



### SECTION - B

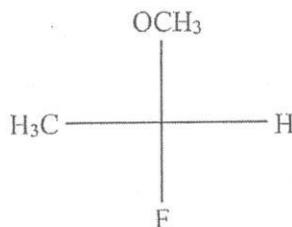
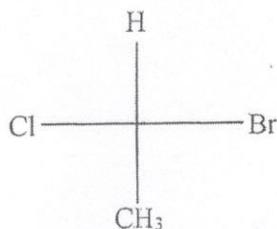
2. Draw the Molecular orbital energy level diagram of  $N_2^+$  molecule. Also, calculate its bond order and determine its magnetic behaviour.
3. a) What is Fluorescence? Discuss its application in medicine.  
b) What are molecular vibrations? Discuss its types.
4. a) Derive Vander Waal's equation of state for real gases.  
b) What are critical constant? Explain.
5. a) What is hardness of water? How can we remove permanent hardness of water?  
b) What is electro negativity? How does it vary in the periodic table?

### SECTION - C

6. a) Explain why electron affinity of halogen are very high?  
b) In each of the following pairs, which will provide greater conduction of electricity and why?
  - i) Copper wire at  $30^\circ C$  or same copper wire at  $100^\circ C$ .
  - ii) KCl solution at  $25^\circ C$  or same KCl solution at  $50^\circ C$ .
  - iii)  $0 \times 1 M NH_4OH$  at  $25^\circ C$  or  $2 M NH_4OH$  at  $25^\circ C$ .
7. Explain the following :
  - a) Electronegativity of elements increase on moving from left to right in the periodic table.
  - b) Ionization enthalpy decrease in a group from top to bottom.

8. a) What is optical activity and specific rotation?

b) Assign RS configuration of the following :



9. a) Describe the synthesis of any drug molecule.

b) What are elimination reactions? Explain with examples.

**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.**



00 DEC 2025

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

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 : 08-01-2026

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. Write briefly :**

- a) What is linear combination of atomic orbital?
- b) What are Auxochromes?
- c) What is Cell potential?
- d) What are dipolar interactions?
- e) Explain the trend of ionization potential across the periodic table.
- f) What are Enantiomers?
- g) What is Friedel craft alkylation reaction?
- h) How many signals are present in Proton NMR of ethylbenzene?
- i) What is Polarizability?
- j) Differentiate between temporary and permanent hardness of water.

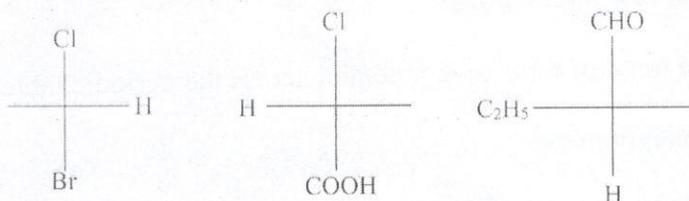


### SECTION - B

2. a) Describe the Schrodinger's wave equation for particle in one dimensional box.  
b) Draw the molecular orbital energy level diagram of  $N_2$  molecule.
3. a) Discuss in detail Crystal field splitting in tetrahedral complexes.  
b) What is role of doping on band structure of solid?
4. a) What are the factors affecting the value of  $\lambda_{max}$  and intensity of spectral line in UV-spectroscopy?  
b) Differentiate stretching and bending mode of molecular vibrations.
5. a) Derive the Vander Waals equation of state.  
b) Discuss the potential energy surface diagram of  $H_3$ .

### SECTION - C

6. a) Discuss the lime soda process for softening of hard water.  
b) What is electrochemical corrosion? Discuss its mechanism.
7. a) What is electron affinity? How it shows variation along the period and down the group?  
b) Write short notes on HSAB principle.
8. a) Describe the conformational analysis of ethane.  
b) Write the R and S system of nomenclature.



9. a) What are free radical reaction? Discuss in detail.  
b) Write the synthesis of aspirin.

**NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.**



B.Mr-13  
09

2  
00 DEC 2025

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

**SEMI-CONDUCTOR PHYSICS**

Subject Code : BTPH-104-18

M.Code : 75360

Date of Examination : 10-01-2026

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) What is E-k diagram?
- b) What does Bloch's theorem state about particles in a periodic potential?
- c) "In a solid, consider the energy level lying  $0.04 \text{ eV}$  above Fermi level". What is the probability of this level being occupied by an electron at  $150 \text{ K}$ ?
- d) What is carrier diffusion, and how is it different from carrier drift?
- e) Differentiate between an Ohmic contact and a Schottky contact in metal-semiconductor junctions.
- f) Obtain the probability of emission for Stimulated emission.
- g) When a laser has  $4 \text{ V}$  applied to it, it draws  $10 \text{ mA}$  and produce  $3 \text{ mW}$  of optical power. What is the efficiency of laser?
- h) What is the principle behind measuring the wavelength of a semiconductor laser?
- i) What information can be extracted from the I-V characteristics of a diode?
- j) Discuss the advantages of four probe method over two probe method.



### SECTION - B

2. Explain the free electron theory of metals. Derive an expression for the density of states in three dimensional systems.
3. Using the Kronig-Penny model, derive an expression that shows the formation of allowed and forbidden energy bands in a periodic potential.
4. What are diffusion and drift current? Explain the origin of contact potential, while formation of p-n junction.
5. Describe the variation of Fermi level in a semiconductor with impurity concentration and temperature.

### SECTION - C

6. Explain the principle, construction and working of a semiconductor laser with diagram.
7. Describe the concept of joint density of states in semiconductors. Explain, how it affects optical transitions and derive the joint density of states for a simple semiconductor?
8. What is Four-point probe method? How to calculate the band gap using Four-point probe method?
9. a) What is Capacitance-voltage measurements? What information can be obtained using it?  
b) What information can be obtained using Hot-point probe measurement?

**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.**

00 DEC 2025

Roll No. 

--	--	--	--	--	--	--	--	--	--

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 : 10-01-2026

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) Write the following statement using single stroke capital vertical letters of 12 mm size : "MONEY AND SUCCESS DONT CHANGE PEOPLE; THEY MERELY AMPLIFY WHAT IS ALREADY THERE"
- b) Draw projections of a line lying on a Profile Plane whose front view is larger than its top view. Which angle is bigger " $\theta$ " or " $\phi$ "? Show with the help of a suitable free hand drawing.
- c) Explain the difference between 1<sup>st</sup> Angle Projection and 3<sup>rd</sup> Angle Projection.
- d) Show conventional representation of Concrete and Wood on a Drawing sheet.
- e) Explain Frustum and Truncated Solids with a suitable drawing.
- f) Draw a regular pentagonal lamina of side 68 mm.
- g) What are isometric lines and non-isometric lines?
- h) Show by means of traces, a plane perpendicular to HP and inclined to VP.
- i) Explain with suitable example the various types of dimensions.
- j) Draw projections of a line inclined to HP and parallel to VP with a suitable freehand drawing. Also, show traces.

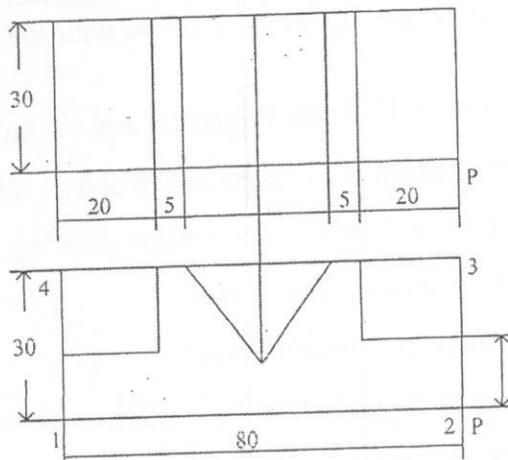


### SECTION - B

2. Line "CD" 68 mm long; has its end "C" on HP and 22 mm from VP. The line is inclined at  $42^\circ$  to the "HP" and  $35^\circ$  to the "VP". Draw its projections when the line is lying in first quadrant.
3. The distance between Delhi and Agra is 200 km. In a railway map, it is represented by a line 5 cm long. Find its R.F. Draw a diagonal scale to show single km and long enough to measure up to 600km.
4. A point "K" is 42mm below HP and lying in 3<sup>rd</sup> quadrant. Its shortest distance from the reference line is 68 mm. Draw its projections and find out its distance from VP.
5. A line "AB" is contained by a profile plane. Its end "A" is 44mm behind VP and 12, below HP and end "B" is 8mm behind VP and 52mm below HP. Draw its projection and find TL,  $\theta$ ,  $\phi$ , HT and VT.

### SECTION - C

6. A regular hexagonal lamina of side 20 mm, perpendicular to HP and lying on HP on one of its sides. The plane is parallel to VP and 20 mm from VP. Draw its projections and show traces.
7. A cone of base diameter 46 mm and axis 62 mm long; is lying on HP on its generator with axis parallel to VP. Draw its projections assuming the cone lying in first quadrant.
8. A right regular triangular prism of base edge 38mm, axis 72mm long is resting on its rectangular face on HP, with axis perpendicular to VP. Draw its projections.
9. Draw the isometric view of a V-Block; Front and Top views are shown as follows :



**NOTE :** Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (AI&ML/AI&DS/CSE/DS/IT/ Internet of Things and Cyber Security  
including Block Chain Technology) (Sem.-1,2)**SEMI-CONDUCTOR PHYSICS**

Subject Code : BTPH-104-18

M.Code : 75360

Date of Examination : 10-01-2026

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) What is E-k diagram?
- b) What does Bloch's theorem state about particles in a periodic potential?
- c) "In a solid, consider the energy level lying 0.04 eV above Fermi level". What is the probability of this level being occupied by an electron at 150 K?
- d) What is carrier diffusion, and how is it different from carrier drift?
- e) Differentiate between an Ohmic contact and a Schottky contact in metal-semiconductor junctions.
- f) Obtain the probability of emission for Stimulated emission.
- g) When a laser has 4 V applied to it, it draws 10 mA and produce 3 mW of optical power. What is the efficiency of laser?
- h) What is the principle behind measuring the wavelength of a semiconductor laser?
- i) What information can be extracted from the I-V characteristics of a diode?
- j) Discuss the advantages of four probe method over two probe method.



## SECTION - B

2. Explain the free electron theory of metals. Derive an expression for the density of states in three dimensional systems.
3. Using the Kronig-Penny model, derive an expression that shows the formation of allowed and forbidden energy bands in a periodic potential.
4. What are diffusion and drift current? Explain the origin of contact potential, while formation of p-n junction.
5. Describe the variation of Fermi level in a semiconductor with impurity concentration and temperature.

## SECTION - C

6. Explain the principle, construction and working of a semiconductor laser with diagram.
7. Describe the concept of joint density of states in semiconductors. Explain, how it affects optical transitions and derive the joint density of states for a simple semiconductor?
8. What is Four-point probe method? How to calculate the band gap using Four-point probe method?
9. a) What is Capacitance-voltage measurements? What information can be obtained using it?  
b) What information can be obtained using Hot-point probe measurement?

**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.**



## SECTION-B

2. Write a program to swap two numbers using call by reference.
3. Write a program to find the sum of 2 arrays.
4. Explain different types of operators in C programming language with the help of an example each.
5. What is an array? How can we create an array in C programming language? Write a program to search an element in an array.

## SECTION - C

6. What is sorting? Explain selection sort.
7. Explain in details about the various string library functions.
8. Explain in detail various loop/ iterative statements in C programming language.
9. **Differentiate between**
  - a. Array and structure.
  - b. Main memory and secondary memory.

**NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.**

00 DEC 2025

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 01

Total No. of Questions : 08

M.Tech. (CSE/ECE/EE/Power System/VLSI Design) (Sem.-1)

**RESEARCH METHODOLOGY AND IPR**

Subject Code : MTRM-101-18

M.Code : 75161

Date of Examination : 19-01-2026

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. Define research problem and its sources. Enumerate characteristics of a good research problem.
2. Why is data collection an important aspect of research process? Distinguish the terms analysis and interpretation of datasets.
3. a) Discuss the complete step-by-step process of patenting and development.  
b) Explain the different process, procedures and documents associated in trademark and copyright. Draw a rough figure to explain.
4. What is sampling in research process? Explain the various factors that should be considered in decision making of a sampling method.
5. What is the role of plagiarism? How can we deal with it? Discuss the tools of plagiarism.
6. Differentiate between descriptive and experimental research.
7. Explain the benefits of effective technical writing focusing upon major sections to be included in a report or research paper.
8. **Write short notes on the following :**
  - a) Patenting under PCT.
  - b) New Developments in IPR.

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



Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 01

Total No. of Questions : 08

M.Tech. (CSE Engg.) (Sem.-1)

**MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE**

Subject Code : MTCS-101-18

M.Code : 75153

Date of Examination : 03-01-2026

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 in detail with example univariate and multivariate central limit theorems.
2. Define variance. Discuss normal distribution, expected value and variance.
3. Define PCA. How it is performed? What are various sub-tasks that can be done in PCA?
4. Define samples. How sampling distribution is helpful in estimations?
5. Write notes on isomorphism, planer graphs and graph coloring.
6. Differentiate between classification and regression with example.
7. Briefly describe Computer Architecture and Software Engineering. Also, discuss about Machine Learning.
8. Write a note on recent trends in distribution function in mathematical field of computer science.

**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.**





## SECTION - B

2. What are X-rays? State and derive Bragg's law for X-ray diffraction in crystals. Explain the significance of each term.
3. What is Tunnel diode? Draw and Explain the V-I characteristic of Tunnel diode.
4. Derive the London equations for superconductors and explain their physical significance.
5. a) Explain Dielectric polarization. What is Displacement current?  
b) What is Gradient of scalar field? Discuss the physical significance gradient.

## SECTION - C

6. Explain the construction and working of Ruby laser with the help of energy level diagram. Why Ruby laser is a pulsed laser?
7. a) Define Numerical Aperture (NA) of an optical fiber. Derive its expression in terms of the refractive indices of the core and cladding. Explain physical significance of NA.  
b) An optical fiber has a core refractive index  $n_1 = 1.50$  and a cladding refractive index  $n_2 = 1.45$ . Calculate the Numerical Aperture and acceptance angle in air.
8. Explain dual nature of matter and describe briefly Davisson and Germer experiment for qualitative verification of matter waves.
9. Explain the synthesis of nanomaterials using ball milling and sol-gel techniques.

**NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.**

00 DEC 2025

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

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-101-18

M.Code : 75346

Date of Examination : 15-01-2026

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. Which keyword is used to define a structure in C?
- b. How do you access the last element of an array in C?
- c. What happens if no condition in a switch matches?
- d. Name one sorting algorithm with  $O(n^2)$  complexity.
- e. Give an example of a recursive function.
- f. What is a void function?
- g. Name a divide and conquer sorting algorithm.
- h. What does the term pseudo code means?
- i. What is the role of a compiler in program execution?
- j. What is the advantage of binary search over linear search?



## SECTION - B

2. Explain the types of arithmetic expressions in C. How are they evaluated with respect to operator precedence and associativity?
3. Compare and contrast if-else, switch and nested conditional statements. Provide examples where each is most appropriate.
4. Write a program to perform matrix addition and multiplication using 2D arrays. Explain the logic and indexing used.
5. Define recursion and explain how it differs from iteration? What are the advantages and limitations of using recursion?

## SECTION - C

6. Write a program to manage student records using structures. Include operations like input, display and search.
7. Discuss the relationship between pointers and arrays. How can pointers be used to manipulate strings and structures?
8. Discuss the importance of file handling in real-world applications.
9. Describe the working principle of the Bubble Sort algorithm.

**NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC case against the Student.**

00 DEC 2025

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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 : 15-01-2026

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 : ADMIRE, BRAVERY
- b) Give synonyms for the following : ARTFUL, CHORUS
- c) Define cliches.
- d) Make two words with prefix : anti
- e) Make two words with suffix : less
- f) Give full form of the abbreviations : WHO, ASAP
- g) **Correct the following :**
  - i) What type of books you like to read?
  - ii) The moment she will enter the room, we will start singing the birthday song.
- h) What are techniques for writing precisely?
- i) Elaborate noun-pronoun agreement.



j) **Punctuate :**

- i) When i go to the shop i will get some crisps
- ii) Martha took her children to the zoo yesterday

### **SECTION - B**

- 2. Write an essay on "Poverty" **OR** "Child Labour".
- 3. Draft a business letter cancelling an order of different furniture items placed earlier by your company.
- 4. Write a note on "Describing".
- 5. **Make a precise of the following passage :**

When we survey our lives and efforts, we soon observe that almost the whole of our actions and desires are bound up with the existence of other human beings. We notice that whole nature resembles that of the social animals. We eat food that others have produced, wear clothes that others have made, live in houses that others have built. The greater part of our knowledge and beliefs has been passed on to us by other people through the medium of a language which others have created. Without language and mental capacities, we would have been poor indeed comparable to higher animals. We have therefore to admit that we owe our principle knowledge over the least to the fact of living in human society. The individual if left alone from birth would remain primitive and beast like in his thoughts and feelings to a degree that we can hardly imagine. The individual is what he is and has the significance that he has not much in virtue of the individuality, but rather as a member of a great human community, which directs his material and spiritual existence from the cradle to the grave.

### **SECTION - C**

- 6. Elaborate use of phrases and clauses in sentences
- 7. **Read the following passage carefully and answer the questions that follow :**

Competition can be a great motivator. It can move you to go that extra mile and do that much better. But things start to go wrong when beating someone becomes your only goal. At every step along the way, you will be compared whether with fellow students or

siblings. Competitions and comparisons are part of every student's life but as a student, you have to learn to deal with these comparisons and let these not get the better of you. Whether you "win" or "lose", if you lose sight of what really matters, it is only going to distract you away from your growth. No matter how well you do, letting your success get to your head can be disastrous. It takes you away from the things that really matter and your complacency might even hamper your performance the next time around. And at the same time, if you look at the performance of another person as your benchmark, you are bound to be disappointed at some point. Irrespective of how well you might have done at some other point, you are bound to come across someone who is a shade better than you. And when a comparison is done, how you deal with it could define who you are and what you will be tomorrow. Here is some advice: Do not judge yourself by how others have performed. Set your own targets and raise the bar for yourself.

**Question :**

- a) How can competition motivate us?
  - b) What should not be allowed to happen?
  - c) What can be disappointing?
  - d) Use the following words in your own sentences : distract, complacency
8. Draft a report on a special sale fair organized by your company.
  9. Draft a resume/CV for the post of an engineer.

**NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.**



00 DEC 2025  
SF 18  
A

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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 : 22-12-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. 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) Find the Mode from the following data: 8, 9, 11, 16, 11, 23, 21, 27, 21, 35, 21, 7, 11.
- b) Two dice are rolled once. Find the probability that the numbers on the two dice are different.
- c) For a moderately skewed data, the arithmetic mean is 50, the coefficient of variation is 2 and Karl Pearson's coefficient of skewness is 0.1. Find the mode.
- d) If  $n = 5$ ,  $\sum D^2 = 6$ , what is the coefficient of rank correlation?

e) Find  $E(X)$  for the following probability distribution :

<b>X :</b>	8	12	16	20	24
<b>P(X) :</b>	1/8	1/6	3/8	1/4	1/12

- f) Find the mean of Poisson distribution.
- g) A random sample of 450 virus cultures has a mean life time of 0.875 days. Can it be reasonably regarded as a sample from a large population of mean 0.85 days and standard deviation 0.6 days?



- h) Explain the method of least squares to fit a parabola.
- i) Find the value of  $c$  such that the following function is a probability density function :

$$f(x) = \begin{cases} cx^2, & 1 \leq x \leq 2 \\ 0, & \text{elsewhere} \end{cases}$$

- j) Write two properties of  $\chi^2$ -test.

### SECTION - B

2. a) The probability that a 50 year old man will be alive at 60 is 0.83 and the probability that a 45 year old woman will be alive at 55 is 0.87. What is the probability that a man who is 50 and his wife who is 45 will both be alive 10 years hence?

- b) Calculate median age from the following data :

Age( year)	5-14	15-24	25-34	35-44	45-54	55-64	65-74
No. of females	420	300	206	205	133	86	40

3. a) Consider the set of data 2, 3, 7, 8, 10. Find the first and second moment about the arbitrary value 4.
- b) A die is rolled until 6 appears. What is the expectation of the number of rolling's required?
4. If the mean of a Binomial Distribution is 5 and variance is 3. Find the probability of obtaining at least 5 failures.

5. Find the co-efficient of correlation between the values of X and Y given below :

X	1	2	3	4	5	6	7
Y	5	8	3	5	2	2	3

### SECTION - C

6. The standard deviation of the size of snail population is 2.70 cm. Find the probability that in a sample of size 66, the sample mean will differ from the population mean by 0.75 or more.



### SECTION - B

2. Find the rank of the matrix  $\begin{bmatrix} 1 & -2 & 2 & 3 & 6 \\ 0 & -1 & -3 & 1 & 1 \\ -2 & 4 & -3 & -6 & 11 \end{bmatrix}$ .
3. Find linear transformation  $T : \mathbb{R}^4 \rightarrow \mathbb{R}^3$  whose null space is generated by  $(0, 1, 2, 3)$  and  $(-1, 2, 3, 0)$ .
4. Solve the differential equation  $\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 13y = e^{3x} \sin 4x$ .
5. Solve  $y^2p - xyq = x(z - 2y)$ .

### SECTION - C

6. Determine the value of  $\lambda$  for which the equations  $3x - 2y + z = 0$ ,  $\lambda x - 14y + 15z = 0$ ,  $x + 2y - 3z = 0$  have non trivial solutions. Find the solutions.
7. Let  $V$  be a vector space of  $2 \times 2$  matrices over  $\mathbb{R}$  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
- Null space of  $T$ .
  - Range of  $T$ .
8. A particle moves with S.H.M. of period 12 secs, travels 8 cm from the position of rest in 2 secs. Find the amplitude, maximum velocity and velocity at the end of 2 secs.
9. Solve  $(D^3 - 3D^2D')z = x^2y$ .

**NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.**

00 DEC 2025

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (ECE) (Sem.-3)**  
**ANALOG DEVICES & CIRCUITS**

Subject Code : BTEC-301

M.Code : 96260

Date of Examination : 09-12-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Write briefly :

- a) Define LCD.
- b) How many types of photodiodes are available? Name them.
- c) Explain JFET.
- d) What do you mean by bias stability?
- e) Describe crossover distortion.
- f) What is harmonic distortion?
- g) Differentiate between amplifiers and oscillators?
- h) Give the feedback concept in oscillators?
- i) What is the principle of oscillators?
- j) Draw transistor hybrid model.



### SECTION - B

2. Draw and explain analysis of temperature dependence of PN diode.
3. Give characteristics and applications of MOSFET.
4. Draw and explain Class -B push-pull amplifier.
5. Derive the expression for frequency and amplitude of RC phase shift oscillator.
6. Explain high frequency T model in transistors.

### SECTION - C

7. Explain different types of transistor configurations.
8. Draw and explain complementary-symmetry amplifier in detail.
9. Explain frequency response of Sinusoidal oscillators.

**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.**

9. To test the claim that the resistance of electric wire can be reduced by atleast 0.05 ohm by allowing 25 values obtained for each alloyed wire and standard wire produced the following results:

	Mean	Standard Deviation
Alloyed wire	0.083 ohm	0.003 ohm
Standard wire	0.136 ohm	0.002 ohm

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



**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.**

00 DEC 2025

Roll No.

Total No. of Pages : 03

Total No. of Questions : 09

B.Tech. (AI&DS/AI&ML/(AI)Block chain/CSE/DS/Cyber Security  
CD&DS/EEE/EE/IT/R&AI/Internet of things and cyber security including  
Block chain Technology)(Sem.3)

**MATHEMATICS-III**  
**(PROBABILITY AND STATISTICS)**

Subject Code : BTAM-302-23

M.Code : 94630

Date of Examination : 09-12-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

**1. Write briefly :**

- a) State Multiplication theorem of probability.
- b) Find the mean of first teneven positive numbers.
- c) Give Merits of Quartile deviation.
- d) Find the binomial distribution mean is 6 and variance 4.
- e) Explain the property of Poisson distribution.
- f) State properties of Rank Correlation Coefficient.
- g) State Utility of Standard Error.
- h) Explain Critical region.
- i) Define Regression Coefficients.
- j) Write the normal equation for the curve fitting  $y = a + bx$  by the method of least squares.



## SECTION - B

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

<b>Values</b>	5-10	10-15	15-20	20-25	25-30	30-35	35-40
<b>Frequency</b>	6	8	17	21	15	11	2

3. Suppose the p.d.f of a random variable X is as follows :

$$f(x) = \begin{cases} cx & \text{for } 0 < x < 4 \\ 0 & \text{elsewhere} \end{cases}$$

where c is a given constant. Determine the value of c and the values of  $P(1 \leq X \leq 2)$  and  $P(x > 2)$ .

4. Fit a curve of the form  $y = bx^a$  to the following data :

<b>Year(x)</b>	1	2	3	4	5
<b>Production in tons(y)</b>	7.1	27.8	62.1	110	161

5. In a random sample of 525 families owing television set in the region of New Delhi, it is found that 370 subscribe to star plus. Find a 95 % confidence interval for the actual proportion of such families in New Delhi which subscribe to star plus.
6. In a book of 520 pages, 390 typographical error occur. Assuming Poisson law for the number of errors per page, find the probability that a random sample of 5 pages will contain no error.

## SECTION - C

7. In an examination taken by 500 candidates, the mean and the S.D of marks obtained 40% and 10%. Assuming the Normal distribution, find.

- a) How many will pass if 50% is fixed as minimum?
- b) What should be the minimum marks required, if 350 candidates are to pass.
- c) How many students have scored marks above 60%?

8. Calculate rank correlation coefficient for the following data :

<b>X</b>	12	15	18	20	16	15	18	22	15	21	18	15
<b>Y</b>	10	18	19	12	15	19	17	19	16	14	13	17

4F-15 - ①

00 DEC 2025

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

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

**DIGITAL ELECTRONICS**

Subject Code : BTES301-18

M.Code : 76435

Date of Examination : 13-12-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Write briefly:
  - a) Discuss the need of hexadecimal number system.
  - b) Convert 1101110 to binary number to Gray code.
  - c) What do you mean by combinational circuits? Explain.
  - d) Discuss the significance of multiplexer.
  - e) List the limitations of asynchronous counters.
  - f) State DeMorgan's theorems.
  - g) Differentiate between PROM and EEPROM.
  - h) List the advantages offered by complex Programmable logic devices.
  - i) Write down the various characteristics of FPGA.
  - j) List the advantages R-2R type D/A converter.



## SECTION-B

2. Convert 10000.0001 binary number to decimal number, hexadecimal and octal.
3. Reduce  $F(A,B,C,D) = \sum m(1,3,5,7,9,11,13,15)$  to the simplest possible form using K-Map or Quine-McCluskey method.
4. Draw the logic diagram and explain the working of a successive approximation type A/D converter.
5. Draw the logic diagram and explain the working of a Master Slave JK flip-flop. What are its limitations? Also, mention how the limitation(s) of JK flip-flop are taken care in it.
6. Compare RAMs and ROMs. Also, discuss (in detail) the write operation in RAM.

## SECTION-C

7. **Differentiate between:**
  - a) Ring and twisted ring counters.
  - b) Analog and digital systems.
  - c) Excess -3 and Gray codes.
  - d) Simplification by K-Map and Boolean-algebra.
8. Design a synchronous counter using JK flip flops that has the following sequence: 0000, 0010, 0101, 0110 and repeat. The undesired states must always go to 0000 on the next clock pulse.
9. **Discuss the following:**
  - a) Programmable array logic
  - b) Implementation of basic gates using NAND and NOR gates.

**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.**

00 DEC 2025

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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 : 13-12-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Write briefly :

- a) Draw ramp signals.
- b) Define instantaneous value.
- c) What are advantages of maximum power theorem?
- d) Write node equation.
- e) What do you mean by frequency analysis?
- f) Give relationship between transfer and impulse response.
- g) Explain steady response.
- h) Draw stop bands filter.
- i) What is the need of filters?
- j) Draw ladder network.



### SECTION - B

2. Explain steps to apply Thevenin's theorem.
3. Find out the Laplace transform of  $f(t) = e^{at}$  for  $t \geq 0$ .
4. Draw and explain poles and zeros on the positive real axis.
5. Derive expression for network synthesis for 2 terminal networks.
6. Design a constant k LPF with  $f_c = 1$  kHz and  $R_o = 600 \Omega$ . At what frequency  $\alpha$  will be 10 dB?

### SECTION - C

7. Explain time domain behaviour from poles and zeros.
8. Design Foster I and Foster II forms.
9. Draw and explain m-derived filters.

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

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (AI & DS/AI & ML/CSE/Block Chain/Cyber  
Security/IOT/CSD/ECS/R&AI/Internet of Things and Cyber Security  
Including Block Chain Technology) (Sem.-3)**

**DATA STRUCTURE & ALGORITHMS**

Subject Code : BTCS301-18

M.Code : 76436

Date of Examination : 11-12-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION - A**

**1. Write briefly :**

- a) Using example explain the various rotation operations performed on an AVL tree.
- b) List the importance of data organization through data structures.
- c) How is height and balance factor of a node calculated in a tree?
- d) What is the advantage of B+ tree?
- e) List applications of priority queue.
- f) What is the drawback in applying Binary search over a given list for search operation?
- g) Explain advantage of using linked list over array.
- h) How are elements of a graph stored?
- i) List the various operations on queue with example.
- j) Write steps to convert to post fix expression:  $(8-4)*(2+6)-(3*3)$ .



## SECTION - B

2. Write pseudocode for adding elements of an array row-wise. Derive its time complexity function and obtain the Big O.
3. Explain the concept of insertion in a circular queue giving all possible test cases.
4. Write pseudocode for the various tree traversal techniques.
5. Using the list 24, 5, 35, 17, 12, 16, 21, 10 perform the merge sort step wise.
6. Explain the efficiency of Binary Search Tree during search operation giving example.

## SECTION - C

7. Explain the use of stack for function call and return using suitable example. Why is stack used to implement recurrence functions?
8. Explain the data structure used in Breadth first graph traversal. Give the pseudocode for it.
9. Explain the need of hash tables and any one solution for collision resolution using suitable example.

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

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech.(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: 06-12-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Write briefly:

- a. Define void data type.
- b. Can pointer be incremented or decremented?
- c. What is the purpose of protected access specifier in classes?
- d. Write two uses of scope resolution operator?
- e. What is function overloading?
- f. What happens if class is inherited in protected mode?
- g. What is the purpose of ifstream and ofstream?
- h. Define virtual function.
- i. *"Can a base class pointer point to a derived class object"*? Justify.
- j. What happens if no catch block matches a thrown exception?



### SECTION - B

2. Explain the four major principles of Object-Oriented Programming with suitable examples.
3. Write a program that uses an array of objects and shows use of constructors.
4. Explain the difference between compile-time and run-time polymorphism.
5. Write a program using try, catch and throw blocks to handle multiple exceptions.
6. Write a program to copy the contents of one file to another.

### SECTION - C

7. What is parametrized constructor Write a program using a parameterized constructor to initialize student details.
8. Discuss Inheritance. Write a program showing hierarchical inheritance with Shape as base and Rectangle, Circle as derived.
9. Write a short note on :
  - a. Role of pointers in polymorphism.
  - b. String handling functions.

**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.**

SF-05-2

00 DEC 2025

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

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

**MATHEMATICS-III**

Subject Code : BTAM304-18

M.Code : 76438

Date of Examination:04-12-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Answer the following :

a. State Euler theorem.

b.  $\sin(y - px) = 2p$

c. Find P.I of  $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + 5y = \sin 3x$ .

d. State logarithmic test.

e. Explain conditionally convergent series.

f. If  $z = f\left(\frac{y}{x}\right)$ , then find  $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$ .

g. Evaluate  $\int_0^1 \int_1^4 y \, dx dy$ .

h. State Cauchy sequence.

i. State Cauchy's linear equation.

j. Find the general solution of  $(D^3 + 1)y = 0$



### SECTION - B

2. Test the convergence of  $\sum_{n=2}^{\infty} \frac{1}{[\log(\log n)]^n}$ .
3. Solve  $xp^2 - 2yp + ax = 0$ .
4. Solve the differential equation  $\frac{d^4 y}{dx^4} - y = \cos x \cosh x$ .
5. Evaluate by change of order of integration  $\int_0^1 \int_0^{\sqrt{1-y^2}} (x^2 + y^2) dx dy$ .
6. The convergence or divergence of the series.  $\sum_{n=2}^{\infty} \frac{n + \sqrt{n}}{n^2 - n}$

### SECTION - C

7. Solve  $\frac{d^2 y}{dx^2} + 3\frac{dy}{dx} + 2y = \sin e^x$  using method of variation of parameters.
8. Solve  $y = xp^2 + p$ .
9. The temperature 'T' at any point (x, y, z) in space is  $400xyz^2$ . Find the highest temperature on the surface of unit sphere  $x^2 + y^2 + z^2 = 1$ .

**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.**



### SECTION- B

2. Explain the concept of development in Pre-British phase.
3. Explain the different models of governing system.
4. Explain the meaning and scope of Buddhist economics.
5. Explain the criteria of different social systems.
6. Explain the different idea of development in current context.

### SECTION-C

7. Explain the implications of E. F. Schumacher's idea of development?
8. Explain the ideas of political system as learnt from history.
9. Explain the nature and scope of relation between human being and society.

**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.**

00 DEC 2025

Roll No.

Total No. of Pages : 04

Total No. of Questions : 9

B.Tech.(AI&DS/AI&ML/CS/DS/ETE/CSE/ECE) (Sem.-4)

**UNIVERSAL HUMAN VALUES**

Subject Code : HSMC-122-18

M.Code : 77630

Date of Examination : 23-12-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

(10 × 1 = 10)

1. Answer the following :

- a) What is Holistic System?  
समग्र प्रणाली क्या है?  
संरचनात्मक प्रणाली की है?
- b) What is value education?  
मूल्य शिक्षा क्या है?  
मूल सिद्धि की है?
- c) What is Artistic - Value?  
कलात्मक - मूल्य क्या है?  
कलात्मक - मूल की है?
- d) What is value of any unit in the larger order?  
बड़े आदेश में किसी भी इकाई का क्या मूल्य है?  
बड़े आदेश में किसी भी इकाई का क्या मूल्य है?
- e) To be in a state of liking is .....  
पसंद के हिसाब से एक अवस्था में होना ..... है।  
पसंद के हिसाब से एक अवस्था में होना ..... है।

[M-77630]

(S-17) 1993



- f) What is Material Order?  
ਸਾਮਗਰੀ ਆਦੇਸ਼ ਕਿਆ ਹੈ?  
ਸਾਮਗਰੀ ਆਦੇਸ਼ ਕੀ ਹੈ?
- g) The value "care" is related with body.  
ਸੂਲਯ "ਧਿਆਨ" ਸ਼ਰੀਰ ਕੇ ਸਾਥ ਸੰਬੰਧਿਤ ਹੈ।  
ਮੁੱਲ ਧਿਆਨ ਸਰੀਰ ਦੇ ਨਾਲ ਸਬੰਧਤ ਹੈ।
- h) What is skill?  
ਕੌਸ਼ਲ ਕਿਆ ਹੈ?  
ਹੁਨਰ ਕੀ ਹੈ?
- i) What are the activities and needs of self and body?  
ਸਮਗਰ ਪ੍ਰਾਏਓਗਿਕਿਯੋਂ ਪਰਯਾਕਰਣ ਕੇ ਅਨੁਕੂਲ ਔਰ ਲੋਗੋਂ ਕੇ ਅਨੁਕੂਲ ਹੋਨਾ ਚਾਹਿਏ।  
ਸਵੈ ਅਤੇ ਸਰੀਰ ਦੀਆਂ ਜਰੂਰਤਾਂ ਅਤੇ ਗਤੀਵਿਧੀਆਂ ਕੀ ਹਨ?
- j) What do you mean by Respect?  
ਆਪ ਕਾ ਸਮਮਾਨ ਸੇ ਕਿਆ ਸਤਲਕ ਹੈ?  
ਤੁਹਾਡਾ ਆਦਰ ਤੋਂ ਕੀ ਮਤਲਬ ਹੈ?

#### SECTION-B

(5 × 4 = 20)

2. What in your opinion, is an effective way of ensuring prosperity in the family?  
What programs can you undertake in this respect?  
ਆਪਕੀ ਰਾਯ ਮੇਂ, ਪਰਿਵਾਰ ਮੇਂ ਸਮ੍ਰਿਢਿ ਸੁਨਿਸ਼ਿਚਤ ਕਰਨੇ ਕਾ ਏਕ ਪ੍ਰਭਾਵੀ ਟਰੀਕਾ ਕਿਆ ਹੈ? ਇਸ ਸੰਬੰਧ ਮੇਂ ਆਪ ਕੌਨ ਸੇ ਕਾਰਯਕ੍ਰਮ ਅਪਨਾ ਸਕਦੇ ਹੈਂ?  
ਤੁਹਾਡੇ ਵਿਚਾਰ ਵਿੱਚ, ਪਰਿਵਾਰ ਵਿੱਚ ਖੁਸ਼ਹਾਲੀ ਨੂੰ ਯਕੀਨੀ ਬਣਾਉਣ ਦਾ ਇੱਕ ਪ੍ਰਭਾਵਸ਼ਾਲੀ ਤਰੀਕਾ ਕੀ ਹੈ? ਇਸ ਸੰਬੰਧ ਵਿੱਚ ਤੁਸੀਂ ਕਿਹੜੇ ਪ੍ਰੋਗਰਾਮ ਲੈ ਸਕਦੇ ਹੋ?
3. Indicate a few feasible steps to promote harmony in society and coexistence with nature.  
ਸਮਾਜ ਮੇਂ ਸਦਭਾਵ ਔਰ ਪ੍ਰਕ੍ਰਿਤਿ ਕੇ ਸਾਥ ਸਹ-ਅਸਿਤਕ ਕੋ ਬਢਾਵਾ ਦੇਨੇ ਕੇ ਲਿਏ ਕੁਝ ਸੰਭਾਵਿਤ ਕਦਮ ਬਤਾਏ।  
ਸਮਾਜ ਵਿੱਚ ਇਕਸੁਰਤਾ ਅਤੇ ਕੁਦਰਤ ਦੇ ਨਾਲ ਸਹਿਹੋਂਦ ਨੂੰ ਵਧਾਉਣ ਲਈ ਕੁਝ ਸੰਭਵ ਕਦਮਾਂ ਦਾ ਸੰਕੇਤ ਦਿਓ।
4. Write short note on the concept of preservation.  
ਸੰਰਕਸ਼ਣ ਕੀ ਅਭਧਾਰਣਾ ਪਰ ਸੰਕਿਸ਼ਿਪਤ ਟਿਪਣੀ ਲਿਖਿਏ।  
ਸੰਭਾਲ ਦੀ ਧਾਰਨਾ 'ਤੇ ਛੋਟਾ ਨੋਟ ਲਿਖੋ।

5. What can be the basis of undivided society—the 'world family'.  
अखण्ड समाज-‘विश्व परिवार’ का आधार क्या हो सकता है?  
अटवँडे समाज-‘संसार परिवार’, का आधार की हो सकदा है?
6. Define self regulation and health. How are the two related?  
स्व:नियमन और स्वास्थ्य को परिभाषित करें। दोनों कैसे संबंधित हैं।  
सवै-निजम अउे सिहत नुं परिभाषित करे। दोवें किवें संबंधित हन?

## SECTION-C

(5 × 6 = 30)

7. What are the basic guidelines of value education?  
मूल्य शिक्षा की बुनियादी दिशानिर्देश क्या हैं?  
मूल सिंधिआ दी बुनिआदी दिशाऩिरदेश की हन?

OR

Describe in brief the salient values in human relationships.  
मानवीय रिशतों में संक्षिप्त मुख्य मूल्यों का विवरण दें।  
मानवी रिशतिआं विंच संबंधित मूख मूलां दा वरनन करे।

8. Differentiate between units and space. Who are the units self-organized in space?  
इकाईयों और अंतरिक्ष के बीच अंतर करें। अंतरिक्ष में स्व-संगठित इकाइयाँ कौन हैं?  
इकाईयां अउे पुलाऩ विचका फरक करे। पुलाऩ विंच सवै-संगठित युनिट कौन हन?

OR

How is a human-being co-existence of Self and Body? Explain Pre-conditioning, Sensation and Natural-Acceptance.

इंसान स्वयं और शरीर का सह-अस्तित्व कैसे है? पूर्व-मान्यता, संवेदना और प्राकृतिक-स्वीकृति समझाओ।

मनुख सवै अउे शरीर दा सहि-असतिउव किवें है? पुरव-मानता, संवेदना अउे सहिज-सविकरिती समझाओ।

9. What is harmony in family?  
परिवार में तालमेल के बारे में बताएं।  
परिवार विंच तालमेल दे बारे विंच दसे।

OR

Compare the Four Orders in Nature on the basis of their salient aspects.

मुख्य पहलुओं के आधार पर प्रकृति में चार आदेशों की तुलना करें।

मूख पहलुआं दे आधार उँते कदरत विंच चार आदेशों की तुलना करे।



10. What do you mean by coexistence? How are units in coexistence being in space?  
ਸਹ-ਅਸਿੱਤਕ ਸੇ ਆਪ ਕਯਾ ਸਮਝ਼ਤੇ ਹੈਂ? ਅੰਤਰਿਕਸ਼ ਮੇਂ ਇਕਾਈਯਾਂ ਸਹ ਅਸਿੱਤਕ ਮੇਂ ਕੈਸੇ ਹੈਂ?  
ਸਹਿਹੋਂਦ ਤੋਂ ਤੁਹਾਡਾ ਕੀ ਮਤਲਬ ਹੈ? ਪੁਲਾੜ ਵਿੱਚ ਇਕਾਈਆਂ ਸਹਿ-ਹੋਂਦ ਕਿਵੇਂ  
ਹੁੰਦੀਆਂ ਹਨ?

OR

“Other than human order, the three orders are mutually fulfilling to each other”.  
Explain with examples, why does human order fail to mutually fulfill itself and to  
the other orders?

“ਮਾਨਕ ਆਦੇਸ਼ ਕੇ ਅਲਾਕਾ, ਤੀਨ ਆਦੇਸ਼ ਪਰਸਪਰ ਏਕ ਦੂਸਰੇ ਕੀ ਪੂਰਾ ਕਰ ਰਹੇ ਹੈਂ” ਤਦਾਹਰਣ  
ਸਹਿਤ ਸਪਸ਼ਟ ਕਰੋ ਕਿ ਮਾਨਕ ਕ੍ਰਿਯਾਕ੍ਰਿਯਾ ਸਵਯੰ ਤਥਾ ਅਨਯ ਆਜ਼ਾਦੀਆਂ ਕੀ ਪਾਰਸਪਰਿਕ ਰੂਪ ਮੇਂ ਪੂਰਾ  
ਕਰਨੇ ਮੇਂ ਕਿਫਲ ਕਯੋਂ ਹੋ ਜਾਤੀ ਹੈ?

“ਮਨੁੱਖੀ ਆਦੇਸ਼ ਤੋਂ ਇਲਾਵਾ, ਤਿੰਨੋਂ ਆਦੇਸ਼ ਆਪ ਵਿੱਚ ਇੱਕ ਦੂਜੇ ਨੂੰ ਪੂਰਾ ਕਰਦੇ  
ਹਨ”। ਉਦਾਹਰਣਾਂ ਦੇ ਨਾਲ ਸਮਝਾਓ, ਮਨੁੱਖੀ ਆਰਡਰ ਆਪਸੀ ਤੌਰ ਤੇ ਆਪਣੇ ਆਪ ਨੂੰ  
ਅਤੇ ਦੂਜੇ ਆਦੇਸ਼ਾਂ ਨੂੰ ਪੂਰਾ ਕਰਨ ਵਿੱਚ ਅਸਫਲ ਕਿਉਂ ਹੁੰਦਾ ਹੈ?

11. What do you mean by conformance? Explain the conformance in the four orders.

ਅਨੁਰੂਪਤਾ ਸੇ ਆਪ ਕਯਾ ਸਮਝ਼ਤੇ ਹੈਂ? ਚਾਰੋਂ ਆਦੇਸ਼ੋਂ ਮੇਂ ਅਨੁਰੂਪਤਾ ਸਪਸ਼ਟ ਕੀਜ਼ਿਏ।

ਅਨੁਕੂਲਤਾ ਤੋਂ ਤੁਹਾਡਾ ਕੀ ਮਤਲਬ ਹੈ? ਚਾਰ ਆਦੇਸ਼ਾਂ ਵਿੱਚ ਅਨੁਕੂਲਤਾ ਦੀ ਵਿਆਖਿਆ  
ਕਰੋ।

OR

What do you understand by the definitiveness of ethical human conduct? Why is  
this definitiveness desirable?

ਨੈਤਿਕ ਮਾਨਕੀਯ ਆਚਰਣ ਕੀ ਨਿਸ਼ਚਿਤਤਾ ਸੇ ਆਪ ਕਯਾ ਸਮਝ਼ਤੇ ਹੈਂ? ਯਹ ਨਿਸ਼ਚਿਤਤਾ ਕਾਂਠਨੀਯ  
ਕਯੋਂ ਹੈ?

ਤੁਸੀਂ ਨੈਤਿਕ ਮਨੁੱਖੀ ਆਚਰਣ ਦੀ ਨਿਸ਼ਚਿਤਤਾ ਦੁਆਰਾ ਕੀ ਸਮਝਦੇ ਹੋ? ਇਹ ਨਿਸ਼ਚਿਤਤਾ  
ਲੋੜੀਂਦੀ ਕਿਉਂ ਹੈ?

Note : Any student found attempting answer sheet from any other person(s), using  
incriminating material or involved in any wrong activity reported by evaluator shall be  
treated under UMC provisions.

Student found sharing the question paper(s)/answer sheet on digital media or with any  
other person or any organization/institution shall also be treated under UMC.

Any student found making any change/addition/modification in contents of scanned  
copy of answer sheet and original answer sheet, shall be covered under UMC provisions.

SF-18 (9)

00 DEC 2025

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 9

B.Tech. (AI&DS/AI&ML/CSE/CS/DS/Internet of Things and Cyber Security including Block Chain Technology)(Sem.-4)

**DESIGN & ANALYSIS OF ALGORITHMS**

Subject Code : BTCS-403-18

M.Code : 77629

Date of Examination : 22-12-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Answer briefly :

- a. What is asymptotic analysis?
- b. Write a short note on time and space trade-off.
- c. Explain the concept of Dynamic Programming.
- d. Define transitive closure of a graph.
- e. What is a spanning tree?
- f. What is Cook's theorem? State its significance in NP-complete problems.
- g. Explain briefly the role of reduction in proving NP-completeness.
- h. Describe various heuristics characteristics.
- i. Differentiate between randomized and deterministic algorithms.
- j. Discuss briefly different ways of analyzing recursive algorithms.



## SECTION - B

2. Define the best-case and worst-case complexities of an algorithm. How do these compare to the average-case complexity in terms of analysis?
3. Differentiate between Branch and Bound and Backtracking algorithms.
4. Explain the topological sorting algorithm and discuss its applications in real world scenarios.
5. Discuss in detail various standard NP complete problems with examples.
6. Discuss the role of randomized algorithms in optimization problems, providing a detailed example of their application and potential advantages.

## SECTION - C

7. What is computability of an algorithm? Discuss various computability classes in detail.
8. Explain in detail the design, analysis and approximation ratio of an Approximation algorithm for the vertex cover problem.
9. Describe the working of Prim's and Kruskal's algorithms for finding a Minimum Spanning Tree.

**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.**

SF-01 (3)  
00 DEC 2025

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (AI&DS/AI&ML/CS/DS/CSE/Internet of Things and Cyber Security including Block Chain Technology) (Sem.-4)

**COMPUTER ORGANIZATION AND ARCHITECTURE**

Subject Code : BTES-401-18

M.Code : 77627

Date of Examination : 17-12-2025

Max. Marks : 60

Time : 3 Hrs.

**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) Define Computer architecture.
- b) What is Control Unit?
- c) Differentiate between Logical and Physical addresses.
- d) What is instruction-level parallelism?
- e) What are the disadvantages of increasing the number of stages in pipeline processing?
- f) Define and explain memory hierarchy.
- g) Write use of software interrupts.
- h) Write functioning of USB.
- i) Differentiate between Arithmetic Shift Left and Arithmetic Shift Right.
- j) Why does increasing the capacity of cache tend to increase its hit rate?



## SECTION - B

2. Explain different addressing modes used in central processing unit.
3. How is Virtual Memory different from Cache memory?
4. What are the advantages and disadvantages of hardwired and micro-programmed design approaches?
5. Explain the working of carry look ahead adder.
6. Formulate a six-segment instruction pipeline for a computer. Specify the operations to be performed in each pipeline.

## SECTION - C

7. Briefly explain the block diagram and instruction set of 8085 processor. How 8085 is different from 8086?
8. What is the need of replacement algorithms in memory organization? Explain with example.
9. Discuss the role of pipelining for data processing in computer organization. How it increases the throughput?

**NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.**

00 DEC 2025

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE/AI&DS/AI&ML/AI/Cyber Security/DS/IoT and Cyber Security  
included Blockchain)(Sem.-4)

**OPERATING SYSTEM**

Subject Code :BTCS-402-18

M.Code :77628

Date of Examination : 19-12-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

**1. Write briefly :**

- a) Define operating system services.
- b) What is a system call?
- c) What is context switching?
- d) State one objective of CPU scheduling.
- e) Define mutual exclusion.
- f) What is a semaphore?
- g) Define deadlock.
- h) What is internal fragmentation?
- i) What is meant by device driver?
- j) What is meant by virtual memory?



### SECTION-B

2. Explain layered, monolithic and microkernel structures of operating systems.
3. Explain process states and process control block (PCB) with a neat diagram.
4. Write a detailed note on the Producer-Consumer problem.
5. What is Banker's algorithm? Explain briefly with an example.
6. Describe file allocation methods used in file systems.

### SECTION-C

7. Discuss in detail various types of operating systems with examples.
8. Explain different page replacement algorithms with suitable examples.
9. Describe disk scheduling algorithms (FCFS, SSTF, SCAN, C-SCAN) with illustrations.

**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.**



### SECTION - B

2. Show that the intersection of two left ideals of a ring is again a left ideal of the ring.
3. State and prove Lagrange's theorem.
4. Prove that  $(p \wedge q) \wedge r = p \wedge (q \wedge r)$ .
5. Let  $A = \{1, 2, 3, 4, 5\}$ . Define functions  $f: A \rightarrow B$  (if possible) such that :
  - a)  $f$  is onto but not one to one.
  - b)  $f$  is neither one to one nor onto.
6. Let  $R$  be a relation defined on set of real numbers by  $a R b$  is  $a \leq b$  where  $a, b$  are real number. Then  $R$  is a partial order relation.

### SECTION - C

7. For any positive integer  $n$ , the ring  $Z_n$  of all integers modulo  $n$  is an integral domain if and only if  $n$  is prime integer.
8. Suppose the preorder and inorder traversals of a binary tree  $T$  yields the following sequences of nodes when the following is given :  
PREORDER : G, B, Q, A, C, K, F, P, D, E, R, H  
INORDER : Q, B, K, C, F, A, G, P, E, D, H, R
  - a) Draw the diagram of  $T$ .
  - b) Find the depth  $d$  of  $T$ .
9. Find the number of positive integers from 1 to 500 which are :
  - a) Divisible by at least one of 3, 5 and 7.
  - b) Divisible by 3 and 5 but not by 7.
  - c) Divisible by 3 but not by 5 and 7.

**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.**



### SECTION - B

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

### SECTION - C

7. **Write a short note on :**
  - a. SEICMMI
  - b. ISO
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 assumption if any :**
  - a. GANTT Chart
  - b. PERT Chart

**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.**

00 DEC 2025

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (AI & DS) (Sem.-5)

**MACHINE LEARNING**

Subject Code : BTCS 618-18

M.Code :93947

Date of Examination : 27-11-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Write briefly :

- a) Define Precision and Recall.
- b) What is unsupervised learning?
- c) What is meant by under fitting of data?
- d) What is Linear Regression?
- e) Define ANN.
- f) Name feed forward and back propagation algorithms.
- g) Define Fitness Function.
- h) What is the difference between sensitivity and specificity?
- i) What is training data-set and testing data-set?
- j) Define Activation Function.



## SECTION-B

2. Explain Naïve Bayes Algorithm.
3. Explain different criteria to evaluate performance of classification models.
4. What are Neural Networks and explain their working in detail.
5. What is overfitting and underfitting? Which technique is used to reduce these effects on model?
6. Explain step-by-step working of Support Vector Machine (SVM) in detail.

## SECTION - C

7. What is dimensionality reduction? Explain Linear Discriminant Analysis (LDA) for feature extraction.
8. Explain feature scaling (Normalization and Standardization) in detail.
- 9: **Define:**
  - a) RMSE
  - b) Mean Absolute Error
  - c) Rsquare
  - d) F-1 Score
  - e) Gini index

**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.**

00 DEC 2025

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(AI&DS) (Sem.-5)

**JAVA PROGRAMMING**

Subject Code :BTAIML509-20

M.Code : 93951

Date of Examination : 27-11-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Write briefly :

- a) JVM
- b) Finalize()
- c) Identifiers
- d) Class vs Object
- e) Generic class
- f) Inheritance
- g) Packages
- h) Exceptional handling
- i) AWT components
- j) JDBC



### SECTION-B

2. Explain various primitive datatypes and operators.
3. Write a note on method overloading and recursion.
4. Discuss the role of constructors in inheritance.
5. Explain the concept of threads with the help of example.
6. Differentiate between arraylist and vector.

### SECTION-C

7. Explain basics of components and containers, layout managers and swing components.
8. Describe the servlet life cycle and deploying servlets.
9. Define threads, synchronization threads, inter communication of threads.

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

Roll No. 

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE/AI&ML) (Sem-5)  
**PROGRAMMING IN PYTHON**

Subject Code : BTAIML501-20

M.Code : 93173

Date of Examination : 27-11-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

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

- a) Mention one key limitation of Python and provide a context where it becomes critical.
- b) Identify the output of: `type(5 + 2.0)` and justify it.
- c) Interpret the role of indentation in Python syntax execution.
- d) Predict the result of: `print("10" + str(5))` and explain why?
- e) Describe the behavior of the expression `3 + 4 * 2` in terms of operator precedence.
- f) Compare the immutability of tuples and strings with an example.
- g) Suggest a situation where using a set would be preferable over a list.
- h) Distinguish between local and global variables using a short function example.
- i) Outline how exceptions can be chained using `raise from` in Python.
- j) State one use case of the 'with' statement while dealing with file handling.



## SECTION - B

2. Construct a Python function to check whether a given number is prime.
3. Analyze the use of break and continue inside nested loops with code illustration.
4. Implement a program that reads a string and returns a dictionary of character frequencies.
5. Illustrate the difference between user-defined exceptions and built-in exceptions with examples.
6. Demonstrate the use of named tuple and compare it with a standard tuple through a practical example.

## SECTION - C

7. Design a Python program using object-oriented concepts for managing book records (title, author, price). Include features to display and update price.
8. Develop a recursive function to compute the sum of digits of a given number. Highlight the concept of variable scope and lifetime.
9. Create a module that includes a custom function and import it into another Python script. Include steps of module creation, importing and usage.

**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.**



### SECTION - B

2. Explain briefly about DFA and NFA.
3. Explain about the graphical notation of PDA.
4. Explain the various types of Turing machine.
5. Define relations on set and explain its property with an example.
6. State and explain rice theorem.

### SECTION - C

7. Draw a DFA to accept string of 0's and 1's ending with the string 011.
8. Construct a regular grammar for  $(ab+a)^*(aa+b)$ .
9. Explain with diagram for the working of a TM model?

**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.**



## SECTION - B

2. What is a formal grammar? Define its four components with examples.
3. What is a regular expression? Construct a regular expression for a language over  $\{a, b\}$  that contains all strings ending with 'ab'.
4. Describe the characteristics and limitations of context-free languages.
5. Prove that every language accepted by a Linear Bounded Automaton is a Context-Sensitive Language.
6. Define unrestricted grammars and explain their production rules.

## SECTION - C

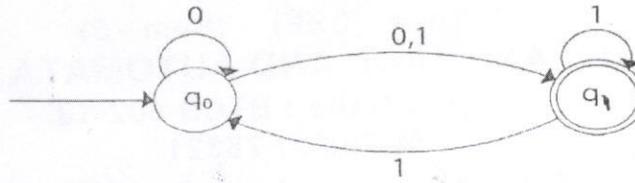
7. a) Convert the following CFG into Chomsky Normal Form :  $S \rightarrow aSb \mid SS \mid \epsilon$ .  
b) Define deterministic pushdown automata. Differentiate it with NPDA.
8. What is Turing machine? Design a Turing Machine which recognizes the language  $L = \{0^n 1^n \mid n \geq 0\}$ .
9. State and explain Rice's Theorem. How it can be used to prove that certain properties of languages recognized by Turing machines are undecidable? Explain.

**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.**

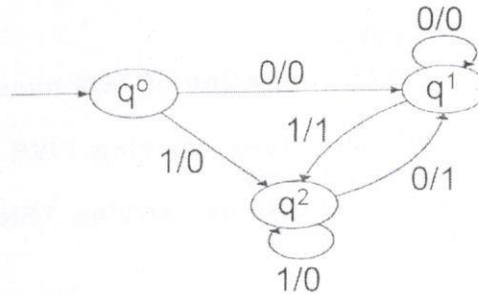


## SECTION - B

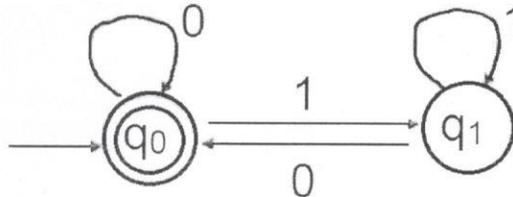
2. Convert this NFA to DFA :



3. Convert the given Mealy machine into Moore machine :



4. Check whether the given FA accepts the language set  $L = \{0, 10, 110, 1100, \dots\}$ . Also, discuss the importance of Language acceptance.



5. What are closure properties? Explain any four.  
 6. What is the significance of pumping lemma for checking regular languages?

## SECTION - C

7. Discuss in detail the hierarchy representing various types of Grammar, Languages and Machines.  
 8. Differentiate between Moore and mealy machine and steps for conversion to each other.  
 9. Discuss church Turing thesis in detail along with various types of TM.

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

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE)(Sem.-5)  
**PROGRAMMING IN PYTHON**

Subject Code : BTCS-510-18

M.Code : 78324

Date of Examination : 05-12-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B 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 remove(), pop() and del functions in Python with examples.
- b) Discuss the role of ORMs in Python.
- c) Explain how multiprocessing is different from multithreading in Python. Write an example of multiprocessing.
- d) Write a Python program to design a simple message box using Tkinter.
- e) How can a whileloop be used with else in Python? Give example.
- f) Consider the following tuple, what will be the output?
  - i. T1 = (10, 20, 30, 40, 50); print(T1 [1:4])
  - ii. T2 = (10,20, 30,40, 50); print(T2 [-3:-1])
- g) Define Exception. List 4 built-in exceptions with the purpose of each.
- h) How are class methods and static methods defined and used in Python classes? Give example.



- i) List and explain at least 6 commonly used string methods in Python with examples.
- j) What will `list(range(10, 0, -2))` return?

### SECTION - B

2. How inheritance, is implemented in Python? Illustrate single and multiple inheritance with programming examples.
3. Suppose you need to store information about students: roll number, name, marks in three subjects, and grade. Which data structure will you use in Python? Write Python code to access and display each component.
4. Write a Python program to demonstrate file handling by reading and writing data into a text file.
5. How exception handling flow works in Python (try, except, else, finally)? Demonstrate with an example program.
6. In how many ways can functions return values in Python? Justify your answer with examples.

### SECTION - C

7. **Write Python code to create a new list containing the cubes of all the numbers in this list : [1, 2, 3, 4, 5, 6]. Code this using:**
  - a. A for loop
  - b. The map () function with lambda.
  - c. List comprehension

Which approach do you find more readable and why?

8. What do you understand by web programming? Design a simple web client in Python.
9. **Write the following programs in python:**
  - a. To take 15 integers as input and display only the even numbers in ascending order.
  - b. To generate and display the first 20 terms of the Fibonacci sequence.

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

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

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

**ENTERPRISE RESOURCE PLANNINGS**

Subject Code : BTES 501-18

M.Code : 78319

Date of Examination : 18-11-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B 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 limitations of ERP?
- b) What are the misconceptions about ERP?
- c) State the various business modules in the ERP system?
- d) Name the ERP products of SAP.
- e) List any two limitations of ERP.
- f) Name the elements of Supply-Chain-Management.
- g) What do you mean by Business Intelligence?
- h) Who are the main players in the ERP market?
- i) What is Business Integration and how do the ERP systems achieve it?
- j) What is OLAP?



## SECTION - B

2. What are the factors to be considered in selecting an ERP Package?
3. What are the benefits and limitations of ERP?
4. Explain the various functions of JD Edwards and its product modules.
5. How are ERP and E-Commerce related? Explain with examples.
6. Explain in detail ERP implementation methodology.

## SECTION - C

7. With suitable representation examine the different phases of the ERP implementation Life Cycle.
8. What are the different approaches to ERP implementation? Define integrated data module. Discuss tangible and intangible benefits of ERP. Will there be any increase in the Productivity after ERP implementation.
9. Discuss the various business modules ERP. Also, explain their functionalities.

**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.**

00 DEC 2025

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

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

**STATISTICAL COMPUTING TECHNIQUES USING R**

Subject Code :BTES 501-20

M.Code :93170

Date of Examination :18-11-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B 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) How can you check if a value is missing (NA) in R?
- b) What is the default type of a vector created in R?
- c) What is an R script and why is it useful?
- d) How can you comment a line of code in an R script?
- e) What is the purpose of exploratory data analysis?
- f) How can you generate a quick summary of a dataset in R?
- g) What is the degree of freedom in the Chi-square goodness of fit test?
- h) What is contingency table in R?
- i) How to read a CSV file into R?
- j) How can you change the default working directory in R?



## SECTION - B

2. What are the built-in mathematical functions in R that can be used for basic calculations?
3. Describe the attributes of a vector in R. How can you access the length, type and names of a vector?
4. How do you create a basic plot in R using the plot() function? Provide an example.
5. What is the difference between an error and a warning in R? Provide an example of each.
6. Give an example of using an ifelse() statement to perform a conditional operation on a vector in R.

## SECTION - C

7.
  - a) What is the purpose of calculating the range of a dataset and how do you compute it in R?
  - b) How can you create a histogram in R to visualize the distribution of a numeric variable?
8.
  - a) What is statistical inference and why is it important in data analysis?
  - b) What is the bootstrap method and how is it used to estimate the standard error of a statistic in R?
9.
  - a) What are some strategies for efficiently handling and analyzing large datasets in R?
  - b) What is a data frame in R and how does it differ from a matrix?

**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.**



### SECTION - B

2. Write a detailed note on Integrity constraints.
3. Write a detailed note on Domain Relational calculus.
4. Explain in detail about B-trees.
5. Explain in detail about Concurrency control.
6. Write a detailed note on Intrusion Detection.

### SECTION - C

7. Write a detailed note on Entity-Relationship Model.
8. Write a detailed note on various Normal forms.
9. Write a detailed note on Distributed Databases.

**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.**



## SECTION - B

2. Design a relational algebraic expression to find customers who ordered all products in a specific category.
3. Demonstrate the process of converting an un-normalized form to BCNF with a simple relation.
4. Analyze how MySQL and Oracle differ in their transaction isolation levels and indexing mechanisms.
5. Simulate a serial schedule and non-serial schedule for two transactions and evaluate serializability.
6. Construct a rolebased access model for a university database and explain permissions for each role.

## SECTION - C

7. Design an airline reservation database using E-R diagram, convert it into relations and normalize it up to 3NF.
8. Write an SQL program for a banking database that performs transaction logging, rollback on failure and includes exception handling.
9. Compare MAC, DAC and RBAC models for security with use-cases in a cloud-based multi-user DBMS environment.

**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.**

00 DEC 2025

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.-5)  
**DATABASE MANAGEMENT SYSTEMS**

Subject Code : BTCS 501-18

M.Code : 78320

Date of Examination : 20-11-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Write briefly :

- a. Explain how the ALTER command in DDL differs from the UPDATE command in DML?
- b) Describe the difference between the SELECT and PROJECT operations in relational algebra.
- c) What is the difference between "dense" and "sparse" indices?
- d) Describe the "two-phase locking" (2PL) protocol and its significance in ensuring serializability.
- e) What is SQL injection and how can it be used to compromise the security of a database?
- f) What is the main difference between an object-relational database and a traditional relational database?
- g) What is a CHECK constraint, and how does it differ from other integrity constraints like primary key and foreign key constraints?
- h) How does the JOIN operation in relational algebra differ from the JOIN in SQL?
- i) What are the advantages of using B-trees for indexing in databases?
- j) What is a serial schedule and why is it considered the safest type of transaction execution?



## SECTION - B

2. Explain the concept of Data Abstraction and its levels and how it differs from Data Independence?
3. Explain the Armstrong axioms and their significance in functional dependencies.
4. Describe the process of insertion and deletion in a B-tree. How does the tree maintain its balance after these operations?
5. Explain the timestamp ordering protocol. How does it ensure serializability in a database system?
6. What is the difference between the strong entity set and weak entity set with the help of an example?

## SECTION - C

7. Explain the concept of "hash collisions" in a hashing system. How are collisions handled in open addressing and separate chaining?
8. Consider the following schema given. The primary keys are underlined:

Sailors (sid:integer, sname:string, rating:integer, age:real)

Boats (bid:integer, bname:string, color:string)

Reserves (sid:integer, bid:integer, day:date) (*Composite Primary key will be used here*)

Write the queries in SQL:

- a) Write SQL queries for creating above tables.
  - b) Find the names and ages of sailors with a rating above 7.
  - c) Find the names of Sailors who have reserved a "red boat".
  - d) Find the names of Sailors who have reserved boat 108.
9. What is normalization? Explain different types of normalizations with the help of an example.

**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.**

00 DEC 2025

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 : 02-12-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B 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 about HTTP Request.
- b) Briefly explain the term Java object.
- c) List different types of operators available in PHP.
- d) Define Proxy servers.
- e) Write a short note on HTML Lists.
- f) Distinguish between 'Get' and 'Post' methods in PHP.
- g) What is a frame? How they are created?
- h) Name any five tools for web site creation.
- i) Write a short note on AJAX server Script.
- j) Discuss the type of Style Sheets.



## SECTION - B

2. Define session. How it works and what are its advantages?
3. How tables and graphics are created in HTML?
4. Differentiate between the 'BITWISE AND' operator and the 'LOGICAL AND' operator in PHP.
5. List and explain any five CSS Properties in detail.
6. What is the use of functions and dialog boxes in java script?

## SECTION - C

7. *"JavaScript is referred to as Object based programming language"*. Justify with an example.
8. Explain with an example program how to connect to a SQL Server database from a PHP script.
9. With the neat block diagram explain the CSS Box Model.

**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.**



## SECTION-B

2. Explain Connecting LAN and Virtual LAN in detail.
3. Explain Go-Back-N ARQ and Selective Repeat ARQ with diagrams.
4. What is IPv6? How is it different from IPv4?
5. Write a detailed note on Transmission Control Protocol (TCP).
6. Write a short note on SNMP.

## SECTION-C

7. Write a detailed note on various Transmission Media in detail.
8. **Explain in detail about following algorithms :**
  - a) Leaky Bucket
  - b) Token Bucket
9. **Write a detailed note on following :**
  - a) FTP
  - b) HTTP

**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.**



### SECTION - B

2. Explain the concept of Problem Spaces in AI and its role in solving problems with agents.
3. What is meant by stochastic search? What problem does it help to overcome compared to deterministic search methods?
4. Explain the issues involved in knowledge representation.
5. Discuss the role of Decision Trees in classifying data with an example.
6. Describe the role of explanation facilities and how they improve user interaction in expert systems?

### SECTION - C

7. Discuss the structure of agents in AI, their interaction with environments and the role of problem-solving agents.
8. Explain the Minimax algorithm and describe how Alpha-Beta pruning significantly improves its efficiency by cutting off irrelevant search branches using alpha and beta bounds?
9. Discuss the process of Learning from examples, including how Winston's Learning Program enhances it with Decision Trees?

**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.**

00 DEC 2025

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

**JAVA PROGRAMMING**

Subject Code : BTAI ML-509-20

M.Code : 93185

Date of Examination : 02-12-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B 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 abstract classes?
- b) Explain overriding Super class methods.
- c) What are labeled loops?
- d) Explain the Java environment concept.
- e) What is an Applet?
- f) What is Servlet life-cycle?
- g) What are containers?
- h) What are Wrapper classes?
- i) Differentiate between a class and an object.
- j) What is the concept of JDBC Programming?



## SECTION-B

2. Explain the Java Source File structure and Compilation-execution.
3. Explain the method overloading and Method overriding using appropriate examples.
4. What is an interface? How is it implemented in Java?
5. How will you extend the Thread class? Explain.
6. Write a Java Program to develop Login Window using AWT.

## SECTION-C

7. Explain the thread control methods in detail.
8. What is the purpose of the finally clause of a try-catch-finally statement? What are the causes Exception? What is the basic difference between the two approaches to exception handling?
9. What are Servlets? Explain developing and deploying Servlets.

**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.**

00 DEC 2025

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

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

**JAVA PROGRAMMING**

Subject Code : BTAI ML-509-20

M.Code : 93185

Date of Examination : 02-12-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B 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 abstract classes?
- b) Explain overriding Super class methods.
- c) What are labeled loops?
- d) Explain the Java environment concept.
- e) What is an Applet?
- f) What is Servlet life-cycle?
- g) What are containers?
- h) What are Wrapper classes?
- i) Differentiate between a class and an object.
- j) What is the concept of JDBC Programming?



Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Artificial Intelligence &amp; Machine Learning/Computer Science &amp; Engineering) (Sem.-5)

**DATA VISUALIZATION USING TABLEAU**

Subject Code : BTAIML 505-20

M.Code : 93181

Date of Examination : 02-12-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B 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 applications of data visualization? List any two.
- b) Differentiate between discrete and continuous data.
- c) Define the calculated field. How is it different from table calculation?
- d) What is the Level of Detail expression?
- e) What is a Scatter plot?
- f) What is a Sparkline?
- g) Define forecasting in Tableau.
- h) When is a tree map preferred?
- i) What is data storytelling?
- j) Define Tableau alerts and their use.



## SECTION - B

2. What are the steps for adding forecasting?
3. Explain the steps involved in connecting data to Tableau and shaping it for visualization.
4. What is the Insight Framework for data visualization? How does it support storytelling?
5. Discuss the use of Marks Card in Tableau with examples of different encoding techniques.
6. How can filters and parameter-based analysis be applied in Tableau?

## SECTION - C

7. Discuss shaping data for use with Tableau in detail, highlighting its importance and methodology.
8. Explain forecasting techniques in Tableau with an emphasis on model types and trend lines.
9. Tableau offers several types of maps. Discuss five different types of map visualizations supported by Tableau, their use cases, and how to implement them?

**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.**

SF-14-3

00 DEC 2025

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

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

**PROGRAMMING IN PYTHON**

Subject Code : BTAIML501-20

M.Code : 93939

Date of Examination : 02-12-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B 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 primary purpose of Python's interactive help feature?
- b. Write the role of indentation in Python programming?
- c. Which function checks conditions in Python and raises an error if the condition is false?
- d. How do you create an infinite loop in Python?
- e. What is an anonymous function in Python, and what keyword is used to define it?
- f. Which module in Python provides access to mathematical functions?
- g. Name two common built-in exceptions in Python.
- h. What is garbage collection in the context of Python objects?
- i. Name a collection in Python that maintains the order of elements.
- j. Which module in Python offers tools for working with dates and times?





## SECTION-B

2. Differentiate between LAN, MAN and WAN.
3. Discuss the Token Bucket congestion control algorithm.
4. Explain the topologies used in a LAN. Write their advantages and disadvantages also.
5. Explain four way handshaking methods to terminate a connection in TCP.
6. Explain various CSMA protocols.

## SECTION-C

7. Explain in detail various transmission media used for data communication in detail.
8. Explain Distance Vector Routing Protocol. What is its major drawback?
9. Explain in detail various sliding window protocols.

**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.**

00 DEC 2025

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Computer Science & Engineering)(Sem.-6)  
**CLOUD COMPUTING**

Subject Code : BTCS-612-18

M.Code : 79254

Date of Examination : 10-01-2026

Max. Marks : 60

Time : 3 Hrs.

**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) Utility Computing
- b) Virtualization
- c) Challenges of Cloud Computing.
- d) Multitenancy
- e) Scalability
- f) Importance of Cloud Security.
- g) Instance
- h) AWS
- i) Community cloud
- j) PaaS



## SECTION-B

2. Explain in detail vision of a cloud computing.
3. Define characteristics of virtualization and role of Elasticity.
4. Explain in detail how cloud services are provided?
5. List the merits and de-merits of Public and Private Cloud Models.
6. Write down different measures followed to reduce cloud security breaches.

## SECTION-C

7. Explain in detail Migration path followed for cloud.
8. Compare existing Cloud platforms/Web services in terms of security parameters available.
9. Write a note on internal security breaches and service hijacking and their countermeasures.

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

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

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

COMPUTER NETWORKS

Subject Code : BTCS-504-18

M.Code : 93665

Date of Examination : 21-11-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B 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) Define Topology.
- b) What is peer to peer networking?
- c) What is spread spectrum?
- d) Define checksum.
- e) What is error control?
- f) What is the key function of a router in a network?
- g) Define unicasting.
- h) What is the size of IP address, Port address and MAC address?
- i) What is the purpose of an IP address in a computer network?
- j) Define Telnet.



## SECTION-B

2. Describe the process of data encapsulation in the OSI model and how it affects data transmission between devices.
3. Explain about the stop and wait and Go back -N ARQ protocol used at data link layer.
4. Discuss the advantages and disadvantages of using IPv6 over IPv4 in the context of Internet addressing and network expansion.
5. Explain the concept of Quality of Service (QoS) in networking and how it ensures efficient data transmission in real-time applications.
6. What is DNS protocol? How does DNS protocol work?

## SECTION-C

7. Discuss the various network topologies, such as bus, star and mesh and provide examples of situations where each topology is most suitable.
8. In detail, describe the role of ARP (Address Resolution Protocol) and RARP in a local area network, including its purpose and how it operates.
9. **Write a short note on :**
  - a) CSMA/CD
  - b) SMTP

**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.**

00 DEC 2025

Roll No.

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 : 26-11-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B 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. What is big data and why is it important?
- b. Differentiate between Hadoop and traditional databases.
- c. Name two tools used for data visualization.
- d. Differentiate between structured and unstructured data.
- e. What is the significance of dashboards in data analytics?
- f. What are association rules in data mining?
- g. What are the key deliverables in the deployment phase?
- h. What are decision trees and how are they used in data analytics?
- i. Differentiate between supervised and unsupervised learning.
- j. What is web mining and how is it useful?



## SECTION - B

2. Describe the importance of big data analytics in industry verticals.
3. Explain the importance of data pre-processing and its common techniques.
4. How does business understanding influence the analytics lifecycle?
5. Explain the k-means clustering algorithm with steps.
6. Explain the process of creating final deliverables in an analytics project.

## SECTION - C

7. Explain Hadoop's storage (HDFS) and processing (MapReduce) frameworks in detail, including their advantages and limitations.
8. Explain Naïve Bayes Classification algorithm with the help of an example.
9. How can an organization successfully implement and operationalize an analytics project?

**NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.**

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

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

**MACHINE LEARNING**

Subject Code : BTCS-619-18

M.Code : 93666

Date of Examination : 26-11-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B 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 is unsupervised learning?
- b) Write a short note on reinforcement learning.
- c) What role does data integration plays in data pre-processing?
- d) Explain the purpose of data reduction during data pre-processing.
- e) What is the significance of the correlation co-efficient in regression analysis?
- f) How is it determined whether a regression model is a good fit for the data?
- g) Discuss briefly two metrics used for the evaluation of a classification model.
- h) Discuss the various applications of clustering.
- i) Differentiate between mutation and elitism.
- j) What is the need of association rule learning?



(52)-450

## SECTION-B

2. What is the ANN? Explain any three activation functions used in NN.
3. Differentiate between standardisation and normalization. Explain different scenarios when each is preferred over the other.
4. Differentiate between Simple linear regression and Multiple linear regression. Discuss scenarios where each might be more suitable.
5. Explain the K-Nearest Neighbours (K-NN) algorithm in classification. How does it classify data points and what are the factors to consider when choosing the value of K?
6. Describe the basic structure of a neural network and explain how does the data flows through the network during training and prediction?

## SECTION-C

7. What is Performance analysis? Discuss the various metrics to evaluate the performance of a regression model discussing the advantages and limitations of each.
8. Explain in detail the split algorithm based on information theory in the context of tree induction. Also, discuss key metrics used for measuring information gain.
9. What is the need of data preprocessing? Discuss the various data preprocessing methods.

**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.**

00 DEC 2025

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

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

**DEEP LEARNING**

Subject Code : BTCS 704-18

M.Code : 93966

Date of Examination : 28-11-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Write briefly :

- a) Overfitting
- b) Bias
- c) Parameter Penalties
- d) Data Augmentation
- e) Convolution Function
- f) Deep Recurrent Network
- g) Encoder-Decoder
- h) Machine Learning
- i) Sequence Modeling
- j) Sigmoid Belief Networks



### SECTION - B

2. What is the role of stochastic gradient decent? Give suitable example.
3. Discuss any two application areas of computational graphs.
4. What is the role of activation functions in convolution networks?
5. Explain the significance of deep boltzmann machines.
6. What are the various advantages and disadvantages of recurrent neural networks?

### SECTION - C

7. Explain the deep belief networks in detail.
8. Explain the dropout and adversarial training and optimization.
9. Discuss the various challenges while implementing deep generative models.

**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.**



## SECTION - B

2. Explain the concept of Data Science.
3. Briefly explain the primary tasks involved in business understanding.
4. Discuss how are association rules useful in Big Data?
5. How linear regressions differ from logistic regression?
6. Discuss the role of Data Visualization Techniques.

## SECTION - C

7. Discuss the basic concept of Big Data analytics in industry verticals.
8. Outline some key techniques used in the Data Preparation phase.
9. Explain the concept of unsupervised learning and provide examples of it.

**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.**

00 DEC 2025

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (AI/DS) (Sem.-6)  
**DATA ANALYTICS USING R**  
Subject Code : BTITCS 601-20  
M.Code : 93954  
Date of Examination : 21-11-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B 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) Discuss Primary Data and Secondary Data.
  - b) Who is a Data Scientist?
  - c) Mention the main purpose of data analysis?
  - d) Define data collection.
  - e) What are the data types in R?
  - f) Mention the various R Logical Operators.
  - g) State the data analysis with Excel.
  - h) What are parallel box plots?
  - i) Distinguish between string and list.
  - j) What do you mean by Descriptive statistics?



## SECTION - B

2. Describe the various applications of the data science.
3. Explain in detail about the various data analysis techniques.
4. Explain in detail about data frame and arrays with example R code.
5. **Give example and define the following functions of R :**
  - a) Read( )
  - b) Head( )
  - c) Summary( )
6. What are the different ways to read the dataset? How to create and rename a variable in R?

## SECTION - C

7. Explain in detail about the various data analysis techniques.
8. Explain about the various statistical functions and math functions in R.
9. When will to use a histogram and when to use a bar chart in R ? Explain with an example by leveraging R package.

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

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.-6)  
**ARTIFICIAL INTELLIGENCE**

Subject Code : BTCS-602-18

M.Code : 79250

Date of Examination : 21-11-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B 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 an intelligent agent in AI? Give an example.
- b) What is direct utility estimation?
- c) What is the difference between open list and closed list in search algorithms?
- d) What is the main objective of the A\* algorithm in artificial intelligence?
- e) What is Bayes' Theorem? State its mathematical expression.
- f) Expand HMM and state its main purpose in probabilistic reasoning.
- g) What is a Markov Decision Process (MDP)?
- h) What is the main difference between value iteration and policy iteration?
- i) What is Reinforcement Learning (RL)?
- j) Differentiate between active and passive reinforcement learning.



## SECTION-B

2. Explain the evolution and history of Artificial Intelligence from its early beginnings to the modern era of machine learning and neural networks.
3. Describe the concept of heuristic search. Explain how Best-First Search makes use of heuristics to find an optimal path?
4. Describe the structure and components of a Bayesian Network. How is knowledge represented in it?
5. Discuss utility theory and explain how utility functions are used to represent preferences under uncertainty?
6. Describe the process of Adaptive Dynamic Programming (ADP) in reinforcement learning. How does it improve the learning process?

## SECTION-C

7. Explain with suitable diagrams how tree and graph search techniques are used to explore the state space in AI problem-solving?
8. Explain in detail the working of Depth-First Search (DFS) and Breadth-First Search (BFS) algorithms. Compare their advantages and limitations.
9. Explain the concept of a Hidden Markov Model (HMM). Discuss its main components and how it is used in temporal reasoning?

**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.**

00 DEC 2025

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech.(CSE) (Sem.-6)**  
**MOBILE APPLICATION DEVELOPMENT**

Subject Code : BTCS620-18

M.Code : 79258

Date of Examination : 18-12-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Explain briefly :

- a) Mobile Platforms
- b) Intent
- c) Testing Tools
- d) Activity
- e) AVD
- f) DVM and JVM
- g) Content Provider
- h) Toast
- i) Status Bar
- j) Android Stack



## SECTION-B

2. Discuss Native data handling and mobile databases.
3. Discuss the Service life cycle in detail.
4. Build an app to differentiate between TimePicker and DatePicker.
5. Write a note on text-to-speech techniques.
6. Describe these App components – Intent, Broadcast receiver and content provider.

## SECTION-C

7. Describe in detail peer-to-peer architecture and mobile agents.
8. Explain the process of testing and deployment of Mobile Apps.
9. Discuss the various app use interface designing, fragments, VUIs and Layouts.

**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.**



## SECTION - B

2. Discuss the need for Fog and Edge computing Middleware.
3. Illustrate the five major activities of a Cloud Provider.
4. Explain Destination Sequenced Distance Vector (DSDV) Protocol in detail.
5. Differentiate between Cloud Computing and Fog Computing in detail.
6. What are Hypervisors? Discuss its various types.

## SECTION - C

7. What is the role of wireless sensor network? Discuss the various design challenges in Ad-hoc and Sensor networks.
8. What do you mean by Cloud computing? Discuss the various cloud service models and its architecture in detail.
9. What is Fog Computing? Discuss its various characteristics, Issues and Challenges.

**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.**



## SECTION-B

2. Compare and contrast ROLAP, MOLAP and HOLAP in terms of their architecture and efficiency in processing OLAP queries, providing examples for clarity.
3. What are the common tasks involved in data mining and how do they differ from traditional data analysis? Use diagrams to illustrate different data mining tasks.
4. Discuss the functionality of search engines. Explain how they crawl, index, and retrieve information from the web.
5. Compare and contrast the Naïve Bayes method and decision tree classification. Highlight their strengths and weaknesses in predictive modeling and support your answer with diagrams illustrating their respective processes.
6. Explain the concept of locality in the web. Discuss how it influences user behavior and content accessibility and include a diagram to illustrate the impact of locality on web navigation and data retrieval.

## SECTION-C

7. Provide a comprehensive overview of web usage mining, detailing its processes and methodologies. Discuss how it analyzes user behavior, patterns and preferences through log file analysis and clickstream data.
8. Explain the Apriori algorithm for mining frequent itemsets. Include a brief description of its working mechanism, how it uses the concept of support and a diagram demonstrating the steps involved.
9. Discuss the process of data cube computation in detail. Explain how data cubes are created, the operations that can be performed on them and the significance of each operation. Illustrate the concepts of slicing, dicing and drilling down/up.

**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.**



## SECTION-B

2. What challenges arise when working with large datasets in association rule mining and what strategies can be implemented to overcome these challenges?
3. Provide an explanation of polynomial regression with a detailed example.
4. Explain the purpose of a residual plot in linear regression. What characteristics define a "good" residual plot and how does it contribute to evaluating model performance?
5. Define the concept of a "population" in genetic algorithms. How does the population evolve over successive generations?
6. In a binary classification scenario, a model exhibits high precision but low recall. Evaluate the real-world implications of this performance and suggest approaches to achieve a balanced trade-off between precision and recall for specific application needs.

## SECTION-C

7. Describe different data cleaning methods in detail, providing an example for each.
8. Examine the influence of various data types, including categorical and continuous variables, on the choice of split algorithms and the criteria used to evaluate splits.
9. Discuss real-world scenarios or problem, domains where mutation and elitism play a crucial role in the effectiveness of Genetic Algorithms. Provide examples illustrating the significance of these components.

**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.**

00 DEC 2025

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (AI&ML / AI&DS / CE / CSE / EE / ECE / EEE / CSE /

Internet of Things and Cyber Security including

Block Chain Technology) BCA / B.Sc. (IT) (Sem.-6)

**WIRELESS COMMUNICATION**

Subject Code :BTEC-601-18

M.Code :79373

Date of Examination : 18-12-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Write briefly:

- a) Define omni directional antenna.
- b) What do you mean by frequency reuse?
- c) Explain channel crosstalk.
- d) What is cell splitting?
- e) What is the significance of multiplexing in communication systems?
- f) Differentiate between SDMA and TDMA.
- g) Define the term GPRS.
- h) What are the various 3G communication systems?
- i) What is LTE?
- j) Write the communicating range of wireless microwave communication system without repeaters.



### SECTION - B

2. Explain the formula for desired C/I for a normal case in an omni directional antenna system.
3. Draw and explain digital signaling over a frequency non selective slowly fading channel.
4. Describe spread spectrum multiple access, its architecture and working.
5. Explain AMPS and ETACS wireless communication systems.
6. With the help of diagrams, explain Bluetooth technology, its advantages and disadvantages.

### SECTION - C

7. Draw and explain the forward and reverse channels of CDMA.
8. Describe frequency division multiple access technique in detail.
9. Explain the concept of diversity branches and signal path techniques in communication systems.

**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.**



## SECTION-B

2. Write a short note on:
  - a) Input Buffering
  - b) Linkers vs. Loaders
3. For the regular expression,  $(a/b)^*abb$ . Draw the NFA. Obtain DFA from NFA. Minimize DFA using Thompson's Construction method.
4. Explain the concept of types and declarations in the context of a programming language's semantics. Why is type checking important during compilation?
5. What are the key issues in code generation during the compilation process?
6. What are Syntax Directed Definitions (SDDs)? Explain with an example how SDDs are used to define the translation of arithmetic expressions?

## SECTION-C

7. Construct a LL(1) parsing table for the following Grammar :

$S \rightarrow AB$

$A \rightarrow a \mid \epsilon$

$B \rightarrow b \mid \epsilon$

And give the parsing actions for the input string "ab\$".

8. Explain various code optimization techniques in details with examples for each.
9. Explain the process of compilation in detail. Illustrate the output of each phase of compilation for the input expression:  $x = (y - z) + (a * b)$

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

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

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

**NETWORK SECURITY AND CRYPTOGRAPHY**

Subject Code : BTCS701-18

M.Code : 90487

Date of Examination: 05-01-2026

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 concept of block ciphers?
- b) Give the header format of ESP in IPsec.
- c) How the nonlinearity is achieved in DES.
- d) How digital signature is implemented using RSA approach?
- e) Explain the mix column operation in AES algorithm.
- f) What is distributed denial service attack?
- g) What are the threats in networks?
- h) What are the requirements of a good hash function?
- i) Differentiate between Euclidian and extended Euclidian algorithm.
- j) List the various attacks that can be made on packet filtering routers and mention appropriate countermeasures.



### SECTION - B

2. You are required to implement secure web access in your organization. Which protocol will you use for the purpose? Explain secure connection establishment and protocol to encrypt messages in details with suitable diagrams.

3. Explain briefly the MD5 algorithm. How it is different from earlier versions of it?
4. Illustrate man in the middle attack on Diffie Hellman key exchange algorithm.
5. Explain the concept of wireless security. List its various protocols available. Identify and mitigate software security vulnerabilities in existing systems.
6. Differentiate between monoalphabetic and polyalphabetic ciphers with example.

### SECTION - C

7. Explain Elgamal encryption system for Public-Key cryptography. Why this system is able to thwart man-in-the middle attack? Give mathematical proof of this algorithm.

8. Write a short note with the help of suitable example:

- a. Kerberos
- b. Honeybots
- c. IDS
- d. Personal Firewalls

9. What is Rivest, Shamir, Adleman algorithm? Give mathematical proof of this algorithm. Explain with the help of suitable example. Use suitable assumption, if any.

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.



## SECTION - B

2. Explain the various issues of code generation in compiler design.
3. What is an Abstract syntax tree? How to construct it? Explain by writing syntax directed definition.
4. Compare the various forms of three address code.
5. Construct the CLR parsing table for the following grammar:  
$$S \rightarrow L=R \mid R$$
$$L \rightarrow *R \mid id$$
$$R \rightarrow L$$
6. Explain the error recovery actions in a lexical analyzer.

## SECTION - C

7. Draw a block diagram of phases of a compiler and identify the main functions of each phase.
8. Consider the pseudo code for quick sort and perform all the function preserving transformation techniques on flow graph of it.
9. How to generate object code for  $X=Y+Z*15$  through different phases of compiler?

**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.**



## SECTION - B

2. What is Agile Manifesto? Explain the core values and principles of Agile software development.
3. Elaborate on the Interface Segregation Principle and its relevance to Agile software design.
4. What are user stories in Scrum? Discuss their characteristics and contents, and explain how they are used to capture requirements effectively? Provide an example of a well-written user story.
5. List and briefly explain any six practices of Extreme Programming.
6. What is Test-Driven Development? Explain how acceptance tests and story verification are used in TDD?

## SECTION - C

7. What does it mean to limit work in progress in Kanban? Discuss the structure and purpose of a Kanban board. How do adding policies, cards, and optimization practices on the board help in improving workflow management?
8. Describe the roles in Scrum—Product Owner, Scrum Master, and Development Team. Discuss their responsibilities and how they collaborate to deliver value? What are the key events in Scrum?
9. Discuss the Single Responsibility Principle. How does it help in reducing complexity and improving maintainability? Provide a suitable example.

**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.**



## 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 modeling 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 Datawarehousing organization.

## SECTION - C

7. Explain the case study of Business Intelligence implementation in healthcare sector.
8. How does CCR model helpful in setting the benchmark and improve business performance?
9. Discuss the role of dashboards and visualization tools in Business Intelligence.

**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.**

00 DEC 2025

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech.(CSE)(Sem-7,8)**  
**ADHOC AND WIRELESS SENSOR NETWORKS**

Subject Code : BTCS-716-18

M.Code : 90507

Date of Examination : 24-11-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Write briefly :

- a) Give applications of wireless sensor networks in Military and emergency areas.
- b) Explain quality of service requirement in wireless sensor networks.
- c) Enlist the various components of wireless sensor network.
- d) Define noise figure.
- e) Draw the Super frame structure of IEEE 802.15.4.
- f) What do you mean by hybrid routing?
- g) How do you define the term TCP?
- h) Explain the term tampering black hole attack.
- i) What are the various tools used for network security?
- j) Define LEACH.



### SECTION - B

2. With the help of an example, explain Dynamic Source Routing Protocol.
3. Draw and explain PAMAS schedule based protocols.
4. What are the design goals of transport layer protocol for Ad Hoc wireless Networks?
5. Explain sensor network scenarios.
6. Describe the possible solutions for Jamming in network security.

### SECTION - C

7. Explain the various layer wise attacks in wireless sensor networks.
8. Describe low duty cycle protocols and wakeup concepts in detail?
9. Give the classifications of routing protocols.

**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.**



## SECTION - B

2. What do you mean by color model processing models? Explain CYMK model in detail.
3. List the differences between object recognition and object detection. Elaborate the scenario where one is more suitable than other with an example.
4. Explain the concept of feature extraction using SIFT (Scale Invariant Feature Transfer) in detail.
5. What do you mean by morphological algorithms? Explain any one algorithm with an example in detail.
6. Explain (minimum 8) difference between spatial domain and frequency domain with an example?

## SECTION - C

7. What is Object Recognition? Elaborate the concept using deep learning based methods for Object recognition.
8. List down (minimum ten) differences between DFT and DWT in detail. (In tabular Form).
9. **Write short note on :**
  - a) Image Compression
  - b) Image resolution

**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.**



## 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 SVM is used in classification?
5. List at least six common characteristics of a Spam E-mail.
6. Explain the various types of network intrusions.

## SECTION - C

7. Explain any content analysisbased technique for E-mail spam detection along with algorithm.
8. Give anyone model of Deep learning-based algorithm for Intrusion detection.
9. Explain ML performance metrics: Accuracy, Precission, F1-score, false negative and ROC.

**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.**

00 DEC 2025

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

**COMPUTER VISION**

Subject Code : BTAIML-701-20

M.Code : 94006

Date of Examination : 20-11-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

**1. Write briefly :**

- a) What is the Euclidean distance between two pixels at coordinates  $(x_1, y_1)$  and  $(x_2, y_2)$ ?
- b) What is the main objective of sharpening spatial filters?
- c) State the separability property of the 2D DFT.
- d) Define salt-and-pepper noise.
- e) What is the purpose of colour transformations?
- f) How does multiresolution analysis help in image processing?
- g) What is morphological erosion in image processing?
- h) Define disparity in a stereo image pair.
- i) What is epipolar geometry in stereo vision?
- j) Name two common object recognition methods.



## SECTION - B

2. Define sampling and quantization in digital image processing. How do these processes affect image resolution and quality?
3. Explain the concept of frequency domain filtering and how it differs from spatial domain filtering.
4. How is smoothing performed in a color image? Explain the process using the RGB color space.
5. What is Structure-from-Motion? Describe how camera motion and 3D structure are recovered from a sequence of images.
6. Define pattern and pattern classes in the context of object recognition. How do feature vectors help in distinguishing different pattern classes?

## SECTION - C

7. Explain the image degradation/restoration model. Compare additive and multiplicative noise with examples. How do their properties impact restoration methods?
8. Derive the mathematical expressions for the 1-D Discrete Fourier Transform (DFT) and its inverse. Discuss the importance of DFT in the context of signal and image processing, highlighting its practical applications.
9.
  - a) Derive the discrete formulation of Laplacian filter and explain how it works for image sharpening.
  - b) What are image pyramids? Explain how Gaussian and Laplacian pyramids are constructed.

**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.**

48-01 - 5

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (AI&ML/AI&DS/CSE/IT/Internet of Things and Cyber Security  
including Block Chain Technology)(Sem.-7)

**ROUTING AND SWITCHING**

Subject Code : BTEC-905A-18

M.Code : 90691

Date of Examination : 27-11-2025

Max. Marks : 60

Time : 3 Hrs.

**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 :

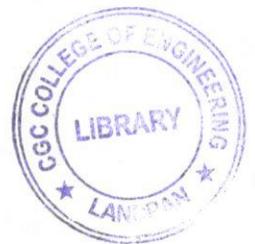
- a) Define what is a CLI file.
- b) What do you mean by transport layer protocols?
- c) Define the term SNMP protocol.
- d) What do you mean by mapped IPv6 address?
- e) Differentiate between TCP and UDP.
- f) Draw the ethernet frame structure for IEEE 802.3.
- g) "Is NAT a security feature on Router"? Clarify.
- h) How does Generic Routing Encapsulation (GRE) is used in DDoS attacks?
- i) Write briefly about requirement of access control list in network security
- j) What is Dynamic Host Configuration Protocol (DHCP)?

### SECTION - B

2. Discuss about the working environment of Wireless LAN.
3. How can NAT help transition to IPv6?
4. Discuss how frame processing is carried in VLAN?
5. Explain about the detailed procedure for establishing a single switched network.
6. Explain about the VRP Operating System Image Management.

### SECTION - C

7. Discuss the working of Distance Vector Routing Protocol with RIP.
8. Discuss about Authentication, Authorization and Accounting (AAA).
9. **Discuss the followings:**
  - a) VLAN Routing
  - b) Establishing Enterprise Radio Access Network Solutions.



**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.**

00 DEC 2025

Roll No. 

--	--	--	--	--	--	--	--	--	--

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 : 02-12-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B 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 do Bayesian methods aim to do in statistics?
- b) What's the role of system evaluation in Systems Engineering?
- c) What are the key components of a cyber-physical system?
- d) What's the main focus of logical thinking in this context?
- e) How does the aerospace sector benefit from using statistics?
- f) How can an organization impact Systems Engineering?
- g) Why are "countermeasures" important in connected systems?
- h) What makes logical agents unique among other agents?
- i) What is reinforcement learning?
- j) How do pooling layers help in a CNN's operation?



Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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 : 20-11-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Write briefly:
  - a) Define ROLAP.
  - b) What is slicing?
  - c) List any two challenges of data mining.
  - d) What is data preprocessing?
  - e) What is data normalization?
  - f) Define Support in ARM.
  - g) What is web usage mining?
  - h) List any two characteristics of search engine.
  - i) What is rollup operation in OLAP?
  - j) What is classification?



## SECTION-B

2. Explain the architecture of OLAP systems and its key components.
3. Discuss the guidelines for designing a data warehouse with a multidimensional view.
4. Describe the major steps in data preprocessing.
5. Explain the working of the Apriori algorithm with an example.
6. Discuss the role of ranking algorithms in search engines.

## SECTION-C

7. What is data cube? Explain the process of data cube computation and optimization strategies used.
8. What is clustering? Explain hierarchical clustering with types and suitable diagrams. How does it handle large databases?
9. **Write a short note on:**
  - a) Significance of web mining in e-commerce.
  - b) Direct hashing and pruning.

**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.**