a) Derive the Schrodinger wave equation?
b) Explain the difference between octahedral and tetrahedral crystal field splitting
3. a) What is meant by band theory? differentiate between conduction band and valence band?
b) What is aromaticity? Explain with example?
4. a) What is fluorescence and its role in medicine?
b) Describe principal and instrumentation of Nuclear magnetic resonance spectroscopy
5. a) Why real gases deviate from ideal gas behaviour?
b) Derive the van der Waals equation from the ideal gas equation

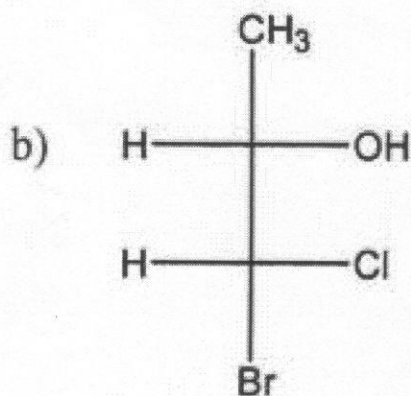
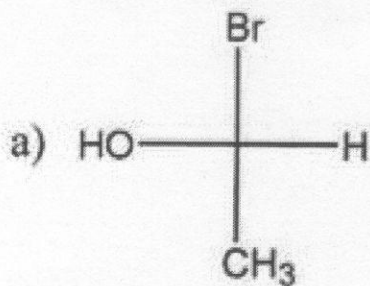
SECTION-C

6. a) Derive the Nernst equation?
b) Discuss the various methods for softening of the hard water
7. a) What is effective nuclear charge?
b) Explain the trend of change of atomic radii across the periodic table?
c). What is hard acid soft base principle?
8. a) What is chirality and explain absolute configuration?



7. What is electron affinity? What are the factors affecting electron affinity? How does it show variation along the period and down the group?

8. (a) Assign R and S configuration in the following molecules.



(b) Discuss the conformational analysis in n-Butane.

9. (a) Compare SN1 and SN2 Substitution reaction.

(b) Explain:

(i) Oxidation reaction

(ii) Ring opening reaction.

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Roll No.

Total No. of Questions : 09

Total No. of Pages : 03

B.Tech.(AI&ML/AI&DS/DS/Block Chain/CE/CSE/
Cyber Security/Computer Science and Design)/EE/EC/EI/ET/IT/
ME/IOT/EC/EI/Industry Integrated) (Sem.-1, 2)
ENGLISH

Subject Code : BTH11104-40

M.Code : 93806

Time : 3 Hrs.

Date of Examination : 11-05-2026

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. Attempt any **FIVE** questions from SECTION B & C carrying **EIGHT** marks each.
4. Select at least **TWO** questions from SECTION - B & C.

SECTION - A

1. Answer briefly:
- a) Give antonyms for the following: CROOKED, CLUMSY
 - b) Give synonyms for the following: DECEPTIVE, ENORMOUS
 - c) Define modifiers.
 - d) Make two words with prefix: inter
 - e) Make two words with suffix: ive
 - f) Give full form of the abbreviations: ICC, PSU
 - g) Correct the following:
 - i. The resources was divided based on its expertise.
 - ii. If Jacob would have called me, I would have picked him up from the airport.
 - h) Punctuate:



i. did you sell buns at the fair

ii. Samncera and i are going to town on Friday

1) What is importance of proper punctuation?

j) What are articles?

SECTION-B

2. Write an essay on "Corruption" OR "Internet and Our Lives".
3. Draft a business letter lodging a complaint against defective supply of certain computer items to your company.
4. Write a note on "Classifying".
5. Make a précis of the following passage:

5. Make a précis of the following passage:

see, society feels that it must control or discipline the citizen, shape his mind according to certain religious, social, moral and economic patterns. Now, is discipline necessary at all? Please listen carefully. Don't immediately say YES or NO. Most of us feel, especially while we are young, that there should be no discipline, that we should be allowed to do whatever we like and we think that is freedom. But merely to say that we should be free and so on has very little meaning without understanding the whole problem of discipline. The keen athlete is disciplining himself the whole time, isn't he? His joy in playing games and the very necessity to keep fit makes him go to bed early, refrain from smoking, eat the right food and generally observe the rules of good health. His discipline and punctuality is not an imposition but a natural outcome of his enjoyment of athletics.

SECTION-C

6. Elaborate organizing principles of paragraphs in documents.

7. Read the following passage carefully and answer the questions that follow:

The greatest enemy of mankind, as people have discovered is not science, but war. Science merely reflects the social forces by which it is surrounded—it is found that when there is peace, science is constructive when there is war, and science is perverted to destructive ends. The weapons which science gives us do not necessarily create war; these make war increasingly more terrible. Until now, it has brought us to the doorstep of doom. Our main problem, therefore, is not to curb science, but to stop the war—to substitute law for force, and international government for anarchy in the relations of one nation with another. That is a job in which everybody must participate, including the scientists. But the bomb of Hiroshima suddenly woke us up to the fact that we have very little time. The hour is late and our work has scarcely begun. Now we are face to face with this urgent question: "Can education and tolerance, understanding and creative intelligence run fast enough to keep us abreast with our own mounting capacity to destroy?" That is the question which we shall have to answer one way or the other in this generation. Science must help us in the answer, but the main decision lies within ourselves.

- a. What does science reflect?
 - b. What do weapons do?
 - c. What question needs an answer?
 - d. Use the following words in your own sentences: anarchy, scarcely
8. Draft a report on save environment campaign organized by your company.
9. Draft a resume/CV for the post of an engineer.

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JUN 2026

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Total No. of Pages : 01

Total No. of Questions : 08

M.Tech. (CSE) (Sem.-2)

COMPUTER VISION

Subject Code : MTCS208-18

M.Code : 76059

Date of Examination : 25-05-2026

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWELVE marks.

1. Explain computer imaging systems. Describe the process of image formation and sensing.
2. Discuss image preprocessing techniques and explain binary image analysis.
3. Explain edge detection with reference to common edge detectors and evaluate edge detection performance.
4. What is the Hough Transform? Explain its application in line or circle detection.
5. Explain image segmentation and discuss morphological filtering operations.
6. Describe the Fourier Transform for images. Explain its significance in frequency domain analysis.
7. Explain feature extraction based on shape, color, and texture. How are feature vectors and similarity measures used?
8. Discuss supervised and unsupervised learning for pattern classification. Explain Bayes and KNN classifiers.

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Roll No.

Total No. of Pages: 02

HUMAN AND COMPUTER INTERACTION

M.Code: 76060

Time: 3 Hrs.

Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWELVE marks.

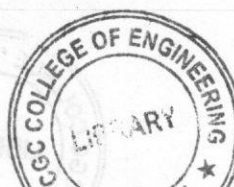
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7. Write notes on:

- a) Goals and task hierarchies.
- b) Different types of overlays.

8. Explain in detail various organizational issues that affect the acceptance and relevance of information and communication systems.

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Total No. of Pages : 03

Total No. of Questions : 09

B.Tech. (AI&ML/AI&DS/DS/CSE/IT/ME/Internet of Things and Cyber
Security including Block Chain Technology) (Sem.-02)**MATHEMATICS-II**

Subject Code : BTAM204-18

M.Code : 91960

Date of Examination : 25-05-2026

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. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
4. Select at least TWO questions from SECTION - B & C.

SECTION - A**I. Answer the following :**

- (a) Define conditional probability.
- (b) Explain the term skewness with example.
- (c) What do you mean by continuous distribution function?
- (d) Define Poisson distribution.
- (e) Find the value of k , $f(x) = \begin{cases} ke^{-x}, & x \geq 0 \\ 0, & \text{otherwise} \end{cases}$, where k is a positive constant.
- (f) Let x be the number of years before a certain kind of pump needs replacement. Let x have the probability function $f(x) = kx^3$, $x = 0, 1, 2, 3, 4$. Find k .
- (g) What do you mean by rank correlation?
- (h) If the probability of producing a defective bulb is $p = 0.01$, what is the probability that a lot of 100 bulbs will contain more than 1 defective?



(i) Explain Chi-square test for goodness of fit.

(j) What is hypothesis testing?

SECTION - B

2. Calculate the coefficient of correlation between the price of tea and coffee by Spearman's rank correlation method,

Price of tea (Rs):	75	88	95	70	60	80	81	50
Price of coffee (Rs):	120	134	150	115	110	140	142	100

3. (a) If $P(A) = 0.6$, $P(B) = 0.5$, $P(A \cap B) = 0.3$, then find

(i) $P(A | B)$

(ii) $P(B | A)$.

(b) A random variable follows binomial distribution with $n = 10$ and $p = 0.5$. Find the mean and variance.

4. (a) The average number of defects in a machine component is 2 per unit. Find the probability that a unit contains exactly 3 defects.

(b) Explain properties of normal distribution.

5. The mean weight of 500 male students in a certain college is 151 lbs and standard deviation is 15 lbs. Assuming the weights are normally distributed, find how many students weigh

(a) Between 120 and 155 lbs

(b) More than 185 lbs.



SECTION – C

6. Find the value of k for a continuous random variable X whose probability density function is given by $f(x) = kx^2 e^{-x}$, $-\infty < x < \infty$.
7. The life time of electric bulbs for a random sample of 10 from a large consignment gave the following data:

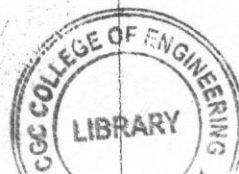
Item	1	2	3	4	5	6	7	8	9	10
Life (in '000 hrs):	4.2	4.6	3.9	4.1	5.2	3.8	3.9	4.3	4.4	5.6

Can we accept the hypothesis that the average life time of bulbs is 4000 hrs?

[$t_{5\%} = 2.26$ for 9 d.f.].

8. The income of a group of 10,000 persons was found to be normally distributed with mean Rs. 7500 and standard deviation of Rs. 500. Show that of this group about 95% had income exceeding Rs. 6680 and only 5% had income exceeding Rs. 8320, $P(0 < Z < 1.64) = 0.4495$.
9. The mean of sample sizes 1000 and 2000 are 67.5 cm and 68.0 cm respectively. Can the samples be regarded as drawn from the same population of S.D. 2.5 cm?

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Total No. of Questions : 08

Total No. of Pages : 02

M.Tech. (CSE) (Sem.-2)

SOFT COMPUTING

Subject Code : MTCS-202-18

M.Code : 76056

Date of Examination : 14-05-2026

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES:

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWELVE marks.

2. Each question carries TWELVE marks.

- 1.(a) Differentiate between conventional AI and computational intelligence.

- (b) Explain with an example how machine learning fits within the soft computing paradigm.

- 2.(a) Define fuzzy sets. Explain any two operations performed on fuzzy sets with numerical examples.

- (b) Construct a simple fuzzy inference system (FIS) for “room temperature control” using three fuzzy rules.

- 3.(a) Explain the architecture and working of a Radial Basis Function (RBF) network.

- (b) Compare supervised, unsupervised, and reinforcement learning in neural networks.

4. What is a Genetic Algorithm (GA)? Explain how Genetic Algorithms can be applied in feature selection for machine learning models.

- 5.(a) Write Python code to create a simple neural network with one hidden layer using TensorFlow.

- (b) Discuss the role of the fuzzy logic toolbox in MATLAB for building fuzzy inference systems.

6. What are Feedforward Neural Networks (FNNs)? Explain their architecture, working principle, and training process in detail. What role does backpropagation play in FNNs?



7. What are the recent developments in deep learning classifiers such as CNNs, RNNs, and Transformers?

8. Write short notes on:

- (a) Applications of GA
- (b) SVM
- (c) Fuzzy Decision Making

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Roll No.



SECTION-B

2. Solve by Gauss Elimination method the system of equations

$$x + y + z = 3, \quad 3x - 9y + 2z = -4, \quad 5x - 3y + 4z = 6$$

3. Prove that the subspace of R^3 consisting of triplet (a, b, c) with $c = 0$ is a subspace of R^3 , which is isomorphic to R^2 .

4. Solve $(2xy^2 + y)dx + (x + 2x^2y - x^4y^3)dy = 0$.

5. Solve $(x^2 - yz)p + (y^2 - zx)q = z^2 - xy$

SECTION-C

6. Determine ω, μ such that the following equations:

$$2x - 5y + 2z = 8, \quad 2x + 4y + 6z = 5, \quad x + 2y + \omega z = \mu$$

- (i) a unique solution,
- (ii) no solution,
- (iii) infinitely many solutions.

7. Let V be a vector space of 2×2 matrices over R and let $M = \begin{bmatrix} 1 & -1 \\ -2 & 2 \end{bmatrix}$. Let $T: V \rightarrow V$

be the linear map defined by $T(A) = MA \forall A \in V$. Find the basis and dimension of

- (i) Null space of T
 - (ii) Range of T
8. Apply method of variation of parameters to solve $\frac{d^2y}{dx^2} + 9y = \sec 3x$.
9. Solve $(D^3 - D'^3)z = x^3y^3$

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SECTION-B

2. Evaluate by change of order of integration: $\int_0^1 \int_{4y}^4 e^{x^2} dx dy$.
3. Solve: $(2xy^2 + y) dx + (x + 2x^2y - x^4y^3) dy = 0$.
4. Examine the convergence of the series: $\frac{1}{\log 2} - \frac{1}{\log 3} + \frac{1}{\log 4} - \frac{1}{\log 5} + \dots$
5. Solve: $\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + 2y = \sin(e^x)$.
6. Find $\frac{d^2y}{dx^2}$ if $x^3 + y^3 = 3axy$.

SECTION-C

7. Find the volume common to the cylinders: $x^2 + y^2 = a^2$ and $x^2 + z^2 = a^2$.
8. Solve $\frac{d^2y}{dx^2} + 9y = \sec 3x$ using the method of variation of parameters.
9. Solve: $y + px = p^2x^2$.

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SECTION-B

2. Explain the hierarchy of console stream classes with a diagram. ,
3. What is copy constructor? Why do we need copy constructor? Give example.
4. Design a class diagram for a banking system that includes Account, Customer, and Transaction classes. Show inheritance, relationships, and key data members and methods.
5. Describe the syntax and use of function templates in C++.
6. A file stores employee attendance record. Explain a C++ approach to read, update, and handle errors during file operations. Include a class-based design.

SECTION-C

7. Explain concept of exception handling? Why do we need it? Give suitable example to handle divide by zero exception
8. Discuss dynamic memory allocation in C++. How we can do static and dynamic memory allocation.
9. Write a short note on
 - (a) Type conversion
 - (b) Virtual base class.

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Roll No.

Total No. of Questions : 09

DEVELOPMENT OF SOCIETIES

M.Code : 76439

Time : 3 Hrs.

Max. Marks : 60

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.

1. Write briefly:

- (a) Define CLAN.
- (b) What is human being?
- (c) Explain the political system.
- (d) Explain governing system.
- (e) What is evolution?
- (f) Define economic development?
- (g) What is swaraj?
- (h) What is regulation of society?
- (i) What do you understand by term capitalism?
- (j) Define social structures.



SECTION-B

2. Explain the concept of Gandhian idea of development.
3. Explain the concept of development in post British period- Barter.
4. Explain the different models of governing system and their comparative study?
5. Explain the relation between human being & society.
6. Explain the criteria of different social systems.

SECTION-C

7. Explain the implications of E. F. Schumacher's idea of development?
8. Explain the different models of governing system & their comparative study in the development of societies.
9. Explain the comparative studies on birth of capitalism, and Marxism.



[illegible]

Total No. of Questions : 09

DIGITAL CIRCUIT AND LOGIC DESIGN

M.Code : 96261

Time : 3 Hrs.

Max. Marks : 60

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.

1. Write briefly :

- (a) Convert Decimal number 238.5 into Binary, Octal and Hexadecimal number systems.
- (b) Explain Excess 3 code.
- (c) Minimize the Boolean expression $A'B'C + A'B'C'$
- (d) Design Ex-OR gate using NAND and NOR.
- (e) Draw 3 bit even parity generator diagram.
- (f) What do you mean by clocked flip flops?
- (g) Define resolution.
- (h) Draw 8:1 multiplexer.
- (i) What are the disadvantages of Weighted resistor D/A converter?
- (j) What do you mean by excitation table?



SECTION-B

2. Minimize $F = \text{IIM}(0,2,3,4,6,9)$ using QM method.
3. Design 2 bit asynchronous up counter.
4. Draw and explain successive approximation A/D converter.
5. Give classifications and characteristics of memories.
6. Design ECL logic family in detail.

SECTION-C

7. Design and explain seven segment display.
8. Convert SR flip flop into JK flip flop.
9. Give comparison of various logic families.

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Roll No.

SECTION-B

2. Explain Binary Arithmetic operations with examples.
3. Describe canonical forms of Boolean expressions.
4. Simplify using K-Map: $F(A, B, C, D) = \sum(1, 3, 5, 7, 9, 11, 13)$
5. Discuss the working of Encoder and Decoder with examples.
6. Differentiate the operation of D Flip-Flop and T Flip-Flop.

SECTION-C

7. (a) Design Magnitude Comparator with logic diagram.
(b) Explain Parity Generator and Checker.
8. Discuss various Programmable Logic Devices (PLA, PAL, FPGA).
9. Explain the following conversion techniques:
 - (a) Weighted Resistor DAC
 - (b) Counter Type ADC

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JUN 2026

Roll No.

[illegible]

Total No. of Pages: 02

Total No. of Questions: 09

B.Tech. (E&CE) (Sem.-3)

MATHEMATICS – III (INTEGRAL TRANSFORMS, PROBABILITY & STATISTICS)

Subject Code: BTAM-303-23

M.Code: 96258

Date of Examination: 12-06-2026

Max. Marks: 60

Time: 3 Hrs.

INSTRUCTIONS TO CANDIDATES:

- 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.

SECTION A

1. Write briefly:

- (a) Explain Dirac-delta function
- (b) State Gibbs Phenomenon
- (c) State Translation theorem
- (d) Explain properties of binomial theorem
- (e) Find the Z transform of $\delta(k - n); k \geq 0$
- (f) State properties of Z transforms
- (g) State advantages of Fourier series
- (h) Evaluate $\cosh(at)$
- (i) Explain the order of difference equation
- (j) Define conditional probability



SECTION B

2. Find the inverse Laplace transform of $s^3 / (s^4 - a^4)$
3. Find the Fourier series to represent $f(x) = x + \frac{x^2}{4}$, $-\pi < x < \pi$
4. Find the Z-transform of $c^k \cos(ak)$, $k \geq 0$
5. Find the Z-transform of discrete unit step

$$u(k) = \begin{cases} 0, & k < 0 \\ 1, & k \geq 0 \end{cases}$$

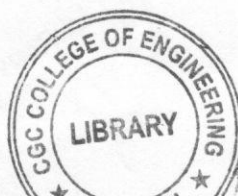
6. Find the mean and median of the following data.

Size	30-39	40-49	50-59	60-69	70-79	80-89	90-99
Frequency	2	3	11	20	32	25	7

SECTION C

7. Using Laplace transforms, find the solution of the initial value problem:
 $y'' + 9y = 9u(t - 3)$, $y(0) = 0$, $y'(0) = 0$
 where $u(t - 3)$ is the unit step function.
8. A semi-infinite line of negligible inductance and leakage per unit length has its voltage and current equal to zero. A constant voltage v_0 is applied at the sending end ($x = 0$) at $t = 0$. Find the voltage and current at any point ($x > 0$) at any instant.
9. In a normal distribution, 31% of the items are under 45 and 8% are over 64. Find the mean and standard deviation of the distribution.

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JUN 2026

Roll No.

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Total No. of Pages: 02

Total No. of Questions: 09

B.Tech.(ECE) (Sem.-3)
NETWORK ANALYSIS AND SYNTHESIS

Subject Code: BTEC-303

M.Code: 96262

Date Of Examination: 10-06-2026

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.

SECTION-A

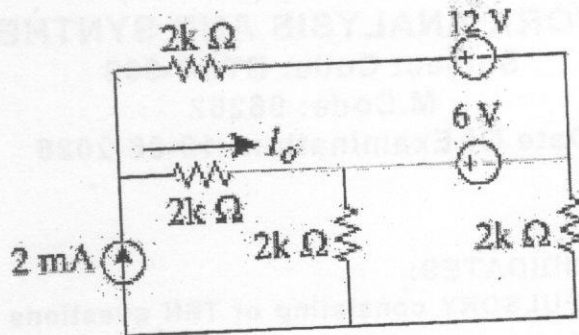
1. Answer the following questions:

- (a) Draw Periodic and Aperiodic signals.
- (b) What do you mean by doublet?
- (c) State Norton's theorem.
- (d) What is convolution theorem?
- (e) Give classification of filters.
- (f) Draw pass band filter.
- (g) Write property of Laplace.
- (h) What is transfer function?
- (i) Draw T-section filter.
- (j) Explain loop equation.



SECTION-B

2. Using Superposition, find I .



3. Explain Laplace transform of shifted functions.
4. Design Cauer I and Cauer – II forms.
5. Describe characteristic impedance and propagation in network.
6. Explain Reciprocity theorem.

SECTION C

7. A z-section filter network consists of a series arm inductance 20 mH and two shunt arm capacitors of 0.16 pF each. Calculate cut off frequency, attenuation and phase shift at 1.5 kHz.
8. Explain Convolution Theorem in detail.
9. Draw and explain composite filters.

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Total No. of Pages : 02

Total No. of Questions : 09

DATA STRUCTURE & ALGORITHMS

Subject Code : BTCS-301-18

M.Code : 76436

Date of Examination: 10-06-2026

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.

SECTION-A

1. **Write briefly :**
 - a) Describe data structures in relation to storage?
 - b) Give advantage of doubly linked list.
 - c) Convert to postfix expression: $(A+B)/(C+D)-(E * F)$
 - d) Explain the concept of circular queue.
 - e) What is a complete binary tree?
 - f) Using example of adding elements of a 2-d array, obtain the time function of its pseudocode.
 - g) How does asymptotic analysis help in performance interpretations?
 - h) Give the node structure of a B tree. Why are they called bottom-up trees?
 - i) List applications of Tree data structures.
 - j) Which data structure is efficient for implementing recursive functions? Why?



SECTION-B

2. Discuss the insertion operation on an array at any intermittent Kth position. Give the pseudocode.
3. Write an algorithm to implement a deque using linked list.
4. Insert the following data using Binary search tree: 3, 7, 8, 11, 14, 15, 21, 32. Discuss the effect on time complexity of such insertions and the measures required to improve.
5. Give steps to sort the following list using Heap sort: 12, 6, 8, 0, 5, 11, 3, 15, 7, 23.
6. What is hashing? Explain how hash addressing is better than direct addressing.

SECTION-C

7. Write an algorithm for quick sort. Discuss its best- and worst-case scenarios using example to obtain time complexities.
8. Give details of applications of Stack, using example for each.
9. Explain Breadth first search algorithm for traversal of a graph, using a suitable example.

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Total No. of Questions: 09

ANALOG DEVICES & CIRCUITS

M.Code: 96260

Time: 3 Hrs.

Max. Marks: 60

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.

1. Answer the following questions:

- (a) Define Light Emitting Diode.
- (b) Explain photodiode.
- (c) Enlist various types of transistors.
- (d) What do you mean by UJT?
- (e) Explain the term “Push-Pull” in amplifiers.
- (f) What are the limitations of transformer coupled amplifiers?
- (g) What is the effect of negative feedback on gain?
- (h) What are the advantages of Crystal Oscillator?
- (i) What is the significance of h-parameters?
- (j) Draw h parameter equivalent circuit of transistor.



SECTION-B

2. Explain the applications of Zener diode specially as Voltage regulator.
3. Differentiate between JFET, UJT and MOSFET.
4. Explain the construction and working of Class A direct coupled with resistive load amplifier.
5. Draw and explain Wein Bridge oscillator.
6. Describe hybrid pi CE transistor model.

SECTION-C

7. Derive the expression for output parameters for various biasing circuits in Transistors.
8. Draw and explain transistor phase inverter amplifier.
9. Explain Colpitts and Hartley oscillators.

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JUN 2026

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Total No. of Pages : 02

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B.Tech.(AI&DS/AI&ML/ Block Chain/CSE/CS/DS/IOT/CSD/ECS/
Robotics & Artificial Intelligence/Internet of Things and Cyber Security
including Block Chain Technology) (Sem.-3)

OBJECT ORIENTED PROGRAMMING

Subject Code : BTCS302-18

M.Code : 76437

Date of Examination: 08-06-2026

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.

SECTION-A

1. Write briefly:

- a) What is the purpose of a Constructor in C++?
- b) Explain the use of the inline keyword before a function.
- c) How does a Friend Function violate the concept of data hiding?
- d) Define Recursive Functions with an example.
- e) What is the difference between a Base Class and a Derived Class?
- f) Define Pure Virtual Functions.
- g) What is the significance of the this pointer?
- h) Identify the stream classes used for File I/O in C++.
- i) Explain the Catching mechanism in exception handling.
- j) What is Function Overloading?



SECTION-B

2. WAP to find factorial of a number using recursion.
3. What are different features of Constructor, what are its different types, explain copy constructor with help of program.
4. What is the difference between Early Binding and Late Binding, explain with help of program.
5. Explain the concept of static member functions with an example.
6. WAP to swap values of 2 variables using friend function.

SECTION-C

7. WAP to find sum of 2 complex numbers by overloading + operator.
8. WAP to copy content of one file to another.
9. What is the difference b/w Error and Exception, WAP to demonstrate the use of try, catch and throw keyword.

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JUN 2026

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Total No. of Pages : 03

Total No. of Questions : 11

B.Tech. (Electronics & Computer Engineering) (Sem.-4)

LINEAR CONTROL SYSTEMS

Subject Code :BTEEE-402

M.Code : 96268

Date of Examination :09-05-2026

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.

SECTION-A

1. Write briefly:

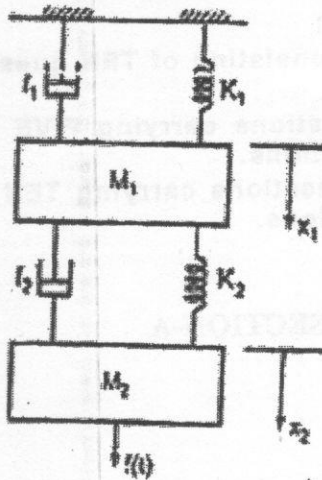
- (a) What is plant? Explain.
- (b) Discuss the advantages of block diagram representation.
- (c) What do you mean by linear time invariant system? Discuss.
- (d) Discuss the effect of feedback on the system stability.
- (e) Define rise and peak times.
- (f) List the advantages of Routh stability criterion.
- (g) Why compensation is required? Explain.
- (h) List the various advantages of frequency domain analysis.
- (i) What do you mean by relative stability? Explain.
- (j) List the characteristics of servo motors.

SECTION-B

2. Discuss:

- (i) Continuous and sampled data control systems
- (ii) Open and closed loop systems

3. Using Mathematical Modelling, find the transfer function of the system shown below



4. Obtain the response of a unity feedback system whose open loop transfer function is:

$$G(s) = \frac{3}{s(s+4)} \text{ For a unit step input.}$$

5. For the root locus of a system having open loop transfer function:

$$G(s)H(s) = \frac{K(s+3)(s+4)}{(s+1)(s+5)(s+6)}$$

Determine the asymptotes to the loci, centroid and breakaway points.

6. Discuss the relation between time and frequency response for second order systems.

SECTION-C

7. Sketch the Bode plot for the transfer function given below:

$$G(s)H(s) = \frac{2(s+0.25)}{s^2(s+1)(s+0.5)}$$

Determine the gain and phase margin. Is the system stable?



8. The open loop transfer function of a unity feedback system is given by:

$$G(s) = \frac{108}{s^2(s+4)(s^2+3s+12)}$$

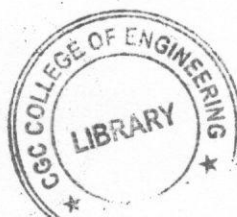
Find the steady state error coefficients and steady state error of the system when the input

$$r(t) = 2 + 5t + 2t^2$$

9. Discuss the following:

- (i) Synchros error detector
- (ii) Lead compensator

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SECTION - B

2. What is DMA? Give an example, where DMA mode of data transfer is useful.
3. What is a Mapping Function? What are the ways cache can be mapped?
4. How the data is represented in computer architecture? Explain with example
5. What are the various addressing modes? Give examples.
6. Formulate a six-segment instruction pipeline for a computer. Specify the operations to be performed in each pipeline.

SECTION - C

7. Explain the difference between hardwired control and micro-programmed control. Is it possible to have a hardwired control associated with a control memory?
8. a) Discuss the role of cache coherency in parallel processors?
b) What is Instruction Hazard? Explain the methods of dealing with instruction hazards.
9. What is the need of replacement algorithms in memory organization? Explain with example.

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Total No. of Questions: 09

DISCRETE MATHEMATICS

M.Code: 77626

Time: 3 Hrs.

Max. Marks: 60

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.

1. Answer briefly:

- How many people among 200000 people are born at same time (hour, minute, seconds).
- Define Integral domain.
- Give an example of a relation which is reflexive but neither symmetric nor transitive.
- Define invertible function.
- Write down the truth table of $(p \leftrightarrow q) \wedge (\sim r)$.
- Is there a simple graph G with six vertices of degree 1, 3, 4, 6, 7?
- Define Perfect Graph.
- Give an example of a connected graph that has a Euler circuit but no Hamiltonian circuit.
- Explain normal subgroup.
- Explain equivalence relation with example.



SECTION-B

2. Determine whether the relation R is a partial order on the set Z where R is defined on Z as,
 $a R b$ if $a = 2b$.
3. Show that the graph K_5 is non-planar.
4. Show that intersection of two partial order relation is a partial order relation.
5. Prove that $(p \vee q) \wedge (\sim p \wedge \sim q)$ is a contradiction.
6. Let $A = \{1, 2, 3, 4, 5\}$. Define functions $f: A \rightarrow B$ (if possible) such that
 - (i) f is one to one and onto.
 - (ii) f is neither one to one nor onto.

SECTION-C

7. Draw the binary expression tree, when inorder and postorder traversal of the tree is given as follows:

Postorder:	k	l	-m	+	n	p	q	r	t-l	+	-*
Inorder:	k	-	l+m	*	n	-	p	+	q/r	-	*

8. A subgroup H of a group G is a normal subgroup of G iff $ghg^{-1} \in H$ for every $h \in H, g \in G$.
9. Find the number of positive integers from 1 to 300 which are
 - (i) divisible by atleast one of 3, 5 and 7.
 - (ii) divisible by 3 and 5 but not by 7.
 - (iii) divisible by 3 but not by 5 and 7.

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Roll No.

Total No. of Questions : 09

DATA STRUCTURES

M.Code : 96267

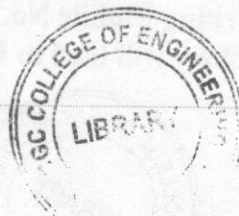
Time : 3 Hrs.

Max. Marks : 60

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

1. Answer briefly :

- State one purpose of pointer arithmetic.
- Write the Big O complexity of binary search.
- A two-dimensional array $A[3][4]$ is stored row-wise. How many elements are present before $A[2][1]$?
- Which linked list is more suitable for backward traversal?
- Name the stack operation that removes the top element.
- Mention one advantage of a priority queue over a normal queue.
- In a binary tree, how many children can a node have at most?
- Which type of heap is commonly used for ascending order sorting?
- In an unweighted graph, which graph traversal is more suitable for finding the shortest path?



- j) Which collision resolution method uses another hash function to find the next location?

SECTION-B

2. Distinguish between linear search and binary search with respect to method, complexity, and applicability.
3. A circular queue of size 5 currently contains 10, 20, 30 with front = 0 and rear = 2. Show the values of front and rear after inserting 40 and deleting one element.
4. Differentiate between preorder, inorder, and postorder traversal of a binary tree.
5. Compare direct address tables and hash tables with respect to memory requirement and access efficiency.
6. Convert the postfix expression $AB+C*DE/-$ into its equivalent infix expression.

SECTION-C

7. Insert the elements 40, 18, 25, 70, 60, and 90 into a max heap one by one. Show the heap after each insertion and write the final array representation.
8. Differentiate merge sort, quick sort, and heap sort on the basis of strategy, time complexity, and extra memory requirement.
9. Represent the following graph using both adjacency matrix and adjacency list:
Vertices: A, B, C, D
Edges: (A, B), (A, C), (B, D), (C, D)

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Roll No.

Total No. of Questions : 09

MATHEMATICS-III (PROBABILITY AND STATISTICS)
Subject Code : BTAM-22222

Subject Code : BTAM-302-23

M.Code : 94630

Date of Examination : 21-05-2026

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.

SECTION - A

1. Write briefly :

- What is the value of skewness for a symmetrical distribution?
- What is a leptokurtic distribution?
- What is the probability of an impossible event?
- Define conditional probability.
- Define a bivariate distribution.
- Which distribution is always symmetric?
- What is a critical region?
- Define Type II error.
- How does t-distribution differ from normal distribution?
- How are ties handled in rank correlation?



SECTION-B

2. Obtain the Karl Pearson's measure of skewness for the following data:

Values	0-5	5-10	10-15	15-20	20-25
Frequency	7	10	20	8	5

3. A random variable X has the following distribution:

X	0	1	2	3
p(x)	k	2k	3k	4k

Find:

- (i) k
 - (ii) $E(X)$
 - (iii) variance
4. A machine produces items with defect probability $p=0.02$. A batch contains 200 items.
- a) Approximate using Poisson distribution.
 - b) Find probability of exactly 3 defective items.
 - c) Find probability of no defective items.
5. In a random sample of 400 items from a large consignment, 20 items are found to be defective. Find 99% confidence limits for the percentage of defectives in consignment.
6. A die is thrown 120 times and the results are:

Outcome	1	2	3	4	5	6
Frequency	15	20	18	22	25	20

Test whether the die is fair using chi-square test at 5% level.



SECTION-C

7. The lifetime of a battery is normally distributed with mean 500 hours and standard deviation 50 hours.

a) Find probability that lifetime is less than 450 hours.

b) Find probability that lifetime lies between 480 and 520 hours.

c) Find the value below which 10% of batteries fail.

8. The following data is given:

X	5	10	15	20	25
Y	7	9	14	18	20

a) Calculate correlation coefficient.

b) Find regression equation of Y on X.

c) Estimate Y for $X=30$.

9. A manufacturer claims that a new battery lasts at least 2 hours longer than the old one.

Samples of 36 batteries each give:

	Mean	Standard Deviation
New battery	42 hrs	4 hrs
Old battery	39 hrs	3 hrs

Test at 5% level whether or not the claim is substantiated.

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Roll No.

Total No. of Questions : 09

COMPUTER ORGANIZATION AND ARCHITECTURE

M.Code: 77627

Time: 3 Hrs.

INSTRUCTIONS TO CANDIDATES :

- ## SECTION - A

1. Write brief note on:

- 1 | 1-77627



SECTION - B

2. What is DMA? Give an example, where DMA mode of data transfer is useful.
3. What is a Mapping Function? What are the ways cache can be mapped?
4. How the data is represented in computer architecture? Explain with example
5. What are the various addressing modes? Give examples.
6. Formulate a six-segment instruction pipeline for a computer. Specify the operations to be performed in each pipeline.

SECTION - C

7. Explain the difference between hardwired control and micro-programmed control. Is it possible to have a hardwired control associated with a control memory?
8. a) Discuss the role of cache coherency in parallel processors?
b) What is Instruction Hazard? Explain the methods of dealing with instruction hazards.
9. What is the need of replacement algorithms in memory organization? Explain with example.

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Roll No.

Total No. of Pages : 02

Subject Code : BTEL-401

M.Code : 96272

Date of Examination : 21-05-2026

Time : 3 Hrs.

Max. Marks : 60

Instruction 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 student has to attempt any **FOUR** questions.
3. Section-C contains **THREE** questions carrying **TEN** marks each and student has to attempt any **TWO** questions.

SECTION-A

1. Write short notes on :

- (a) Define absolute and relative error.
- (b) State Bisection method.
- (c) Write Newton–Raphson iteration formula.
- (d) Define forward difference operator.
- (e) What is interpolation?
- (f) Define least squares method.
- (g) State trapezoidal rule.
- (h) What is Gaussian elimination?
- (i) Define eigenvalues.
- (j) Write Euler’s method formula.



SECTION-B

2. (a) Find absolute and relative error if true value = 2.7183 and approximate value = 2.71.
(b) Find maximum possible error in sum of 12.3 and 4.56.
3. Use Bisection method to find a root of $x^3 - x - 2 = 0$ in the interval $[1, 2]$ correct to three decimal places.
4. Use Newton-Raphson method to find root of $x^2 - 5 = 0$ starting with $x_0 = 2$.
5. Using Newton's forward interpolation, find $y(1.5)$ from:

x	1	2	3	4
y	1	8	27	64

6. Fit a straight line $y = a + bx$ to the data:

x	1	2	3	4
y	6	5	7	10

SECTION-C

7. (a) Evaluate $\int_0^2 \frac{1}{1+x^2} dx$ using trapezoidal rule with $h = 0.5$.

(b) Derive Simpson's $\frac{1}{3}$ rule.

8. Solve using Gaussian elimination:

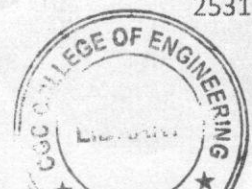
$$\begin{aligned}x + y + z &= 6 \\2x + 3y + z &= 10 \\x + 2y + 3z &= 13\end{aligned}$$

9. (a) Use Euler's method to find $y(0.2)$ given

$$\frac{dy}{dx} = x + y, y(0) = 1, h = 0.1$$

(b) Explain Runge-Kutta method of 4th order.

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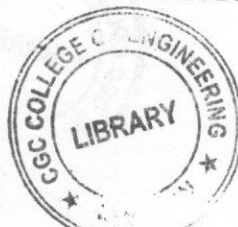
SECTION-B

2. Discuss in detail various characteristics of an algorithm. Explain different ways to measure performance of an algorithm.
3. Describe Greedy approach and explain why it is not always guaranteed to find a globally optimal solution.
4. Explain the methodology of Reduction techniques and how they are essential for proving that a problem belongs to the NP-complete class.
5. Discuss why Approximation algorithms are necessary for solving certain optimization problems. Explain how the quality of an approximation is measured using the approximation ratio.
6. Explain step by step the process of constructing a spanning tree using Breadth-First Search (BFS) with the help of an example.

SECTION-C

7. What are recurrence relations? Discuss in detail the methods for solving recurrence relations with examples.
8. Describe the process of topological sorting using DFS with the help of an example. Explain its significance in scheduling problems.
9. What are NP-hard and NP-complete problems? Explain the importance of distinguishing between tractable and intractable problems.

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JUN 2026

Roll No.

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Total No. of Pages :02

Total No. of Questions : 09

B.Tech. (Electronics & Computer Engineering) (Sem.-4)
ELECTRONICS MEASUREMENTS AND INSTRUMENTATION

Subject Code : BTEC-404

M.Code : 96271

Date of Examination : 19-05-2026

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FOUR questions carrying EIGHT marks each.
3. SECTION-C contains FOUR questions carrying EIGHT marks each.
4. The student has to attempt any 5 questions selecting at least two questions from each of the B and C sections.

SECTION-A

1. Answer briefly :

- (a) Mention the significance of measurements.
- (b) What do you mean by smart sensors?
- (c) Give the difference between sensitivity and selectivity.
- (d) What are the various sources of errors in Q-Meter?
- (e) Explain the principle of Wheatstone bridge.
- (f) What is a rectifier-type voltmeter?
- (g) Explain the concept of null detection in bridges.
- (h) Define bridge sensitivity. How is it improved?
- (i) What are the different types of Digital Voltmeter?
- (j) What is auto-ranging in DVM?



SECTION-B

2. Explain the different types of errors that can occur in measurements.
3. Derive the balance equations of Maxwell Bridge and explain its limitations.
4. Describe the working of ramp-type DVM with neat diagram.
5. A digital meter reads 5.00 V with an accuracy of $\pm 1\%$. Determine the possible range of true voltage.

SECTION-C

6. Explain the principle and working of LVDT transducer.
7. (a) Explain the different types of static characteristics of the measurement system.
(b) With neat diagram, explain the construction, working, torque equation, advantages, and disadvantages of PMMC instrument.
8. (a) What is piezoelectric effect? How can it be used to measure force? Explain with neat diagram.
(b) Explain with neat diagram the working of the instrumentation amplifier.
9. Write short notes on:
 - (a) Hay bridge (with diagrams and equations).
 - (b) Spectrum Analyzer.
 - (c) CRO.

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Roll No.

Total No. of Questions : 09

OPERATING SYSTEM

Subject Code : BTCS-402-18

M.Code :77628

Max. Marks : 60

Time : 3 Hrs.

INSTRUCTIONS TO CANDIDATES :

- 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.

SECTION-A

1. Write briefly :
- List types of Operating Systems.
 - State one advantage of a microkernel approach to structure of an Operating System
 - Differentiate between process and thread.
 - Write one advantage of multithreading.
 - What is Peterson's solution used for?
 - State one use of semaphores.
 - What are the four necessary conditions for a deadlock to occur?
 - What is a safe state in deadlock avoidance?
 - State the difference between internal and external fragmentation.
 - Define file allocation. State one drawback of contiguous allocation.



SECTION-B

2. Explain operating system services in detail.
3. Write a detailed note on Multiprocessor scheduling.
4. Explain message passing as a method of inter-process communication.
5. Write a detailed note on Deadlock Prevention.
6. Write a short note on disk formatting and bad blocks.

SECTION-C

7. Write a detailed note on following:
 - a) Explain in detail about Concept of Virtual Machine.
 - b) Write a detailed note on Scheduling Objectives and Type of Schedulers.
8. Write a detailed note on:
 - a) Write a detailed note on Reader's & Writer Problem in detail.
 - b) Explain free space management techniques in detail.
9. Write a detailed note on Paging scheme of Memory Management.

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JUN 2026

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.-5)

WEB TECHNOLOGIES

Subject Code : BTCS 520-18

M.Code : 78326

Date of Examination : 24-06-2026

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.

SECTION-A

1. Write briefly :
 - a) What is XML? Write any two characteristics of XML.
 - b) Define an Array in PHP.
 - c) List different types of operators available in PHP.
 - d) What is DATE object in JavaScript?
 - e) Differentiate between HTTP and HTTPS.
 - f) Write the features of CSS3.
 - g) Define naming rules in XML.
 - h) Define Session and Cookies.
 - i) What is JavaScript? Write the advantages of JavaScript?
 - j) Define Anchor tag with an example.



SECTION-B

2. What are various types of Internet connections?
3. Explain the structure of the HTML webpage with an example.
4. Explain different types of statements available in PHP.
5. Define Event. How events are handled in JavaScript.
6. Illustrate the web server and proxy server.

SECTION-C

7. Explain the UDDI web service in AJAX.
8. Explain with an example program how to connect to a SQL Server database from a PHP script.
9. Define Form tag. Design a Registration page by using all Form controls.

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JUN 2026

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech (CSE-AI&ML/AI&ML) (Sem.-5)

JAVA PROGRAMMING

Subject Code : BTAIML-509-20

M.Code : 93185

Date of Examination : 24-06-2026

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

- 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.

SECTION-A

1. Write briefly :
- a) What is JDK?
 - b) List various data types in Java
 - c) What is API in Java?
 - d) What are string classes?
 - e) What is a web browser?
 - f) What are Applets?
 - g) Define an interface?
 - h) What is a package?
 - i) What are inner classes?
 - j) What is the purpose of AWT?



SECTION-B

2. What are the basic language elements in JAVA?
3. What are the types of inheritance in Java? Explain all of them with illustrative examples.
4. Explain the collection framework in detail.
5. Discuss Tokenization of a string taking suitable example.
6. Explain need and role of Polymorphism in JAVA.

SECTION-C

7. Explain with suitable examples how the packages can be created, imported and used. Also elaborate on its scope.
8. Explain adding a Menu to Window. Also, explain adding GUI features using Swing Components.
9. Discuss JDBC drivers and Architecture, CURD operation using JDBC and connecting to non-conventional databases.

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JUN 2026

Roll No.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (AI&DS/Block Chain/CSE-CS/DS/CSD) (Sem. -5,7)

COMPUTER NETWORKS

Subject Code : BTCS 504-18

M.Code : 93919

Date of Examination : 20-06-2026

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.

SECTION-A

1. Write briefly :

- a) What is Telnet? How it works?
- b) Differentiate between LAN, MAN and WAN.
- c) What is multiplexing? Discuss.
- d) Write advantages and disadvantages of fiber optic cable.
- e) Compare OSI and TCP/IP models.
- f) Compare bus and ring topologies.
- g) Discuss CSMA protocol
- h) Discuss FTP protocol.
- i) What do you understand by DNS? How does DNS work?
- j) Briefly explain IPv6 protocol.



SECTION-B

2. Explain the structure and working of e-mail.
3. Discuss the Leaky Bucket congestion control algorithm with the help of a suitable example.
4. Explain the construction and properties of co-axial cable. Also write its advantages and disadvantages.
5. Explain the Shortest Path Routing Protocol.
6. Discuss various CSMA protocols.

SECTION-C

7. Explain in detail the OSI reference model with functioning of each layer. Also write merits and demerits of OSI model.
8. Explain various wireless transmission media used for data communication in detail.
9. Explain in detail various error detection and correction codes with examples.

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Roll No.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.-5)

COMPUTER NETWORKS

Subject Code : BTCS 504-18

M.Code : 78323

Date of Examination : 19-06-2026

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.

SECTION - A

1. Write briefly :

- a) Explain in brief the term DHCP.
- b) Write various steps to configure DNS.
- c) Explain the concept of ALOHA.
- d) What is firewall? Give examples.
- e) Differentiate between forward and unicast routing protocol.
- f) Explain the role of SNMP.
- g) What is VLAN? Which IEEE standard governs it?
- h) Explain the term ARP.
- i) What are QoS improving techniques?
- j) Explain the concept of bluetooth with example.



SECTION-B

2. What is topology and discuss types of topologies.
3. Explain the working of CRC for error detection with an example.
4. Discuss the role of switching in data communication.
5. Explain leaky bucket and token bucket algorithm.
6. What do you mean by DNS? What is the role of it?

SECTION-C

7. What is the advantage of IPV6 addressing? Give frame structure of IPV6 header. Explain which network layer protocol is responsible for address resolution.
8. Write a short note on: (a) DDNS (b) WWW
9. What do you mean by error detection and correction? Discuss cyclic redundancy check.

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JUN 2026

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.-5)

PROGRAMMING IN PYTHON

Subject Code : BTCS-510-18

M.Code : 78324

Date of Examination : 22-06-2026

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.

SECTION - A

1. Write briefly :

- (a) Differentiate between mutable and immutable data types in Python with examples.
- (b) How will you declare a dictionary in Python? Write 4 common operations performed on dictionaries.
- (c) List and explain any 4 mathematical functions available in Python's math module.
- (d) How is indexing used to access individual characters in a string? Give example.
- (e) What is the purpose of `__str__()` and `__repr__()` methods in Python classes?
- (f) Describe the role of DB programming in Python.
- (g) What is the purpose of file handling in Python? Explain two modes of opening a file.
- (h) Which packages are used for data visualization and numerical processing in Python?
- (i) Define package in Python. How is it different from a module?
- (j) What is the role of the `issubset()`, `issuperset()`, and `isdisjoint()` methods in Python sets?

Give example.

SECTION-B

2. Write Python code to replace all occurrences of a substring in a given string using regular expressions.
3. Does Python support operator overloading? Justify your answer with a suitable programming example.
4. What are exceptions? How does Python handle exceptions? Give suitable example.
5. Describe dictionaries with 4 methods used with Python.
6. How will you create buttons and labels in a Python GUI using Tkinter? Write code to demonstrate.

SECTION-C

7. Discuss in detail about object-oriented programming (OOP) features in Python. How does Python implement inheritance and polymorphism? Write code to demonstrate multiple inheritance.
8. Design a menu-driven program in Python using user-defined functions to perform operations on lists:
 - a) Insert an element
 - b) Delete an element
 - c) Search an element
 - d) Display the list
9. What is the role of CGI programming? Differentiate the significance of get and post methods with program.

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- h) How does file buffering improve file handling performance in Python?
- i) Why are generators more memory efficient than normal functions returning lists? Explain the concept.
- j) How does the with statement ensure better resource management compared to traditional file handling?

SECTION-B

2. How is the identity operator different from == operator? Justify your answer with an example. Also, find the output of below given code snippet.

```
a = 10
```

```
b = 4
```

```
result = (a >> 1) + (b << 1) - (a & b)
```

```
print(result)
```

Locate and map each of the operators used in the above code snippet to its proper operator category and also mention their associativity and precedence.

3. Suppose there is a List L of numbers varying from 1 to 10. Write a program to count the frequency of a given number in the list of numbers.

```
L=[2,5,2,6,4,2,3,6,4,6,4,5,7]
```

4. Explain the concept of recursion in Python. How does it differ from iteration? Write a recursive function to calculate the factorial of a number and discuss the advantages and limitations of using recursion.
5. Explain the concept of file handling in Python. Describe different file modes (r, w, a, etc.) and illustrate how to perform read and write operations using examples. Also, explain the importance of closing a file and how the with statement helps in file management.

6. What are generators in Python? Explain how they are created using the yield keyword.

Write a generator function to generate the first n Fibonacci numbers and discuss how generators differ from normal functions in terms of execution and memory usage.

SECTION-C

7. A software company is developing a Python-based application to manage employee records. The system should store employee details, allow updating and retrieving information, and handle errors such as invalid inputs or missing data files. The developers also want to structure the program using classes so that different types of employees (e.g., permanent and contractual) can be managed efficiently. Based on this scenario, explain how object-oriented programming concepts such as classes, objects, inheritance, and encapsulation can be applied to design the system. Also, describe how exception handling can be used to manage runtime errors and ensure smooth execution of the program. Provide suitable examples to support your explanation.
8. Differentiate between list, set, tuple and dictionary with an example. What will be the output for each print statement of the code given below.

```
list1=[1, 2, 3, 4, 7, 1, 9]
```

```
list1.pop(1)
```

```
print (list1)
```

```
list1.remove(1)
```

```
print (list1)
```

```
list1.clear()
```

```
print(list1)
```

```
del list1
```



```
print(list1)
```

Also state the reason behind the stated output, mentioning the functionalities of pop(), clear(), remove() and del.

9. Explain how functions and modules can be used to design an efficient Python program.

Discuss different types of function arguments and also mention how does the scope and lifetime of a variable impact the final output of a program? Justify your answer by determining the output of below given code and also mention the reasons behind your output in terms of scope and lifetime of a variable.

```
val = 0
```

```
def function1():
```

```
    print("Printing inside function1",val)
```

```
    return
```

```
def function2(val):
```

```
    print("Printing inside function2 first",val)
```

```
    val = 20
```

```
    print("Printing inside function2 Second",val)
```

```
    return
```

```
function1()
```

```
print("Printing outside function1 ",val)
```

```
function2(val)
```

```
print("Printing outside function2",val)
```

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Roll No.

Total No. of Pages: 02

Total No. of Questions: 09

B.Tech. (CSE) (Sem.-5)
SOFTWARE ENGINEERING

Subject Code : BTCS-503-18

M.Code : 78322

Date of Examination : 16-06-2026

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.

SECTION - A

1. Write briefly :
- Define CBSE.
 - What is a Generic Process Model?
 - What do you mean by modelling using UML?
 - What is a feasibility study?
 - Define Software Engineering as per IEEE standard.
 - Differentiate between cohesion and coupling.
 - Explain in brief about PSP.
 - Explain the concept of software maintenance with the help of a suitable example.
 - What are software reliability metrics?
 - For a given project estimated with a size of 300 KLOC, calculate the Effort and Scheduled time for development, considering the developer has high application experience and very low experience in programming.



SECTION – B

2. Differentiate alpha testing from beta testing and discuss in detail the phases in which alpha and beta testing is done and how it is related to milestones and deliverables.
3. Compare and contrast the benefits of validation and verification in a project.
4. Explain briefly object modelling using UML. Explain with the help of suitable examples.
5. Compare and contrast functional and non-functional requirements.
6. Write various Principles that Guide Practice. Explain all principles of any one module of the Software Development Life Cycle.

SECTION – C

7. Write a short note on:
 - (a) PERT Chart
 - (b) GANTT Chart
- 8.. (a) Give various software reliability metrics.
 - (b) Differentiate between white box and black box testing.
9. Explain with the help of suitable examples and use suitable assumptions if any:
 - (a) SEI CMMI
 - (b) ISO

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JUN 2026

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Artificial Intelligence & Machine Learning)(Sem.-5)

DATA VISUALIZATION USING TABLEAU

Subject Code :BTAIML 505-20

M.Code :93181

Date of Examination : 16-06-2026

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.

SECTION-A

1. Write briefly :
- What do you mean by data visualization tools? Explain with an example
 - What are the data types supported in Tableau?
 - What are the filters? Name the different filters in Tableau.
 - What is a parameter? Write the steps to implement parameters using Tableau
 - What is the purpose of creating a dumbbell chart?
 - What are the strengths and limitations of Tableau when it comes to data visualization
 - What is the impact of sorting data manually in Tableau, and how can it improve visualizations?
 - What are alerts in Tableau dashboards?
 - What type of charts are commonly used to display trends over time?
 - Differentiate between symbol maps and heat maps.

SECTION-B



2. A dataset contains Date, Sales, and Profit for the last 5 years.
 - (a) Which visualization would best show the trend of sales over time?
 - (b) Explain how trend lines can help analyze this data in Tableau.
3. Explain the purpose of charts in detail by taking an example.
4. Discuss different techniques used in Tableau to represent relationships between variables.
5. Explain the concept of one-dimensional unit charts and their applications.
6. Explain data preparation tips for trend analysis. Discuss handling missing values and outliers.

SECTION-C

7. What is Data Blending in Tableau? Explain how it works and how it differs from data joining. Also illustrate a real-world situation where data blending is more suitable than joining datasets.
8. Consider an e-commerce dataset containing information about Orders, Customer Segment, Return Percentage, and Time,
 - (a) Design a dashboard that includes a pie chart for customer segments, a heat map showing returns over time, and a polygon map representing regional distribution
 - (b) Create calculated fields to determine the retention rate and use parameters to enable dynamic filtering. Explain the logic behind these calculations.
9. Write short notes on the following:
 - (a) Alerts in dashboard
 - (b) Histogram
 - (c) Box Plot
 - (d) Marks Card
 - (e) Encoding

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Roll No.

Total No. of Questions : 09

STATISTICAL COMPUTING TECHNIQUES USING R

Subject Code : BTES 501-20

M.Code : 93170

Date of Examination : 11-06-2026

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.

SECTION - A

1. Write briefly :
- What is the use of `scan()` function in R?
 - What is the purpose of `names()` attribute in vectors?
 - What is meant by sub-setting with logical conditions?
 - What is an R script file?
 - Define standard deviation.
 - What is simulation in statistics?
 - Define contingency table.
 - What is bootstrap method?
 - What is dataframe column?
 - What is plot customization?



SECTION-B

2. Explain how data can be imported from external sources into R using different functions.
Discuss challenges in handling external data.
3. Discuss the role of apply-type functions in R. How do they improve efficiency compared to loops?
4. Describe how histograms, boxplots, and scatterplots help in understanding data distribution and relationships.
5. Discuss the concept of regression modelling and its importance in prediction and analysis.
6. Explain how graphics and tables can be combined for effective data presentation in R.

SECTION-C

7. Write an R program to generate Fibonacci series using loops and conditional statements.
8. Discuss how data names and custom classes can be used to organize complex data in R.
9. Explain the concept of generalized linear models and their advantages over simple regression.

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Roll No.

Total No. of Pages : 02

B.Tech. (AI&DS/DS) (Sem.-5)
DATABASE MANAGEMENT SYSTEM
Subject Code : BTCS501-18
M.Code : 93937
Date of Examination : 16-06-2026

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.

1. Write briefly :

- What is the difference between Data and Information?
- Define a Schema and a Database Instance.
- What are the symbols used for Attribute and Relationship in an ER diagram?
- Explain the concept of a Foreign Key.
- What is the difference between the 'DELETE' and 'DROP' commands?
- Define Atomicity in transaction processing.
- What is the use of a Dense Index?
- Briefly describe Discretionary Access Control (DAC).
- What is a Web Database?
- What is a Distributed Database?



SECTION-B

2. Describe the roles and responsibilities of a Database Administrator (DBA).
3. Explain the Entity-Relationship (ER) model concepts of Generalization and Specialization with examples.
4. Write SQL queries for the following:
 - (a) Create a table 'Student' with fields Roll No, Name, and Course.
 - (b) Insert one record into the 'Student' table.
 - (c) Retrieve all students whose name starts with 'A'.
5. Discuss the Optimistic Concurrency Control technique.
6. Explain the concept of Intrusion Detection in database security.

SECTION-C

7. What is Normalization? Explain Boyce-Codd Normal Form (BCNF) and how it differs from 3NF with a suitable example.
8. Define Relational Calculus. Explain Tuple Relational Calculus (TRC) and Domain Relational Calculus (DRC) with illustrative queries.
9. Discuss Transaction Processing in detail. Explain the various states of a transaction (Active, Partially Committed, Committed, Failed, Aborted) using a state transition diagram.

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Roll No.

Total No. of Questions : 09

DATABASE MANAGEMENT SYSTEMS

M.Code : 78320

Time : 3 Hrs.

Max. Marks : 60

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.

1. Write briefly :

- What is the primary difference between DDL and DML? Provide an example of a command for each.
- In SQL, what is the difference between a JOIN operation and a UNION operation?
- Briefly explain the different storage strategies used in Databases.
- What are the four ACID properties in database systems, and why are they essential for transaction management?
- Explain the difference between authentication and authorization in the context of database security.
- What is a distributed database, and how does it differ from a centralized database in terms of architecture?
- What are integrity constraints in a relational database? Explain the role of primary key and foreign key constraints.

- h) What is the purpose of the TRUNCATE command in SQL and how does it differ from DELETE in terms of performance?
- i) Explain different types of attributes used in ER diagrams with examples.
- j) How does a shared lock differ from an exclusive lock in database systems?

SECTION-B

2. Describe the Network Data Model and its advantages over the Hierarchical model.
3. What are the different types of Joins used in RDBMS? Explain any 2 with the help of examples.
4. What is the role of the root, internal nodes, and leaf nodes in a B-tree? How does this structure impact query efficiency?
5. Is the following schedule serializable? If not, then explain the possibilities:

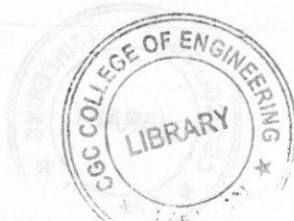
T1	T2
R(A)	
W(A)	
	R(A)
	W(A)
	R(B)
	W(B)
	Commit
R(B)	
W(B)	
Commit	

6. What do you mean by cardinality? What are different kinds of mapping cardinalities?

SECTION-C

7. What is the difference between static and dynamic hashing, and in what situations would dynamic hashing be more appropriate?
8. Discuss different recovery techniques such as log-based recovery and checkpointing.
9. Create an ER diagram on Library Management System.

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SECTION-A



SECTION-B

2. Construct a finite automaton that accepts the language generated by the regular grammar:

$$S \rightarrow aA \mid bB$$

$$A \rightarrow aS \mid a$$

$$B \rightarrow bS \mid b$$

3. Show that the grammar is ambiguous:

$$E \rightarrow E + E \mid E * E \mid id$$

4. Define Context-Sensitive Grammar (CSG). Explain its components with an example.

5. Construct a Turing Machine (TM) to accept the language $L = \{0^n 1^{2n} \mid n \geq 0\}$ over the alphabet $\Sigma = \{0, 1, 2\}$.

6. Explain the Halting Problem and prove that it is undecidable.

SECTION-C

7. Prove the following two closure properties:

(a) Regular languages are closed under intersection. (Given two regular languages A and B over same alphabet Σ , prove $A \cap B$ is regular)

(b) Context-free languages are closed under union. (Given two context-free languages A and B over same alphabet Σ , prove $A \cup B$ is context-free)

8. Describe the NFA and DFA in brief. Also, explain the construction of DFA for the following regular expression:

$$r = (0+1)^* (00+11) (0+1)^*$$

9. Write short notes on the following:

(a) Cook-Levin Theorem



- (b) Vertex Cover Problem
- (c) Ambiguity in CFG
- (d) Post correspondence problem
- (e) Epsilon transition

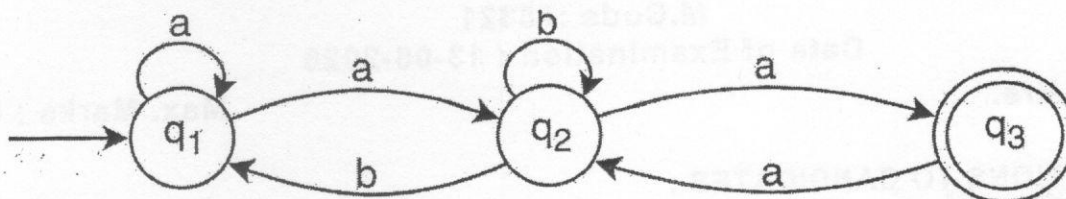
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Roll No.

SECTION-B

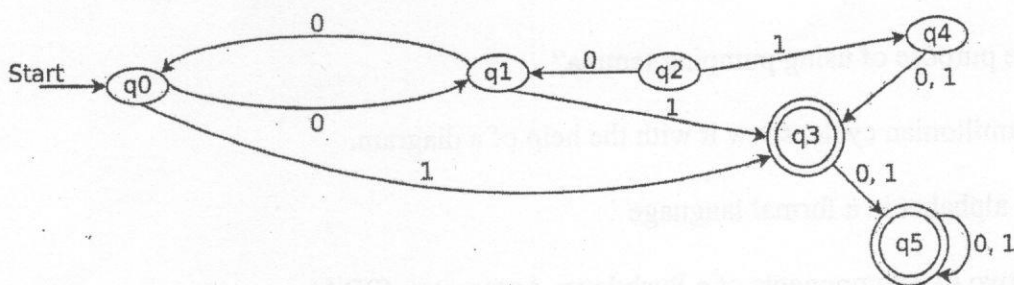
2. Find the string which is represented by the following transition system. The states given are q_1 , q_2 & q_3 .



3. Discuss the properties of regular languages.
4. Explain the difference between a language being "decidable" and "recognizable"
5. Give differences between DFA and NFA.
6. What are closure properties? Explain any four.

SECTION-C

7. Discuss the Chomsky hierarchy highlighting the types of grammars.
8. What is Turing machine and discuss the various representation of the same.
9. Minimize the following automata.



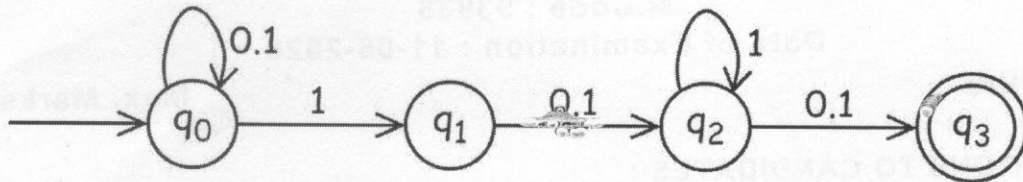
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SECTION-B

2. (a) Explain the concept of finite automata. Consider the following finite automata. Which set of states are reachable for the string 0011?



- (b) Design an automata for all binary strings with at least one 0.
3. The CFG is said to be ambiguous if there exists at least one word of its language that can be generated by different production trees. Comment on the statement. True/False? Why?
4. If L is a regular language and F is a finite language (i.e., a language with a finite number of words), then $L \cup F$ must be a regular language. Comment on the statement. True/False? Why?
5. What is CFG? Determine whether the given set of grammar are context-free or not.
- (a) $\{a^n b^m c^k \mid n, m, k \geq 1 \text{ and } (n + k = m)\}$
- (b) $\{a^i b^j c^k d^l \mid i, j, k, l \geq 1, i = k, j = l\}$
6. Let A, B, C be arbitrary sets of strings. Write whether the following expressions are TRUE or FALSE and, if TRUE, mention the law applied.
- (i) $AA^* = A^*A = A +$
- (ii) $AB = BA$

SECTION-C

7. Given the grammar: $S \rightarrow aSbS \mid bSaS \mid \epsilon$ Convert the grammar into Chomsky Normal Form (CNF) and construct a PDA. Explain step-by-step method.

8. State Pumping Lemma. Using the pumping lemma for regular languages, prove that the language $L = \{a^n b^n \mid n \geq 0\}$ is not regular. Provide a complete contradiction-based proof.

9. (a) Explain the working of minimization of DFA for the given language:

$$L = \{w \in \{0,1\}^* \mid w \text{ ends with } 01 \text{ and contains at least two } 1\text{'s}\}$$

(b) Convert the following regular expression into an equivalent NFA, then convert the NFA into a DFA: $R = (a + b)^* abb$ Show all intermediate steps clearly.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.-5)

ENTERPRISE RESOURCE PLANNINGS

Subject Code : BTES 501-18

M.Code : 78319

Date of Examination : 09-06-2026

Time : 3 Hrs.

Máx. 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.

SECTION-A

1. **Write briefly :**
 - a) What are the three fundamental components of CRM?
 - b) Define the term “ERP”.
 - c) Expand the term “SAP”. What are SAP R/2 and SAP R/3?
 - d) What is the significance of Information Technology in ERP?
 - e) “ERP is a catalyst of fundamental changes in organizations” – Comment?
 - f) List any two limitations of ERP.
 - g) What is impact of free open source software in ERP implementation?
 - h) What are the core components of the SAP system?
 - i) Identify the common functions performed by DBMS in an ERP.
 - j) Name the functional modules of the ERP system.



SECTION-B

2. What is BPR? What is its need and importance?
3. What is the role played by ORACLE in ERP marketplace?
4. How internet is useful in the implementation and growth of ERP? Explain.
5. Differentiate between ERP and multiple software applications. Explain with the help of an example and suitable assumptions.
6. Explain Quality management module in ERP package.

SECTION-C

7. What are the 12 rules of OLAP? What are their advantages and disadvantages?
8. Explain various phases of ERP implementation life-cycle.
9. Explain various benefits of ERP package achieved at various levels of business modules.

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Roll No.

Total No. of Questions : 09

Subject Code :BTAIML501-20

M.Code :93173

Date of Examination : 09-06-2026

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.

SECTION-A

1. Write Briefly:

- Differentiate between variables and keyword.
- Write short note on Non-associative operators.
- Give an example to highlight the benefit of using dictionaries in Python.
- What is the use of Lambda function?
- What are anonymous functions?
- How Pass by reference function calling happens? Briefly explain.
- What is the use of read and write methods in file management?
- What is the use of destructors?
- Give an example demonstrating use of auto iterators.
- What is the difference between DefaultDict and UserDict?



SECTION-B

2. What are different ways of reading input from a user? How command line arguments are parsed?
3. Differentiate between Tuple and Set in detail.
4. Explain in detail the benefits of user defined functions in a Python program. Give an example to support your claims.
5. With an example highlight the benefit of using Exception Handling. What would happen if no exception handling is implemented in a program?
6. What are generators? What are different in-built functions defined for generators?

SECTION-C

7. What are strings? What are the different in-built functions defined over strings? Explain with help of examples.
8. What are modules in python? What is the need of modules? How they are different from functions?
9. Why Classes are created in python? What is the role of constructors in a class? Explain with an example.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (AI&ML/CSE) (Sem.-5)

ARTIFICIAL INTELLIGENCE

Subject Code :BTAIML-502-20

M.Code :93174

Date of Examination : 13-06-2026

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.

SECTION-A**1. Write briefly :**

1. What is Artificial Intelligence (AI)?
2. Differentiate between narrow AI and general AI.
3. Define the term "agent" in AI.
4. What is a knowledge base in AI?
5. What is heuristic search?
6. What is the difference between BFS and DFS?
7. What is the Turing Test?
8. Define natural language processing (NLP).
9. What is the role of data in AI systems?
10. What is an expert system?



SECTION-B

2. What are the various heuristic techniques? Discuss with example.
3. Express the following as a semantic net with interconnected nodes and labeled arcs:
"Company ABC is a software development company. Three departments within the company are Sales, Administration and Programming. Joe is a manager of programming. Bill and Sue are programmers. Sue is married to Sam. Sam is editor of PHI. They have three children, and they live on Elm street. Sue wears glasses and is 5.5 feet tall."
4. What are the characteristics of an AI problem? Discuss with the help of the traveling salesman problem.
5. Under what conditions would it make sense to use both forward and backward chaining?
6. Explain the concept of explanation-based learning (EBL).

SECTION-C

7. What is meant by a "Knowledge-based system"? Describe the basic components of a knowledge-based system. Also mention the various levels of knowledge representation.
8. Compare and contrast rote learning and inductive learning in the context of problem solving in AI, with appropriate examples.
9. What is minimax search for game playing? Explain the Min-Max algorithm.

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Roll No.

Total No. of Questions : 09

ARTIFICIAL INTELLIGENCE

M.Code : 93940

Date of Examination : 09-06-2026

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.

SECTION-A

1. Write briefly :
 - a) Differentiate between weak artificial intelligence and strong artificial intelligence. Give the PAGE (Percepts, Actions, Goals, Environment) description of a medical diagnosis agent.
 - b) List the properties of agent environments.
 - c) Differentiate between a simple reflex agent and a goal-based agent.
 - d) Explain the role of search trees in state space search.
 - e) Discuss the application of Bayesian networks in uncertain reasoning.
 - f) Explain how decision trees are constructed from training examples.
 - g) Discuss the role of attribute selection measures
 - h) Discuss the role of the knowledge base and inference engine in an expert system
 - i) Explain the concept of Learning from Examples.
 - j) Discuss the approaches of Rote Learning and Learning by Taking Advice.



SECTION-B

2. What are Constraint Satisfaction Problems? Explain the use of backtracking search and local search methods for solving CSPs.
3. What is inference in knowledge-based systems? Explain Forward Chaining and Backward Chaining reasoning strategies with examples. Compare their applications and efficiency.
4. State and derive Bayes' Rule. Explain its application in uncertain reasoning with a worked-out example.
5. Describe Winston's Learning Program for concept formation. Explain the process of generalization and specialization. Discuss its significance and limitations.
6. Explain the concept of an Expert System Shell. How does it differ from a full expert system? Discuss its importance in building domain-specific expert systems. Provide examples of commonly used shells.

SECTION-C

7. What are heuristic search strategies? Explain Hill Climbing, Best-First Search, and A* algorithms in detail. Compare their effectiveness in terms of efficiency and optimality.
8. Explain the Minimax algorithm used in game-playing. Illustrate with a simple game tree. How does Alpha-Beta pruning improve the efficiency of Minimax?
9. Explain different knowledge representation schemes such as semantic networks, conceptual dependency, frames, and scripts. Compare their advantages and limitations.

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Roll No.

Total No. of Questions : 09

MACHINE LEARNING

M.Code :93947

Date of Examination : 29-05-2026 .

Max. Marks : 60

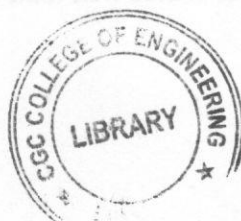
INSTRUCTIONS TO CANDIDATES :

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.

SECTION-A

1. Write briefly :

- (a) What are the basic components of a learning system? Differentiate between supervised and unsupervised learning?
- (b) What is reinforcement learning? How is it helpful in improving learning system?
- (c) Why is data pre-processing required? Differentiate data cleaning and data integration.
- (d) Differentiate simple linear regression and multiple linear regression with example?
- (e) What is clustering? Mention the convergence criterias to stop clustering.
- (f) Discuss the concept and role of Gini Index in decision tree algorithm.
- (g) What is association rule learning? Give few applications where association rule mining can boost prediction.
- (h) Define mutation in genetic algorithms. When is it helpful?
- (i) What is an artificial neural network (ANN)? Mention its characteristics.
- (j) Discuss the importance of fitness function showing mathematical equations.



SECTION-B

2. Explain different data preprocessing methods: cleaning, integration, transformation, and reduction.
3. Discuss different performance evaluation metrics for regression models (RMSE, MAE, R^2).
4. Derive the equation of simple linear regression and explain how coefficients are estimated using the least squares method.
5. Compare hierarchical clustering and partition-based clustering highlighting the complexities of both.
6. Explain genetic algorithms and their operators like selection, crossover and mutation.

SECTION-C

7. Explain the working of Artificial Neural Networks (ANNs) including neuron model, activation functions, and learning process. Also discuss the role of genetic algorithms in optimization.
8. Compare simple, multiple, and polynomial regression models. Discuss their assumptions, advantages, and potential problems like multicollinearity and overfitting.
9. Write short notes on the following:
 - (a) k-Nearest Neighbour algorithm
 - (b) Decision Tree algorithm

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Total No. of Questions: 09

DEEP LEARNING

M.Code: 93966

Time: 3 Hrs.

Max. Marks: 60

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.

1. Answer the following questions briefly:

- a) Distinguish between supervised and unsupervised learning.
- b) What is the significance of variance in a model?
- c) Define architectural design in feedforward networks.
- d) What is bagging in the context of ensemble learning?
- e) Write the mathematical expression for the basic convolution function.
- f) What are unsupervised features in convolutional neural networks (CNNs)?
- g) State the role of the encoder in sequence-to-sequence (Seq2Seq) models.
- h) What is a deep recurrent network?
- i) Define a directed generative network.
- j) What are deep Boltzmann machines?



SECTION-B

2. Discuss and analyze the impact of Maximum Likelihood Estimation (MLE) on model training.
3. Discuss the use of computational graphs in simplifying the backpropagation process.
Why is dropout used in deep feedforward networks?
4. Explain the convolution algorithm and discuss its efficiency for high-dimensional data.
5. Describe the working of recursive neural networks for structured data. How do they differ from Echo State Networks?
6. Explain the architecture of sigmoid belief networks and discuss their role in the evolution of deep generative models.

SECTION-C

7. Describe the encoder-decoder sequence-to-sequence architecture in detail. Explain how this architecture is applied to machine translation tasks.
8. Discuss the stochastic gradient descent (SGD) algorithm with an example. List and explain its advantages and disadvantages in deep networks.
9. Write short notes on the following:
 - (a) Neuroscientific basis of CNNs
 - (b) Parameter penalties

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Total No. of Questions: 09

MOBILE APPLICATION DEVELOPMENT

M.Code :79258

Time: 3 Hrs.

Max. Marks: 60

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.

1. Explain briefly:

- What are system permissions in Android, and why are they important for applications?
- What is an Android Emulator and why is it used in mobile app development?
- How does Text-to-Speech (TTS) enhance user experience in mobile applications?
- Which API would you use to send an SMS programmatically in an Android application?
- What is a mobile agent in the context of mobile computing?
- What are the different frameworks and tools used in development of mobile applications?
- Define the Open Handset Alliance and state its main objective.
- What are Intents in Android? Mention their two main types.
- Define mobile software engineering.
- What is the role of activity lifecycle in mobile app development?



SECTION-B

2. Describe two common methods hackers use to gain unauthorized access and explain one preventive measure for each.
3. What is a Content Provider in Android, and why is it used?
4. Discuss Android application fundamentals. Explain the lifecycle and role of core components such as activities, services, broadcast receivers, and content providers.
5. Explain the key components of the mobility landscape. How do mobile devices, wireless networks, and cloud services interact to enable modern mobile applications?
6. Explain the difference between unit testing, integration testing, and system testing with examples.

SECTION-C

7. Explain the following:
 - (a) Android User
 - (b) Telephony & SMS APIs
 - (c) SQLite
 - (d) Shared Preferences
8. Explain Android Multimedia and list mobile applications.
9. Explain the different states in the life cycle of an Android Service and how the system manages them.

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Roll No.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE/Block Chain/ECE)(Sem.-6)

CLOUD COMPUTING

Subject Code : BTCS-612-18

M.Code : 79254

Date of Examination : 09-05-2026 .

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.

SECTION-A

1. Write briefly :

- a) List any two essential characteristics of cloud computing.
- b) Differentiate between Type-1 and Type-2 hypervisors.
- c) What is hardware-assisted virtualization?
- d) Write the various types of hypervisors.
- e) Define multitenancy in cloud architecture.
- f) What is IaaS?
- g) What is PaaS?
- h) What is RESTful API in cloud services?
- i) What is Elasticity in cloud computing?
- j) What is meant by data confidentiality in cloud security?



SECTION – B

2. Explain in detail the architecture and working of cloud service models (IaaS, PaaS, SaaS) with examples.
3. Explain different types of cloud deployment models.
4. Explain virtualization techniques and their role in resource abstraction.
5. Compare public cloud and private cloud with respect to security and cost.
6. Explain multitenancy and its impact on resource utilization in cloud systems.

SECTION – C

7. Discuss cloud computing concepts including virtualization, hypervisors, multitenancy, scalability, and elasticity.
8. Elaborate the architecture of cloud computing systems, including virtualization layer, service models, and workload distribution.
9. Discuss in detail cloud migration strategies and selection criteria for deployment models with real-world use cases.

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JUN 2026

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Total No. of Pages: 02

Total No. of Questions: 09

B.Tech. (Artificial Intelligence & Machine Learning) (Sem.-6)

MACHINE LEARNING

Subject Code: BTCS-619-18

M.Code: 93666

Date of Examination: 07-05-2026

Time: 3 Hrs.

Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:

- 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.

SECTION-A

1. **Answer briefly:**
 - a) Why machine learning is important?
 - b) Define what a model is in machine learning.
 - c) What is biasness in ML model?
 - d) What is semi supervised learning?
 - e) Define data normalization
 - f) What is linear regression?
 - g) Define terms false positive and false negative.
 - h) What is class label?
 - i) What is tree pruning?
 - j) List one limitation of Naive Bayes classification.



SECTION-B

2. Discuss how choosing the right algorithm impacts the performance of a machine learning model.
3. Compare different metrics used for evaluating the performance of regression models.
4. Discuss the use of support vector machines in binary classification tasks.
5. Discuss the terms support, confidence and lift used in ARM.
6. What is ANN? How do activation functions influence an ANN?

SECTION-C

7. What is data preprocessing? Explain the steps involved in transforming raw data into a format suitable for machine learning models.
8. What is clustering? Discuss the use of the k-means clustering algorithm in customer segmentation and the challenges involved in selecting the optimal number of clusters.
9. Write a short note on
 - a) ROC Curve
 - b) Polynomial Regression.

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Total No. of Questions : 09

Subject Code: BTCS-602-18

M.Code: 79250

Date of Examination: 07-05-2026

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.

1. Write briefly :

- Define Artificial Intelligence and list any two of its major goals.
- What do you mean by state space representation in problem-solving?
- Define heuristic search and give one example.
- Write one difference between depth-first search (DFS) and breadth-first search (BFS).
- Define conditional probability and write its formula.
- What is a Bayesian Network?
- Define utility function in the context of decision theory.
- What is the main difference between value iteration and policy iteration?
- What is Q-learning? Write its basic update equation.
- Define temporal difference (TD) learning in reinforcement learning.



SECTION-B

2. Discuss the problem formulation process in AI. How do state, goal, and operators play a role in defining a problem?
3. What is game search in AI? Explain the concept of minimax algorithm and the role of alpha-beta pruning with an example.
4. Explain Bayes' Rule in detail. How is it used to update probabilities based on new evidence? Give an example.
5. Explain the formulation of a Markov Decision Process (MDP). Describe its main components with examples.
6. Explain the concept of Passive Reinforcement Learning. How does direct utility estimation work in this context?

SECTION-C

7. Describe the different types of agents and their environments in AI with suitable examples.
8. Discuss the A* algorithm in detail. Write its evaluation function and explain how it combines cost and heuristic information.
9. Write short notes:
 - (a) Temporal models in AI. How do they handle uncertainty and time-dependent information?
 - (b) Partially Observable Markov Decision Processes (POMDPs), their structure and applications in AI decision-making.

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Total No. of Questions : 09

Subject Code : BTITCS 601-20

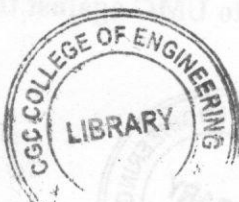
Date of Examination : 07-05-2026

Max. Marks : 60

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.

1. Write briefly :

- (a) What is data analytics?
- (b) What is a vector in R?
- (c) What is a histogram?
- (d) What is the need for data analytics?
- (e) What is a decision tree?
- (f) What is a normal distribution?
- (g) What is logistic regression?
- (h) Explain survival analysis.
- (i) What is reinforcement learning?
- (j) Explain active learning.



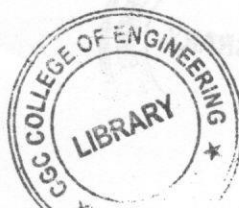
SECTION-B

2. Define semi-structured data with an example.
3. Explain how arrays are created in R with a small program.
4. Explain how scatter plots are created in R, illustrating with a program.
5. Explain time series analysis in R. Describe how it is performed and illustrate your answer with a suitable program.
6. Explain how a random forest is created?

SECTION-C

7. Compare active learning and reinforcement learning in detail. Explain the key characteristics of both approaches.
8. Explain how external data is imported into R in detail. Further, explain the functions and packages used in R for data import.
9. Explain regression techniques in R along with an example for each.

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Total No. of Questions : 09

COMPILER DESIGN

Subject Code : BTCS-601-18

M.Code : 79249

Date of Examination : 04-05-2026

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

- 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.

SECTION-A

1. Write briefly :
 - a) What role does look ahead pointer plays during input buffering.
 - b) Give any example of ambiguous grammar.
 - c) What is the purpose of symbol table?
 - d) What is a regular expression, give example of any regular expression?
 - e) Syntax tree
 - f) What is difference between parse tree and syntax tree?
 - g) What do you mean by DAG
 - h) Differentiate between top down and bottom up parser.
 - i) What are the various components of CFG?
 - j) Differentiate between compiler and interpreter.



SECTION-B

2. Explain shift reduce parsing with help of an example.
3. Discuss run time storage management.
4. Design a DFA over an alphabet $\Sigma = \{a,b\}$ that accepts all strings ending with ab.
5. Differentiate between parse tree and syntax tree with the use of suitable example.
6. Check whether the following grammar is LR(1) or not?

$S \rightarrow CC$

$C \rightarrow cC \mid b$

SECTION-C

7. Construct the LR(0) parsing table for the following grammar

$S \rightarrow L = R$

$S \rightarrow R$

$L \rightarrow * R$

$L \rightarrow id$

$R \rightarrow L$

Also check whether the above grammar is LR(0) or not?

8. (a) What is peephole optimization?
(b) Machine dependent code.
9. By taking suitable example explain the role of various phases of compiler.

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JUN 2026

Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

B.Tech. (AI&ML) (Sem.-6)
NETWORKS

COMPUTER NETWORKS

Subject Code : BTCS-504-18
M. Code : 93665

M.Code : 93665

Date of Examination : 04-05-2026

Max. Marks : 60

Time : 3 Hrs.

INSTRUCTIONS TO CANDIDATES :
SECTION A is COMPULSORY

- 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.

SECTION-A

1. Answer briefly :
- Define the term Protocols and Standards.
 - Write advantages of Wave Division Multiplexing.
 - Explain the term Hamming Distance.
 - What is the need of Error detection? Explain in brief.
 - What do you mean by Unicast Routing protocols.
 - Discuss about RARP in brief.
 - Define congestion.
 - Write advantages of Token Bucket Algorithm.
 - Explain in brief about the term DDNS.
 - Discuss about Bluetooth in brief.



SECTION-B

2. Write a detailed note on Frequency Division Multiplexing.
3. Explain in detail about Block coding.
4. Write a detailed note on ARP.
5. Write a detailed note on SCTP.
6. Write a detailed note on Firewalls.

SECTION-C

7. Write a detailed note on various Connection Topologies.
8. Explain in detail about the following protocols:
 - (a) Pure ALOHA
 - (b) BOOTP
9. Write a detailed note on the following:
 - (a) User Datagram Protocol (UDP)
 - (b) Domain Name System (DNS)

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JUN 2026

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Total No. of Pages :02

Total No. of Questions : 09

B.Tech. (Artificial Intelligence (AI) and Data Science) (Sem.-6)

BIG DATA ANALYTICS

Subject Code :BTDS 603-20

M.Code :93960

Date of Examination : 09-05-2026

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.

SECTION-A

I. Answer the following :

- (a) List any two characteristics of Big Data.
- (b) What is the purpose of Hadoop?
- (c) Name any two phases of the analytics lifecycle?
- (d) Why is model evaluation important?
- (e) Differentiate between classification and regression with an example?
- (f) What is meant by Naive Bayes assumption?
- (g) Define Decision Tree in simple terms.
- (h) What is K-means clustering used for?
- (i) Give two examples of visualization tools or charts.
- (j) What is meant by final analytics report?



SECTION-B

2. Compare Hadoop MapReduce with traditional data processing systems. Highlight advantages and limitations.
3. Explain the importance of feature engineering and feature selection in the data analytics process.
4. Explain the concept of model evaluation metrics such as accuracy, precision, recall, and F1-score with suitable examples.
5. Discuss the principles of effective data visualization design and common mistakes to avoid.
6. Compare Decision Tree and Naive Bayes classifiers based on working, assumptions, and performance.

SECTION-C

7. Explain the complete process of data preprocessing in detail. Discuss various techniques such as data cleaning, transformation, reduction, and discretization with suitable examples.
8. Discuss the end-to-end process of building a machine learning model, including training, testing, evaluation, and visualization of results. Explain how insights are derived.
9. Write short notes on the following:
 - (a) K-means clustering and its real-world applications.
 - (b) Phases of Data Analytics Lifecycle and its significance.

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SF-14-(9)

Total No. of Pages : 02

B.Tech. (Artificial Intelligence & Machine Learning) (Sem.-6)

Subject Code : BTCS-702-18

Date of Examination : 12-05-2026

Max. Marks : 60

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.

1. Write briefly :

- a) What is the purpose of a data warehouse?
- b) What does ETL stand for in data warehousing?
- c) What is the goal of association rule mining?
- d) What is supervised learning in data mining?
- e) What is the role of feature selection in classification?
- f) What is the primary goal of clustering?
- g) List two characteristics of a search engine.
- h) What is web crawling's role in search engine operations?
- i) What is web content mining?
- j) What is direct hashing?

SECTION-B

2. What are the primary advantages of implementing a star schema in a data warehouse?
3. Explain the concept of a Hybrid OLAP (HOLAP) data cube and its role in integrating the strengths of MOLAP and ROLAP.
4. What is the primary goal of association rule mining in data mining, and how is it applied in real-world scenarios?
5. Explain how classification algorithms are used in data mining to categorize data into predefined classes or labels.
6. Explain the concept of web content mining and its role in extracting useful information from web pages or documents.

SECTION-C

7. Discuss the importance of cluster analysis in identifying meaningful patterns within data sets and also compare the advantages and disadvantages of partitioning with hierarchical clustering methods.
8. Describe the role of web crawling and indexing in search engine operations.
9. How does data preprocessing contribute to enhancing the efficiency and accuracy of data mining algorithms, and what are some common challenges associated with this process?

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SECTION B

2. Describe the operation of a cellular system during a call.
3. Calculate frequency reuse distance formula in a communication system.
4. Explain selection diversity combining with block diagram.
5. Explain the need for multiple access techniques in cellular systems.
6. Discuss various 4G and 5G mobile techniques.

SECTION C

7. Explain packet radio protocols. Discuss advantages of packet switching over circuit switching.
8. Explain different IEEE standards used in wireless communication.
9. Explain forward CDMA channels (pilot, sync, paging and traffic).

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JUN 2026

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (AI & ML) (Sem.-6)

ADVANCE COMPUTING AND NETWORK TECHNOLOGIES

Subject Code : BTAIML-607-20

M.Code : 93681

Date of Examination : 23-05-2026

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.

SECTION-A

1. Write briefly :

- a) What is hypervisor?
- b) What is software as a service (SaaS)?
- c) Define elasticity in cloud computing.
- d) List any four characteristics of fog computing?
- e) What is the need of fog and edge computing middleware?
- f) Define WPAN.
- g) What is Visible Light Communication (VLC)?
- h) What is OFDM?
- i) What is meant by energy efficiency in sensor networks?
- j) What is reactive routing protocol?



SECTION-B

2. Differentiate between Type 1 and Type 2 hypervisors with examples.
3. List and explain security challenges in fog and edge computing.
4. Explain the physical layer technologies in wireless networks.
5. What is the difference between Vehicle-to-Infrastructure (V2I) and Vehicle-to-Vehicle (V2V) communication?
6. What is LEACH protocol in WSNs?

SECTION-C

7. Describe in detail the different cloud deployment models - public cloud, private cloud, hybrid cloud, and community cloud. Also explain their architecture, key characteristics, advantages, limitations and real-world applications to each.
8. Describe the architecture of fog computing. Further, discuss the communication and network model used in fog computing.
9. Discuss MAC protocols for Ad Hoc and wireless sensor networks in detail.

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Roll No.

Total No. of Questions : 09

BIG DATA ANALYTICS

M.Code :93675

Time : 3 Hrs.

Max. Marks : 60

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.

1. Write briefly :

- Why do you need to tame the big data?
- What is HDFS?
- List some big data platforms.
- What is unstructured data analytics?
- What is k-means clustering?
- What are the measures of similarity and dissimilarity?
- What is data preprocessing?
- Differentiate between supervised and unsupervised learning.
- What is a dashboard?
- Name some final deliverables in big data.



SECTION-B

2. What is Big Data? Describe the main features of big data in detail.
3. Explain in detail about Storage Considerations in Big Data.
4. Explain the life cycle phases of Data Analytics.
5. Explain the association rule mining problem. Consider an example with the following set of transactions (10 items). Assume we wish to find association rules with at least 30% support and 60% confidence. Find the frequent itemset and then the association rules.

TID	Items bought
001	B,M,T,Y
002	B, M
003	A, T, S, P ,
004	A, B, C, D
005	A, B
006	T, Y, E, M
007	A. B. M
008	B,C,D, T,P .
009	D. T. S
010	A, B, M

6. Explain visualization techniques for big data.

SECTION-C

7. Explain the process of logistic regression by taking a suitable example.
8. What are the advantages of Hadoop? Explain Hadoop Architecture and its Components with a proper diagram.
9. What are various Hadoop ecosystem components? Write a note on the MapReduce Framework.

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Roll No.

Total No. of Questions: 09

Subject Code: BTDS705-20

M.Code: 94023

Date of Examination:17-06-2026

Time: 3 Hrs.

Max. Marks: 60

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.

SECTION-A

1. Answer the following questions:

- What is the difference between knowledge sharing and knowledge delivery?
- What do you mean by efficacy score i in CCR model?
- Define Cluster Analysis?
- List two applications of out-liers analysis.
- Explain Data-warehousing.
- What do you mean by the term Business Intelligence?
- Explain descriptive modelling technique.
- What are scorecards and dashboards in Business Intelligence?
- Define infographics.
- State two differences between static and interactive visualisation with an example.



SECTION-B

2. Explain the role of mathematical and statistical models in Business Intelligence.
3. How the ETL(Extract/Transform/Load) beneficial in Business Intelligence?
4. How the predictive/descriptive and prescriptive modelling techniques are useful in Business Intelligence? Elaborate with an example.
5. Describe the steps that how CCR model is used in finding the efficiency in Business Intelligence.
6. Explain outlier analysis and its significance in Data warehousing organisation

SECTION-C

7. Describe case study showing how knowledge deliveries strategies effectively improve business performance.
8. Explain the case study of Business Intelligence implementation in retail /banking sector.
9. Explain the difference between CLAP and OLTP and its significance in Business Intelligence.

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Total No. of Questions : 09

NETWORK SECURITY APPLICATIONS USING AI

Subject Code : BTAIML 705-20

M.Code : 93994

Date of Examination : 17-06-2026

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.

SECTION - A

1. Write briefly :
 - a) What is the problem of underfitting or overfitting of ML model w.r.t. dataset.
 - b) Explain the term data cleaning.
 - c) Define Precision as a parameter to measure performance of AI model?
 - d) What factors decide the splitting of dataset into training and testing set?
 - e) What are the types of analysis adopted by IDPS?
 - f) List four common methods of credit card frauds?
 - g) Explain the suitability of using SVM classification?
 - h) How is mean absolute error determined in a dataset?
 - i) What is the disadvantage with decision tree-based classification algorithm?
 - j) Justify the use of machine learning in similarity matching based problems.



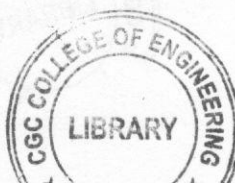
SECTION-B

2. Explain the framework of Machine learning with details in each step for prediction models.
3. Explain some of the red flags to identify a credit card fraud. List the preventive measures.
4. Using an example explain how logistic regression is used in classification?
5. List at least six, common characteristics of a Spam E-mail.
6. How is network security breached? How is prediction of attack different from prevention?

SECTION-C

7. Explain any NLP based E-mail spam detection algorithm.
8. Give anyone model of shallow ML based algorithm for Intrusion detection.
9. Explain ML performance metrics: Accuracy, Recall, F1-score, false positive and AUC.s.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (AI&ML/AI&DS/CSE) (Sem.-7)

ROUTING AND SWITCHING

Subject Code : BTEC-905A-18

M.Code : 90691

Date of Examination : 15-06-2026

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.

SECTION - A

1. Write briefly :

- a) What is ARP?
- b) What is dynamic routing?
- c) What is default gateway?
- d) Explain the term inter-VLAN routing.
- e) Write the purpose of DHCP.
- f) What is port security?
- g) Differentiate between IPv4 and IPv6.
- h) Write the application of FTP.
- i) Write the functions of NAT.
- j) What is VPN?

SECTION - B



2. Compare TCP and UDP and classify the situation where TCP outperforms UDP.
3. What do you mean by routing in networks? Discuss about link state routing with OSPF.
4. Describe the features and benefits of the VRP software package management system.
How does it differ from traditional monolithic image upgrades?
5. Discuss the role of NAT in computer networks.
6. Discuss the role of Authentication and Authorization in Network Security.

SECTION-C

7. Discuss in detail about establishing enterprise radio access network solutions.
8. How does VPN encryption protect data from attacks? Identify the types of attacks that VPNs can prevent and those they cannot.
9. Discuss the followings:
 - (i) IPv6 Application Services.
 - (ii) Internet Control Message Protocol (ICMP).

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JUN 2026

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Total No. of Pages: 02

Total No. of Questions: 09

B.Tech. (Artificial Intelligence & Machine Learning) (Sem.-7)

APPLIED INTELLIGENCE

Subject Code: BTAIML-709-20

M.Code: 93989

Date of Examination :12-06-2026

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.

SECTION-A

1. Answer briefly:

- a) What are random variables?
- b) Write about validation.
- c) What do you mean by system architecture?
- d) Write about intelligent agent.
- e) What is the use of sensors?
- f) What do you mean by "Propositional logic"?
- g) What is use of clustering?
- h) What do you mean by naive Bayes method?
- i) How AI and deep learning are correlated?
- j) What are actuators?



SECTION-B

2. Describe various classification methods.
3. Explain the full system process in System Engineering.
4. Write a detailed note on embedded systems.
5. What is use of tensorflow?
6. Explain various statistical learning methods in detail.

SECTION-C

7. Explain the logic and automated reasoning in detail.
8. Differentiate between "Artificial Neural Networks" and Neural Networks".
9. Explain the use of Markov processes and chains in detail.

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.



JUN 2026

Roll No.

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Total No. of Pages : 02

Total No. of Questions: 09

B.Tech. (Computer Science & Engg.)(Sem.-7)

AGILE SOFTWARE DEVELOPMENT

Subject Code: BTCS710-18

M.Code: 90501

Date of Examination: 10-06-2026

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.

SECTION- A

1. Answer the following questions:

- (a) Define Agile software development.
- (b) Define Extreme programming.
- (c) Write a brief note on the Single Responsibility Principle.
- (d) What is the Dependency Inversion Principle?
- (e) Who plays the 'Scrum Master' role, and what is their responsibility?
- (f) List any six practices of Extreme Programming.
- (g) What is the purpose of Work in Progress limits in Kanban?
- (h) Define a card in the Kanban system
- (i) Define regression testing.
- (j) What is the role of test automation in Agile?



SECTION- B

2. Discuss the Agile Manifesto. Explain the evolution of Agile, its brief history and motivation behind its emergence.
3. Describe the Open-Closed Principle and the Liskov Substitution Principle. How do these two principles contribute to extensibility and robustness in object-oriented design?
4. Explain the main artifacts in Scrum: Product Backlog, Sprint Backlog, and Increment. How do these artifacts ensure transparency and progress tracking in a Scrum project?
5. Explain the workflow in a Kanban system and how work is pulled between columns.
6. What is risk-based testing? Explain its role in prioritizing tests within Agile projects. How is it related to regression testing and test automation? Provide suitable examples.

SECTION- C

7. Compare traditional Software Development Life Cycle and Agile in terms of workflow, feedback cycles, and team collaboration.
8. Discuss in detail the Scrum events including Sprint, Sprint Planning, Daily Scrum, Review, and Retrospective.
9. Explain the basic values and principles of Extreme Programming (XP). How do they guide the overall development process? Discuss the roles in an XP project.

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JUN 2026

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Total No. of Pages : 03

Total No. of Questions: 09

B.Tech. (CSE-AI&ML/ AI&DS) (Sem.-7)

COMPUTER VISION

Subject Code: BTAI ML-701-20

M.Code: 94006

Date of Examination: 23-06-2026

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.

SECTION-A

1. Answer the following questions briefly:

1. (a) An 8-bit grayscale image has pixel values ranging from 0 to 255. If the image is quantized to 4 bits, how many gray levels remain? What is the effect on image quality?
- (b) Define spatial resolution. If a 512x512 image is displayed on a 4x4 inch screen, what is the spatial resolution in DPI?
- (c) Apply the power-law (gamma) transformation $s = c \cdot r^\gamma$ with $c = 1$ and $\gamma = 0.5$ to pixel intensity $r = 64$. What is the output intensity s ?
- (d) What is a histogram of a digital image? if a 4x4 image has pixel values $\{0,0,1,1,2,2,3,3,0,1,2,3,0,1,2,3\}$, compute its normalized histogram.
- (e) State the convolution theorem in the context of image processing. Why is filtering in the frequency domain sometimes preferred over spatial domain filtering?
- (f) What is image degradation? Write the degradation model equation and identify each term.



- (g) In the RGB color model, what are the coordinates of pure yellow, cyan, and magenta?
- (h) Define structuring element in morphological processing. For a binary image, what is the result of erosion if no part of the structuring element fits within the object?
- (i) What is disparity in stereo vision? if two cameras are 10 cm apart, the focal length is 5 cm, and the disparity of a point is 2 pixels (pixel size = 0.01 cm), calculate the depth Z .
- (j) What is a feature descriptor in object recognition? Name two popular feature descriptors and state one distinguishing property of each.

SECTION-B

2. Explain histogram equalization with a complete numerical example. Given the following 4-bit image (16 gray levels), compute the equalized histogram and the new pixel mapping: Pixel Values: {0, 0, 1, 2, 2, 3, 3, 3, 4, 4, 5, 6, 7, 7, 7, 7} in a 4x4 image.
3. Apply a 3x3 average (mean) filter to the following 5x5 image for the center pixel at position (3,3). Show all calculations: [10, 20, 30, 20, 10 / 20, 30, 40, 30, 20 / 30, 40, 50, 40, 30 / 20, 30, 40, 30. 20 / 10, 20, 30, 20, 10] Also explain when to prefer a Gaussian filter over an average filter.
4. Explain the concept of 2D Discrete Fourier Transform (DFT). If a 1 D signal is $x = [1, 2, 3, 4]$, compute its 4-point DFT manually and find the magnitude spectrum. Show step-by-step calculations.
5. Explain the Wiener filter for image restoration. Derive the Wiener filter expression in the frequency domain. If the degradation function $H(u,v) = 0.5$ and signal-to-noise ratio is 10, compute the Wiener filter output for an observed pixel value $G(u,v) = 20$.



6. Explain the Sobel edge detection operator. Apply the Sobel operator (both G_x and G_y masks) on the following 3×3 neighborhood and compute the gradient magnitude and direction: $[80, 80, 120 / 80, 80, 120 / 80, 80, 120]$

SECTION-C

7. Explain morphological opening and closing operations. For the following binary image and a 3×1 horizontal structuring element $B = [1 \ 1 \ 1]$, perform erosion then dilation (opening) step by step: Image row: $[0, 1, 1, 0, 1, 1, 1, 0, 1, 0]$. Show intermediate and final results.
8. Describe the stereo vision pipeline: camera calibration, rectification, disparity map computation, and 3D reconstruction. Two rectified cameras with baseline $B = 15$ cm, focal length $b = 8$ cm, pixel size $= 0.02$ cm observe a point with disparity $d = 4$ pixels. Find the depth Z of the point.
9. Describe the Bag of Words (BoW) model for image classification. How is a visual vocabulary built, and how is an image represented as a histogram of visual words? Apply to a scenario where you have 3 visual words and a query image with feature assignments $[w_1, w_2, w_1, w_3, w_2, w_1]$. Compute the BoW histogram.

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Roll No.

Total No. of Questions : 09

COMPILER DESIGN

M.Code :93988

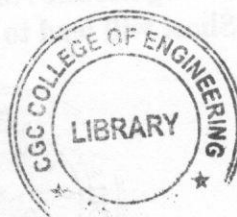
Time : 3 Hrs.

Max. Marks : 60

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1. Write briefly :

- a) Describe the role of lexical analysis in compiler design?
- b) Define Dead-code elimination with example.
- c) List the various error recovery strategies for a lexical analysis.
- d) Define Regular Expressions and Regular Grammar.
- e) What are the three functions of backpatching?
- f) Define a syntax-directed translation.
- g) Differences between SLR, CLR, LALR parsers?
- h) Define symbol table.
- i) Name any four procedural optimization techniques.
- j) Give the applications of DAG.



SECTION-B

2. How to design the compiler by using the source program position: :=initial+rate*60 .
3. Explain the Storage Organization with simple examples.
4. Write about all issues in code generation. Describe it
5. Describe the representation of 3-address code with an examples.
6. Construct the recursive decent parser for the following grammar:
 - a. $E \rightarrow E+T/T$
 - b. $T \rightarrow T*F/F$
 - c. $F \rightarrow (E)/id$

SECTION-C

7. Explain optimization techniques on Basic Blocks with simple examples?
8. Elaborate the Translation scheme of SDD.
9. Explain LEX Tool with an Lex Programme?

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SECTION-B

2. What do you mean by color image processing? Explain with respect to the RGB color model in detail.
3. What is the role of illumination in Image acquisition? Explain in detail.
4. What do you mean by wavelet processing? Explain 1-D wavelet transform in detail.
5. What do you mean by morphological algorithms? Explain any one algorithm with an example in detail.
6. Explain the concept of feature extraction using SIFT (Scale Invariant Feature Transfer) in detail.

SECTION-C

7. What is Object Recognition? List two object recognition techniques in detail
8. Write short note on (a) Image Compression (b) Image resolution.
9. State any five factors affecting the image quality during Image acquisition. Explain the steps involved for it also.

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Roll No.

Total No. of Questions: 09

ADHOC AND WIRELESS SENSOR NETWORKS

M.Code: 90507

Time: 3 Hrs.

INSTRUCTIONS TO CANDIDATES:

- ## SECTION - A

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SECTION-B

2. Explain the characteristics of Ad hoc networks and compare them with traditional wireless networks.
3. Describe the issue involved in designing routing protocols for Ad hoc wireless networks.
4. Describe the key management technique used in wireless sensor networks.
5. Explain energy consumption issues in wireless sensor networks and methods to reduce them.
6. Describe IEEE 802.15.4 standard and its role in wireless sensor networks.

SECTION-C

7. Describe the working principles of MAC protocols in wireless sensor networks and explain how they handle energy efficiency and collisions.
8. Explain various types of security threats in wireless sensor networks and discuss technique used to achieve secure communication.
9. Explain collision avoidance mechanisms in MAC protocols and their importance in wireless communication.

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Roll No.

Total No. of Questions : 09

NETWORK SECURITY AND CRYPTOGRAPHY

M.Code : 90487

Max. Marks : 60

Time : 3 Hrs.

INSTRUCTIONS TO CANDIDATES :

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3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

1. Write briefly:

- Define CIA triad in security.
- Give examples of active threats.
- Name any two public key cryptographic algorithms.
- Why do we need digital signatures?
- Suppose you receive a digital message with a hash appended. How would you verify its integrity?
- What is the main advantage of elliptic curve cryptography?
- Difference between a block cipher and a stream cipher?
- What is Kerberos?
- What is Access Control List (ACL)?
- Define packet filtering.



SECTION-B

2. Describe the various security services and mechanisms.
3. Explain Fermat's Little Theorem along with its cryptographic applications.
4. Briefly explain the concept and purpose of a Message Authentication Code (MAC).
5. Explain Kerberos protocol for authentication with steps and architecture.
6. Compare and contrast anomaly-based and misuse-based intrusion detection techniques.

SECTION-C

7. Define cryptography. Explain the major goals of network security and how cryptography helps in achieving them.
8. Discuss the role of digital signatures in ensuring authentication, integrity, and non-repudiation.
9. Write a short note on:
 - a) DES encryption using neat diagram.
 - b) Hardware and software firewalls.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.-7,8)

DATA MINING AND DATA WAREHOUSING

Subject Code : BTCS-702-18

M.Code : 90488

Date of Examination : 28-04-2026

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
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SECTION - A

1. Write briefly :

- a) Define Data characterization.
- b) Define the term HOLAP.
- c) What is Metadata?
- d) Define data reduction.
- e) What is Cluster Analysis?
- f) What are the various sources for data warehouse?
- g) What is Classification?
- h) What is DHP?
- i) What is DIC?
- j) Define web data mining.



SECTION-B

2. List and discuss the characteristics and main functions performed by the components of a data warehouse. Give diagrammatic illustration.
3. What is the use of data mining task? What are the basic types of data mining tasks? Explain with examples.
4. Write and explain the algorithm for mining frequent item sets with candidate generation. Give relevant example.
5. Describe in detail about types of data in cluster analysis.
6. List out some variants of Apriori Algorithm.

SECTION-C

7. Explain the Density-based methods and Constraint-based cluster analysis in detail.
8. Explain the architecture of Search Engine along with its characteristics.
9. Write a short note on Web Content Mining.

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