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

Total No. of Pages : 02

Total No. of Questions : 09

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

PROGRAMMING FOR PROBLEM SOLVING

Subject Code : BTPS101-18

M.Code : 93803

Date of Examination :23-05-2025

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

1. **Write a short notes on :**

   a. Discuss the role of operating system.

   b. List various symbols used in flowchart.

   c. Differentiate between syntax error and logical error.

   d. Differentiate between while and do while loop.

   e. How can we find if the two strings are same or not?

   f. What are library functions? Give an example.

   g. What is recursion? Give an example of recursive function.

   h. How much memory is allocated to structure object? Explain with the help of an example.

   i. Write code to create a pointer, save the address of a variable in that pointer and print the value of that variable using pointer.

   j. Explain various types of logical operators with the help of an example each.

SECTION - B

2. Explain various methods of passing arguments to a function.

3. Write a program to create a student structure with 4 members. Accept input and then display the contents of that structure.

4. What is flowchart? Explain different symbols of flowchart. Draw a flowchart that finds the largest of three numbers.

5. Explain different data types used in C programming language.

SECTION - C

6. What is sorting? Explain bubble sorting.

7. **Explain :**

   a. Different types of memories.

   b. Algorithm with the help of an example.

8. Explain in detail various conditional statements in C programming language.

9. What is file handling? Explain various functions to manage the files in C programming language.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CE/AI&ML/AI&DS/CSE/EE/ECE/EEE/IT/ME/Computer Engineering/IOT and Cyber Security including Block chain Technology) (Sem.–1,2)

PROGRAMMING FOR PROBLEM SOLVING

Subject Code : BTPS-101-18

M.Code : 75346

Date of Examination : 05-06-2025

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

1. **Write briefly :**

a) Explain the concept of an algorithm with an example.

b) Define syntax and logical errors with examples.

c) Describe a conditional statement in programming.

d) Describe the difference between 1-D and 2-D arrays.

e) Explain the concept of algorithm complexity with an example.

f) Explain parameter passing in functions.

g) What are the advantages of using recursion?

h) Explain the difference between a structure and an array.

i) Describe the use of pointers in programming and discuss their advantages and disadvantages.

j) Explain the difference between reading and writing modes in file handling.

SECTION - B

2. Describe the different components of a computer system and their functions.

3. Explain the role of the operating system and compilers in program execution.

4. Explain how conditional branching and looping structures are used together in Programming, with examples.

5. Discuss the concept of an array of structures and provide an example.

SECTION - C

6. Write a pseudocode to calculate the sum of the first 10 natural numbers.

7. Create a program to add two matrices represented as 2-D arrays.

8. Explain the process of linear and binary search algorithms with examples.

9. Explain self-referential structures and how pointers are used in linked lists.

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Total No. of Pages :03

Total No. of Questions : 09

B.Tech.(AI&ML/AI&DS/BlockChain/CE/CSE/IOT/DS/CS/CSD)/EE/EEE/ECE/ETE/IT/ME/ (Robotics & Artificial Intelligence/Internet of Things and Cyber Security including Block Chain Technology) (Sem.–2)

ENGLISH

Subject Code : BTHU101-18

M.Code : 93806

Date of Examination : 27-05-2025

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 atleast TWO questions from SECTION - B & C.

SECTION-A

1. **Write briefly :**

a) Give synonym and antonym of Angry.

b) Write full form of a.m. and https.

c) She is happy……. her victory, (fill in preposition).

d) It's important to place modifiers close to .... words they modify. (Fill in articles)

e) I will call you when I arrive. (Identify clause)

f) Create antonyms of any two words using prefix "dis-".

g) Change any two words into adjective using suffix "-ful"

h) …… have tried, but few have succeeded. (use pronoun)

i) She behave in a very modest manner. (Identify the error and correct it)

j) I saw the cat running down the street with a broken leg. (Place the modifier at correct place)

SECTION - B

2. What is the importance of maintaining a consistent tone throughout a piece of writing?

3. How can you ensure your writing is clear and concise?

4. Write an introduction to a paper on "Use of Technology in Education System".

5. What are the standard formatting guidelines for academic papers?

SECTION-C

6. Write a letter to your client informing him/her about the delay in delivery of assignment to them.

7. Write an essay on any of the following :

   The Importance of Mental Health Awareness, Cultural Diversity and Its Influence on Society or The Influence of Art and Literature on Society.

8. Make a precise of the following and give a suitable title :

   In today's fast-paced world, the significance of effective time management cannot be overstated. Individuals and organizations alike face the constant challenge of juggling multiple tasks and responsibilities. Proper time management enables people to prioritize their duties, set achievable goals, and allocate their time efficiently. By employing techniques such as the Eisenhower Matrix, which categorizes tasks based on urgency and importance, individuals can focus on what truly matters and avoid becoming overwhelmed. Additionally, establishing a daily routine fosters discipline and helps minimize distractions. The benefits of mastering time management extend beyond productivity; it also reduces stress levels and enhances overall well-being. Those who manage their time effectively often report feeling more in control of their lives and are better equipped to handle unexpected challenges. Furthermore, in professional settings, efficient time management can lead to improved team collaboration and project outcomes, as deadlines are met and expectations are exceeded. In conclusion, cultivating strong time management skills is essential for achieving personal and professional success. It empowers individuals to make informed decisions about how to spend their time, leading to a more balanced and fulfilling life.

9. Read the following paragraph and answer the questions that follow :

Climate change is one of the most pressing issues facing humanity today. It refers to the long-term alteration of temperature and typical weather patterns in a place. While natural factors contribute to climate change, human activities, such as burning fossil fuels and deforestation, are the primary drivers of the current rapid changes. The effects of climate change are widespread and include rising sea levels, more frequent extreme weather events and disruptions to ecosystems. Addressing climate change requires collective action on a global scale, including transitioning to renewable energy sources, enhancing energy efficiency, and implementing sustainable practices in agriculture and industry. Public awareness and individual actions also play crucial roles in mitigating climate change effects. Governments, businesses, and individuals must work together to create innovative solutions and policies that can lead to a more sustainable future.

Comprehension Questions :

a) What is the primary cause of the current rapid changes in climate, according to the paragraph?

b) List two effects of climate change mentioned in the text.

c) What actions are suggested to address climate change?

d) How does the paragraph emphasize the importance of collective action?

e) What role do public awareness and individual actions play in combating climate change?

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

Total No. of Pages : 03

Total No. of Questions : 05

B.Tech. (AI&DS)/(AI&ML)/(CE)/(CSE/DS) /(EE)/(ECE)/(EEE)(IT)/(ME)/(IOT and Cyber Security Including Block Chain Technology) (Sem.–1,2)

ENGLISH

Subject Code : BTHU-101-18

M.Code : 75349

Date of Examinaton : 03-06-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES:

1. All Questions Are COMPULSORY.

1. a) Use the following phrases in sentences: for good, in a short time, with patience, with a bad temper, on the desk.

   b) **Correct the following :**

   i. She have a beautiful dress.

   ii. He don't have any siblings.

   iii. I visits my grandmother every weekend.

   iv. They doesn't like to watch movies.

   v. She can sings very well.

2. Draft a business letter to the dealers of your company to send details of vehicles sold model wise in the last six months. Give reasons behind your request.

3. a) Draft a business email to the suppliers of the company to give additional discounts on the raw material being purchased from them.

   b) Elaborate features of conclusion in writing.

4. Write an essay in about 500 words on "Increase in Population and Poverty" OR "Empowerment for Women".

(S17) - 1160

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

In some ways we already do: every time we spend our cash we are making an active choice about the companies support and the practices we endorse. Today, when corporations can be more influential than entire states, where we put our pounds is where the power lies. The problem is/so it is difficult to confidently make an informed choice. Consider this: the retail manufacturing industry is the second most polluting industry on earth, second only to oil. According to Annie Leonard, an expert in overconsumption, only 1% of the materials used to produce our consumer goods are still in use six-months after sale. Somewhere, the value of craftsmanship and of provenance has been lost. Price and speed are trumping value. However, the tide is turning. Increasing awareness around these issues has led to a rise in what is known as conscious consumption, a movement of people who seek out ways to make positive decisions about what to buy and look for a solution to the negative impact consumerism is having on our world. This is a growing tribe: a third of UK consumers claim to be very concerned about issues regarding the origin of products. A study from YouGov and the Global Poverty Project revealed that 74% of those surveyed would pay an extra 5% for their clothes if there was a guarantee workers were being paid fairly and working in safe conditions. If you're thinking that 5% doesn't sound like a lot, consider the fact that the fashion industry could take a staggering 125 million people out of poverty by adding only 1% of its profits to workers' wages. Issues such as equal pay, environmentally conscious manufacturing processes, prevention of counterfeit goods, human trafficking, responsible farming practices and overproduction of goods are all at the forefront of consumers' minds when making these choices. In an increasingly open, digital world where authenticity is the buzzword of choice; businesses must keep up with growing demands for ethical behaviour and transparency in everything from employee rights and gender discrimination to the supply chain. In studying for my Phd, I researched product supply chain transparency in depth, looking at technologies to improve information about products and the global network of people and resources that fuel them. I believe technology is the key to dealing with the challenges created by consumerism. Open data, social networks and mobile tech can change the game. Groundbreaking technologies could enable transparency in supply chains, which is why this year I have opened on turning my findings into a social enterprise to empower businesses to take steps to being open.

1. Why businesses must keep up with the growing demands of ethical behavior and transparency?

2. Which statement(s) corroborate the statement made by the author that "the tide is turning"?

3. According to the author, how can we tackle the impact of consumerism?

4. **Make sentences to clarify the meaning of the following words :** endorse, staggering, empower.

5. Give a gist of the passage.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (AI&OS/AI&ML/Block Chain/Internet of Things and Cyber Security including Block Chain Technology/ CE/CSE/CS/IOT/CSD/EEE/ECE/EE/ETE/ME/ECS/IT/Food Technology/Robotics & AI/ Block Chain Technology) (Sem.–1,2)

CHEMISTRY-I

Subject Code : BTCH101-23

M.Code : 93800

Date of Examination : 20-05-2025

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

1. **Write briefly :**

a) Define aromaticity and give one example of an aromatic molecule.

b) Draw the pi-molecular orbital's of buta-diene.

c) What is spin-spin coupling in NMR?

d) In 1H NMR spectroscopy, what is meant by chemical shift'?

e) What are Van der Waals interactions, and how do they differ from ionic and dipolar interactions?

f) List any three factors that affect the rate of corrosion.

g) How do atomic and ionic sizes change across a period and down a group in the periodic table?

h) Why do noble gases have positive electron gain enthalpies?

i) What is the difference between enantiomers and diastereomers?

j) What is the difference between electrophilic and nucleophilic, substitution reactions?

SECTION - B

2. a) What is the effect of doping on-the band structure of semiconductors and how does it influence their electrical conductivity?

   b) Explain how d-orbitals split in a tetrahedral crystal field. Why crystal field splitting in tetrahedral environment is lower than the octahedral environment?

3. a) Derive the Schrodinger wave equation and explain the physical significance of Ψ and Ψ^2.

   b) What is the principle behind electronic spectroscopy, and what types of electronic transitions can occur in molecules?

4. a) What factors influence the value of λ_{max} and the intensity of spectral lines?

   b) What is the principle of NMR spectroscopy? Explain.

5. a) Define the critical point of a substance and explain the relationship between critical constants and the van der Waals constants.

   b) How does the behavior of real gases deviate from ideal gas behavior at high pressure or low temperature?

SECTION - C

6. a) What are the various problems associated with hard water and how it affects daily life?

   b) State the Nernst equation and explain its application in calculating cell potentials.

7. a) What is the effective nuclear charge, and how does it affect the behavior of electrons in an atom?

   b) How does electro negativity influence the polarity of chemical bonds?

8. a) Give the conformational analysis of Propane by drawing the potential energy diagram for various conformations of it.

   b) **Explain :**

      i. Chirality

      ii. Optical activity

9. What is an electrophilic addition reaction, and how does it differ from nucleophilic addition? Explain by giving suitable examples.

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Total No. of Pages : 02

Total No. of Questions : 09

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

CHEMISTRY-I

Subject Code : BTCH-101-18

M.Code : 75343

Date of Examination : 29-05-2025

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

1. Answer briefly :

   a. What are dipole-dipole interactions? Explain.

   b. Give one example of hard and soft acid.

   c. Why TMS is used as an internal standard in NMR Spectroscopy?

   d. What is Dry corrosion? Explain.

   e. What is Markownikof's rule? Explain by giving example.

   f. Differentiate between lionization Isomerism and Hydrate Isomerism.

   g. Which of the following will show IR spectrum?

   O_2, N_2, Hl, CO_2

   h. How is entropy related to free energy?

   i. Calculate the bond order of O_2 and O_2^+.

   j. What is absolute configuration?

SECTION - B

2. a. Draw the molecular orbital energy level diagram of CO molecule.

   b. Differentiate between n-type and p-type semiconductors.

3. a. Discuss in detail Crystal field splitting in octahedral complexes.

   b. What is Aufbau Principle?

4. a. Explain the process of Fluorescence and phosphorescence with the help of Jablonski diagram.

   b. Differentiate between scattering and diffraction.

5. a. Derive expression for the calculation of V_c, P_c and T_c in terms of van der waal's constant.

   b. Explain the deviation of real gases from ideal behavior.

SECTION - C

6. a. What is corrosion? Discuss mechanism of dry corrosion.

   b. Calculate the emf of the cell Zn/ Zn^{2+} (0.001M) || Cu^{2+}(0.1M)/ Cu. The standard potential of Cu/Cu^{2+} half-cell is +0.34 V and Zn/Zn^{2+} is 0.76 V.

7. a. What is ionization energy? Which elements have the highest ionization energy? How ionization energy shows variation along the period and down the group?

   b. What is the difference between oxidation number and oxidation state?

8. a. Describe the conformational analysis of butane.

   b. What is enantiomerism? Explain the requirement for enantiomerism.

9. Explain the following terms :

   a) Elimination reaction with mechanism.

   b) Ring Cyclization reaction.

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Total No. of Pages : 01

Total No. of Questions : 09

B.Tech. (AI&DS/AI&ML/Blockchain/CE/CSE/Cyber Security/IOT/CS&D/EEE/ECE/DS/EE/ECE(Industry Integrated)/ETE/ECS/FT/IT/ME/Robotics & AI/CSE (Internet of Things and Cyber Security including block Chain Technology)) (Sem.–2)

ENGINEERING MATHEMATICS-II

Subject Code : BTAM201-23

M.Code : 93811

Date of Examination : 06-05-2025

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

1. Write a short notes on :

a) Determine whether the system of equations : $x - 3z = -1$ and $2x - z = 3$ is consistent or not? Justify.

b) Find the column rank of the matrix $A = \begin{pmatrix} 1 & 1 & 2 \\ 1 & 4 & 3 \\ 3 & 3 & 6 \end{pmatrix}$.

c) State Rank-Nullity theorem.

d) If λ is an eigenvalue of the matrix A, then prove that $\alpha\lambda$ is an eigenvalue of αA, where α is a scalar.

e) Let $T : V \to V$ be a Linear Transformation. Show that $T(O) = O$, where O is the zero element of vector space V.

f) Write down the ordinary differential equation for simple population decay model.

g) Find the particular integral of $(D^3 + 1)\, y = \cos(2x - 1)$.

h) Find the differential equation of all ellipses centered at the origin and foci on x-axis.

i) Construct the partial differential equation of $z = a(x + y) + b(x - y)$ by eliminating the arbitrary constants.

j) Find the solution of the partial differential equation $(D^4 - 2D^2D'^2 + D'^4)\, z = 0$.

SECTION - B

2. Using Gauss Elimination method, solve the following system of linear equations :

$x + 3y - 2z = 0,\quad 2x - y + 4z = 0,\quad x - 11y + 14z = 0.$

3. Determine the all values of k such that the rank of the matrix A is 3, where

$$A = \begin{bmatrix} 1 & 1 & -1 & 0 \\ 4 & 4 & -3 & 1 \\ k & 2 & 2 & 2 \\ 9 & 9 & k & 3 \end{bmatrix}.$$

4. Diagonalize the matrix $\begin{pmatrix} 0 & 2 & 1 \\ 2 & 0 & 3 \\ 1 & -3 & 0 \end{pmatrix}$.

5. Find a Linear transformation $T : \mathbb{R}^4 \to \mathbb{R}^3$ whose null space is generated by (1, 2, 3, 4) and (0, 1, 1, 1).

SECTION - C

6. If $\log\left(\frac{dy}{dx}\right) = (x + y)$ and $y(1) = 1$, then find $y(-1)$.

7. Solve $\frac{d^2y}{dx^2} + a^2y = \tan ax,$, using the method of variation of parameters.

8. Find the general solution of the partial differential equation $(y + z)\, p + (z + x)\, q = x + y$.

9. Solve $(p^2 + q^2)\, x = pz$ using Charpit's method.

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

Total No. of Questions : 09

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

MATHEMATICS-II

Subject Code : BTAM204-18

M.Code : 91960

Date of Examination : 20-05-2025

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

1. **Write short notes on :**

a) A cyclist pedals from his house to his college at a speed of l0 kmph. Find the average speed.

b) Find the variance of first n natural numbers.

c) Surjit and Sachdev appeared for an interview. The probability of their selection is $\frac{1}{3}$ and $\frac{1}{6}$, respectively. Find the probability that only one of them selected.

d) State any two properties of Binomial distribution.

e) **Bring out the fallacy, if any, in the following statement :**

"The mean of a Poisson distribution is 5 while its standard deviation is 4."

f) What is the relation between Correlation and. Regression Coefficients?

g) What is the Objective of Sampling?

h) State any two applications of t-test.

i) Define F-Test (Variance Ratio Test).

j) Define Chi-square (χ^2) test.

SECTION - B

2. Average scores of three batsman A, B and C are 40, 45, 55 respectively and their standard deviation are 9, 11, and 15, respectively. Which batsman is more consistent?

3. **Calculate Karl Pearson's coefficient of skewness from the following data :**

Profit (In Lakhs) below	20	40	60	80	100
No. of companies	8	20	50	64	70

4. **Calculate the coefficient of correlation between the values X and Y given below :**

X	79	89	97	69	59	79	68	61
Y	125	137	156	112	107	136	123	108

5. **The data given below shows the age of husbands and age of wives. Estimate the most likely age of husband when wife's age is 16 years :**

Age of husbands (in years)	36	23	27	28	28	29	30	31	33	35
Age of wives (in years)	29	18	20	22	27	21	29	27	29	28

SECTION - C

6. In a distribution, exactly normal, 7% of the items are under 35 and 89% are under 63. What are the mean and standard deviation of the distribution?

7. Fit the curve $y = a + bx^2$ to the data

X	10	20	30	40	50
Y	8	10	15	21	30

8. A dice is thrown 9,000 times of 3 or 4 is observed 3,240 times. Show that the dice cannot be regarded as an unbiased one and find the limits between which the probability of a throw of 3 or 4 lies.

9. A sample of 18 items has a mean 24 units and standard deviation 3 units. Test the hypothesis that it is a random sample from a normal population with mean 27 units.

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Total No. of Questions : 09

B.Tech. (AI&DS/AI&ML/Block Chain/CE/IOT/CSE/EEE/CS/EE/ECE/FT/IT /ME/CSD/ETE/DS/R&AI/Internet of Things and Cyber Security Including Block chain Technology) (Sem.–1)

ENGINEERING MATHEMATICS-I

Subject Code : BTAM101-23

M.Code : 93796

Date of Examination : 03-06-2025

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

1. **Write short notes on :**

a) Explain absolute convergence of improper integrals of second kind.

b) Evaluate the triple Integral $\int_0^2 \int_0^2 \int_0^{yz} xyzdxdydz$.

c) Evaluate $\int_0^1 \int_{x^2}^{x} dydx$

d) State homogeneous function.

e) If $f(x, y) = x^2y + xy^3 - 3x + 4y - 6$, find $\frac{\partial f}{\partial x}$

f) Define conditionally convergent series.

g) State Integral Test.

h) Compute $\Gamma\left(-\frac{3}{2}\right)$.

i) Prove symmetry of beta function.

j) State Taylor's theorem.

SECTION - B

2. Show that the function $\int_0^\infty x^{n-1} e^{-x}\, dx$ is convergent if and only if $n > 0$.

3. Test the convergence of $x + \frac{2^2 x^2}{2!} + \frac{3^3 x^3}{3!} + \frac{4^4 x^4}{4!} \ldots\ldots\ldots \infty$.

4. Discuss the convergence or divergence of the series $\sum \frac{n^p}{(n+1)^q}$.

5. Find the volume of the solid generated by revolving the curve $x = 2t + 3$, $y = 4t^2 - 9$ about the x axis for $2t = -3$ to $2t = 3$.

SECTION-C

6. If $\theta = t^n e^{\frac{-r^2}{4t}}$, find the value of n which will make $\frac{1}{r^2}\frac{\partial}{\partial r}\left(r^2 \frac{\partial \theta}{\partial r}\right) = \frac{\partial \theta}{\partial t}$.

7. If $U = Cosec^{-1}\left(\frac{x^{\frac{1}{2}} + y^{\frac{1}{2}}}{x^{\frac{1}{3}} + y^{\frac{1}{3}}}\right)^{\frac{1}{2}}$, Prove that

$$x^2 \frac{\partial^2 U}{\partial y^2} + 2xy \frac{\partial^2 U}{\partial x \partial y} + y^2 \frac{\partial^2 U}{\partial y^2} = \frac{13 + \tan^2 U}{144}$$

8. Find the volume common to the cylinders $x^2 + y^2 = a^2$ and $x^2 + z^2 = a^2$.

9. Evaluate $\iint (x^2 + y^2)\, dx\, dy$ throughout the area enclosed by the curve

$y = 4x$, $x + y = 3$, $y = 0$ and $y = 2$.

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

Total No. of Pages : 04

Total No. of Questions : 09

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

MATHEMATICS-I

Subject Code : BTAM-104-18

M.Code : 75362

Date of Examination: 14-06-2025

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 EACH from SECTION - B & C.

SECTION - A

1. **Explain briefly :**

a) Verify Lagrange's Mean value theorem for $f(x) = e^x$ in [0, 1].

b) Show that $\sin x\,(1 + \cos x)$ has a maximum when $x = \pi/3$.

c) Evaluate $\int_0^\infty x^2 e^{-x^2}\,dx$.

d) Determine the rank of the matrix $A = \begin{bmatrix} 1 & 4 & 5 \\ 2 & 6 & 8 \\ 3 & 7 & 22 \end{bmatrix}$.

e) If $A = \begin{bmatrix} \cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha \end{bmatrix}$ verify that $AA^T = I = A^T A$, where I is the unit matrix.

f) For what values of k, do the following sets of vectors form a basis in ¡ ^{3} : $\{(k, 1-k, k), (0, 3k-1, 2), (-k, 1, 0)\}$.

g) State $ran(T)$ and $ker(T)$ of a linear transformation $T : V \to W$. State rank-nullity theorem.

(S1)-1328

h) Examine whether the matrix A is similar to the matrix B where $A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$.

i) Express the matrix $A = \begin{bmatrix} 2 & 1 & 3 \\ -3 & 4 & -1 \\ -1 & 1 & 2 \end{bmatrix}$ as sum of symmetric and skew-symmetric matrices.

j) Show that the eigen values of symmetric matrix are real.

SECTION - B

2. a) Expand $\log(1+x)$ by Maclaurin's series.

   b) Evaluate $\lim_{x \to 0} \frac{e^x - e^{\sin x}}{x - \sin x}$.

3. a) Find the surface area of the solid generated by the revolution of the astroid $x = a\cos^3 t,\ y = a\sin^3 t,$ about the y-axis.

   b) Prove that $\beta(m,n) = \int_0^1 \frac{x^{m-1} + x^{n-1}}{(1+x)^{m+n}}\, dx.$

4. a) Solve the equations $3z + y + 2z = 3,\ 2x - 3y - z = 3,\ x + 2y + z = 4$ by Cramer's rule.

   b) **Using the Gauss-Jordan method, find the inverse of the matrix :**

$$A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ -2 & -4 & -4 \end{bmatrix}.$$

5. a) Are the following vectors linearly dependent. If so, find the relation between them : $\{(1, 1, 1, 3), (1, 2, 3, 4), (2, 3, 4, 9)\}$.

b) Investigate for what values of λ and μ, the simultaneous equations $x + y + z = 6$, $x + 2y + 3z = 10$, $x + 2y + \lambda z = \mu$, have no solution, a unique solution and an infinite number of solutions.

SECTION - C

6. a) Let T be a transformation from $\mathbb{R}^3$ into $\mathbb{R}^1$ defined by $T(x_1, x_2, x_3) = x_1^2 + x_2^3 + x_3^2$. Show that T is not a linear transformation.

b) Find *ker* (T) and *ran* (T) and their dimensions for

$$T : \mathbb{R}^2 \to \mathbb{R}^3 ; T\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 2x + y \\ y - x \\ 3x + 4y \end{pmatrix}.$$

7. a) Let $T : \mathbb{R}^3 \to \mathbb{R}^2$ be a linear transformation defined by $T\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} y + z \\ y - z \end{pmatrix}$.

Determine the matrix of the linear transformation T, with respect to the standard basis

$$X = \left\{ \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix}, \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix} \right\} \text{ in } \mathbb{R}^3 \text{ and } Y = \left\{ \begin{pmatrix} 1 \\ 0 \end{pmatrix}, \begin{pmatrix} 0 \\ 1 \end{pmatrix} \right\} \text{ in } \mathbb{R}^2.$$

b) If x, y, z and linearly independent vectors in $\mathbb{R}^3$ then show that $x + y, y + z, z + x$ are also linearly dependent in $\mathbb{R}^3$.

8. a) **Find the eigen values and the corresponding eigen vectors of the matrix :**

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

b) The eigen vectors of a 3×3 matrix A corresponding to the eigen values 2, 2, 4 are $(-2, 1, 0)^T$, $(-1, 0, 1)^T$, $(1, 0, 1)^T$ respectively. Find the matrix A.

9. Show that the matrix $A \begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$ is diagonalizable. Hence find P such that $P^{-1}AP$ is a diagonal matrix.

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Total No. of Pages : 02

Total No. of Questions : 09

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

ENGINEERING PHYSICS

Subject Code : BTPH101-23

M.Code : 93794

Date of Examination : 14-06-2025

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

1. **Write briefly :**

   a. Calculate the minimum wavelength of Continuous X-rays emitted from an X-ray tube whose operating voltage is 40 kV.

   b. Show that at 0 K, the probability to find electron in an energy level above the fermi level is Zero.

   c. Why superconductors cannot carry current beyond a certain limit?

   d. Distinguish between diamagnetic and paramagnetic materials.

   e. Show that Divergence of Curl of vector is zero.

   f. Distinguish between Stimulated emission and spontaneous emission.

   g. Write a note on four level lasers.

   h. What are Carbon Nanotubes (CNTs)?

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Total No. of Pages : 02

Total No. of Questions : 09

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

BASIC ELECTRICAL ENGINEERING

Subject Code : BTEE101-18

M.Code : 93797

Date of Examination : 05-06-2025

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 atleast TWO questions from SECTION - B & C.

SECTION-A

I. Write short notes on :

a) What is the function of a contactor?

b) What is an apparent power? Draw the power triangle.

c) What are the demerits of low power factor to an electric AC system?

d) What are dependent voltage and current sources?

e) Draw the electric circuit schematic of a step down auto-transformer.

f) Distinguish between the active and passive elements.

g) Explain the working principle of a single-phase induction motor.

h) Enlist the types of batteries in electric systems.

i) Draw and explain in brief, the BH curve for a typical magnetic material.

j) Explain the three-phase balanced circuits.

SECTION-B

2. Draw and explain the electric circuit schematic of an earth leakage circuit breaker.

3. State and prove the Superposition theorem. Give example.

4. Prove that the emf in DC machines is directly proportional to flux per pole and speed. Derive it.

5. A capacitor has a capacitance of 30 μF. Find its capacitive reactance for frequencies of 25 Hz and 50 Hz. Find in each case the current, if the supply voltage is 440 V.

SECTION-C

6. A choke coil is connected in series with a 200 μF capacitor. With a constant supply voltage of 250 V, it is found that the circuit takes its maximum current of 50 A, when the supply frequency is 100 Hz.

Determine :

a) Resistance and inductance of the choke coil.

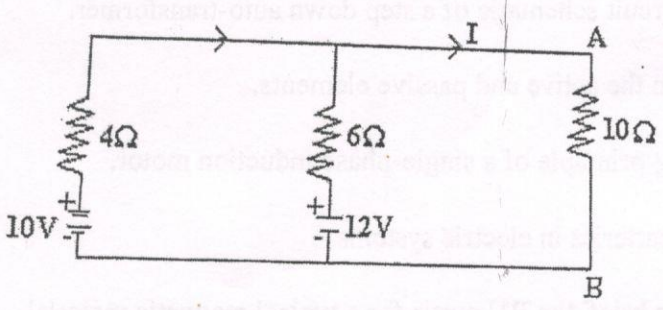
b) Voltage across the capacitor.

c) Q-factor of the circuit.

7. What is the purpose of earthing? Explain the procedure for implementing any one type of earthing in a domestic system.

8. Calculate the value of voltage regulation at 0.8 pf lagging for a transformer with resistance drop 2% and reactance drop of 4% of the voltage. Hence, explain the significance of the voltage regulation. (6, 2)

9. Determine the current I in the network by using Thevenin's theorem. Use figure below.



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Total No. of Questions : 09

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

ENGINEERING GRAPHICS & DESIGN

Subject Code : BTME101-21

M.Code : 93799

Date of Examination : 31-05-2025

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

1. **Write short notes on :**

   a) Explain the terms isometric drawing and isometric projection.

   b) Show by means of traces, a plane inclined to HP and perpendicular to VP.

   c) Draw projections of a line lying on HP and inclined to VP with the help of a suitable free hand drawing. Also, show traces.

   d) How will you represent Liquid and Wood on a drawing sheet?

   e) Name the methods to determine the true length and true inclinations of a straight line.

   f) What is the difference between plain scale and diagonal scale?

   g) What are the standard sizes of drawing sheets?

   h) Explain with the help of a simple sketch (i) size dimensions (ii) location dimensions.

   i) **Write the following statement using single stroke capital vertical letters of 12 mm size :**

   "BE THE CHANGE THAT YOU WISH TO SEE IN THE WORLD".

   j) Explain the following terms with a suitable freehand drawing: Apex, Slant Height, Base Rim and Generator.

SECTION - B

2. On a plan, a line 22cm long represents a distance of 440m. Draw a Diagonal Scale to read up to single meter. Mark 287m on the scale.

3. A point "N" is 68 mm behind VP and 79 mm below HP. Draw its projections and find out its shortest distance from the reference line.

4. Plan and elevation of a line "AB" 75mm long, measure 65mm and 50 mm respectively. End A is in HP and 12mm from VP. Draw its projections and determine its inclinations to the reference planes when the line lies in first quadrant.

5. A line "EF" is lying on profile plan. Its end "E" is 45mm in front of VP and 10mm above HP and end "F" is 10mm in front of VP and 50mm above HP. Draw its projections and determine the true length, traces and inclination with the reference planes.

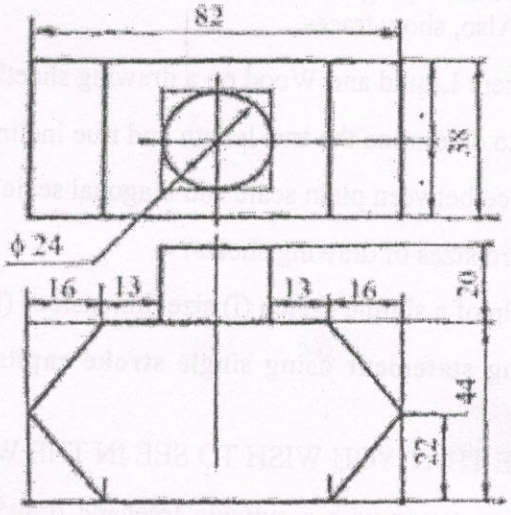
SECTION - C

6. A Pentagonal plane with a 30mm side has an edge on HP, the surface of the Plane is inclined at 45° to the HP and perpendicular to VP. Draw its Projections assuming the plane in first quadrant.

7. A right regular Hexagonal Prism having a base with a 30 mm side and 75 mm long axis has an edge of its base on HP. Its axis is parallel to VP and inclined at 45° to HP. Draw its projections assuming the prism lying in first quadrant.

8. A right regular pentagonal prism, edge of base 20mm and height 50 mm has a central circular hole of diameter 20 mm drilled centrally through it, along with its axis. Draw its isometric projection.

9. **Draw the isometric drawing with the following orthographic projections :**



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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (AI & ML/CSE/DS/AI&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 : 31-05-2025

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

1. **Write briefly :**

   a. Define Bloch' s theorem.

   b. Distinguish between direct and indirect bandgaps.

   c. In a solid, consider the energy level lying 0.01 eV above Fermi level. What is the probability of this level being occupied by an electron at 200 K?

   d. What are Ohmic junctions?

   e. Classify metals in Conductor, semiconductor and insulator on the basis of energy band.

   f. Define population inversion.

   g. What is Fermi's golden rule?

   h. Explain Photovolatic effect.

   i. When a laser has 3 V applied to it, it draws 30 mA and produce 3 mW of optical power. What is the efficiency of laser?

   j. What are the necessary conditions for applying Van der Pauw method?

SECTION - B

2. What are the special features of Classical free electron theory of metals? Derive an expression for the thermal conductivity of a metal.

3. What is Kronig-Penny model? Solve Schrödinger wave equation for periodic potential and explain the origin of energy bands in solids.

4. Obtain the expression for electron density in an intrinsic semiconductor. Estimate the fraction of electrons in conduction band at room temperature in Ge with band gap 0.50eV.

5. What is the need of extrinsic semiconductors? Discuss the effect of temperature on the Fermi level in extrinsic semiconductors.

SECTION - C

6. What is joint density of states? Derive the expression for joint density of states.

7. What are Einstein coefficients? Obtain the relation between Einstein coefficients and discuss its importance.

8. Explain any method to measure the wavelength of monochromatic light. Can the same method be used for measuring wavelength of white light?

9. (a) What is Four-point probe method? Explain the measurement of band gap using it.

   (b) The resistivity of an intrinsic semiconductor is 5.5 Ω m at 30°C and 3.0 Ω m at 42°C. Find the band gap.

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Roll No. | | | | | | | | | | | | | Total No. of Pages : 03

Total No. of Questions : 09

B.Tech. (AI&DS/ML/Block Chain/CSE/Cyber Security/ CS/EEE/EE/IT/IOT) (Sem.–3)

MATHEMATICS-III (PROBABILITY AND STATISTICS)

Subject Code : BTAM-302-23

M.Code : 94630

Date of Examination : 04-06-2025

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 do you mean by Kurtosis?

b) Define sample space and an event of a random experiment. Also, give example.

c) A die is thrown at random. Find the probability that the number on it is even.

d) Define binomial distribution.

e) Write down the mean and variance of Poisson distribution.

f) What do you mean by Regression?

g) Give an example of a positive correlation.

h) Define Standard Error of a sampling distribution of a statistic.

i) Give an example of a small sample.

j) What are the uses of Chi-square test?

SECTION - B

2. **Calculate the first four moments about the mean for the following data :**

x :	1	2	3	4	5	6	7	8	9
f :	1	6	13	25	30	22	9	5	2

3. A random variable X has the following probability distribution

X	0	1	2	3	4	5	6
$P(X)$	k	$3k$	$5k$	$7k$	$9k$	$11k$	$13k$

Find : a) the value of k b) $P(X \geq 4)$ and $P(2 < X \leq 5)$.

4. If X is a normal variate with mean 30 and standard deviation 5, find the probabilities that

a) $26 \leq X \leq 40$ b) $X \geq 45$.

5. **By using the method of least squares, find the straight line of the form $y = a + bx$ that fits the following data :**

x :	100	120	140	160	180	200
y:	0.45	0.55	0.60	0.70	0.80	0.85

6. A sample of 20 items has mean 42 units and standard deviation 5 units. Test the hypothesis that it is a random sample from a normal population with mean 45 units.

SECTION - C

7. **Define Poisson distribution. Fit a Poisson distribution to the following data :**

x :	0	1	2	3	4
f :	123	59	14	3	1

8. **Calculate the coefficient of correlation for the ages of husbands and wives :**

Age of husband (Years)	23	27	28	29	30	31	33	35	36	39
Age of wife (Years)	18	22	23	24	25	26	28	29	30	32

9. **What is Chi-square test? A dice is thrown 90 times with the following results :**

Face :	1	2	3	4	5	6	**Total**
Frequency :	10	12	16	14	18	20	90

Use Chi-square test to test whether these data are consistent with the hypothesis that the dice is unbiased. Given that $\chi^2_{0.05} = 11.07$ for 5 degrees of freedom.

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Correction

00 MAY 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 : 22-05-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. Section-A is compulsory.
3. Section-B contains FIVE questions of FIVE marks each attempt any FOUR questions.
4. Section-C contains FIVE questions of SEVEN AND A HALF marks each attempt any FOUR questions.

SECTION-A

(10 × 1 = 10)

1. Fill in the blanks :

a) Self-exploration is the process for ..... Education.

आत्म-अध्ययन ..... शिक्षा के लिए प्रक्रिया है।

ਸ੍ਵੈ-ਅਧਿਐਨ ..... ਸਿੱਖਿਆ ਲਈ ਪ੍ਰਕਿਰਿਆ ਹੈ।

b) ..... is a feeling of having more than required physical facilities.

..... भौतिक सुविधाओं की आवश्यकता से अधिक होने की भावना है ।

..... ਭੌਤਿਕ ਸਹੂਲਤਾਂ ਦੀ ਲੋੜ ਵਲੋਂ ਜਿਆਦਾ ਹੋਣ ਦੀ ਭਾਵਨਾ ਹੈ।

c) ..... is the foundational value in relationships.

..... रिश्तों में मूलभूत मूल्य है।

..... ਰਿਸ਼ਤਿਆਂ ਵਿੱਚ ਮੁੱਢਲਾ ਮੁੱਲ ਹੈ।

d) Justice is Harmony in ..... .

न्याय ..... में सामंजस्य है।

ਨਿਆਂ ..... ਵਿੱਚ ਤਾਲਮੇਲ ਹੈ।

e) There are ..... orders in Nature.

प्रकृति में ..... आदेश हैं।

ਕੁਦਰਤ ਵਿੱਚ .....ਆਦੇਸ਼ ਹਨ।

True and False :

f) Existence is nature submerged in space.

अस्तित्व अंतरिक्ष में डूबे हुए प्रकृति है।

ਅਸਤੀਤਵ ਖਲਾਅ ਵਿੱਚ ਸਮਾਈ ਹੋਈ ਕੁਦਰਤ ਹੈ।

g) There is no self-regulation in nature.

प्रकृति में कोई आत्म नियमन नहीं है।

ਕੁਦਰਤ ਵਿੱਚ ਕੋਈ ਆਤਮ ਨਿਯਮਤਾ ਨਹੀਂ ਹੈ।

h) Developing ethical competence in individual ensures professional ethics.

व्यक्ति में नैतिक क्षमता का विकास पेशेवर नैतिकता सुनिश्चित करता है।

ਵਿਅਕਤੀ ਵਿੱਚ ਨੈਤਿਕ ਸਮਰੱਥਾ ਦਾ ਵਿਕਾਸ ਪੇਸ਼ੇਵਰ ਨੈਤਿਕਤਾ ਪੱਕੀ ਕਰਦਾ ਹੈ।

i) Holistic technologies should be eco-friendly and people-friendly.

समग्र प्रौद्योगिकियों पर्यावरण के अनुकूल और लोगों के अनुकूल होना चाहिए।

ਸਰਬਾਂਗੀ ਤਕਨੀਕਾਂ ਪਰਿਆਵਰਣ ਦੇ ਅਨੁਕੂਲ ਅਤੇ ਲੋਕਾਂ ਦੇ ਅਨੁਕੂਲ ਹੋਣੀਆਂ ਚਾਹੀਦੀਆਂ ਹਨ।

j) The value "care" is related with body.

मूल्य ''ध्यान'' शरीर के साथ संबंधित है।

ਮੁੱਲ ਧਿਆਨ ਸਰੀਰ ਦੇ ਨਾਲ ਸਬੰਧਤ ਹੈ।

9. What do you mean by universal human order ? What could be your role in moving towards it ?

   आप सार्वभौमिक मानवीय आदेश से क्या समझते हैं? इसमें आपकी भूमिका क्या हो सकती है?

   ਤੁਸੀ ਸਾਰਵਭੌਮਿਕ ਮਾਨਵੀ ਆਦੇਸ਼ ਵਲੋਂ ਕੀ ਸੱਮਝਦੇ ਹੋ ? ਇਸ ਵਿੱਚ ਆਪਣੀ ਭੂਮਿਕਾ ਕੀ ਹੋ ਸਕਦੀ ਹੈ?

10. What have been your achievements through this course ? List the achievements in your thought, behaviour and work.

    इस पाठ्यक्रम से आपकी क्या उपलब्धियाँ रही हैं? अपने विचार, व्यवहार और कार्य की उपलब्धियों को सूचीबद्ध करें ।

    ਇਸ ਕੋਰਸ ਰਾਹੀਂ ਤੁਹਾਡੀਆਂ ਪ੍ਰਾਪਤੀਆਂ ਕੀ ਹਨ? ਆਪਣੇ ਵਿਚਾਰ, ਵਿਹਾਰ ਅਤੇ ਕੰਮ ਵਿੱਚ ਪ੍ਰਾਪਤੀਆਂ ਦੀ ਸੂਚੀ ਬਣਾਓ ।

11. List some suggestions to make value education more effective in the present scenario.

    वर्तमान परिदृश्य में मूल्य शिक्षा को और अधिक प्रभावी बनाने के लिए कुछ सुझाव सूचीबद्ध करें ।

    ਮੌਜੂਦਾ ਸਥਿਤੀ ਵਿੱਚ ਮੁੱਲ ਸਿੱਖਿਆ ਨੂੰ ਹੋਰ ਪ੍ਰਭਾਵਸ਼ਾਲੀ ਬਣਾਉਣ ਲਈ ਕੁਝ ਸੁਝਾਵਾਂ ਦੀ ਸੂਚੀ ਬਣਾਓ।

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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.

9. What do you mean by universal human order ? What could be your role in moving towards it ?

आप सार्वभौमिक मानवीय आदेश से क्या समझते हैं? इसमें आपकी भूमिका क्या हो सकती है?

ਤੁਸੀ ਸਾਰਵਭੌਮਿਕ ਮਾਨਵੀ ਆਦੇਸ਼ ਵਲੋਂ ਕੀ ਸੱਮਝਦੇ ਹੋ ? ਇਸ ਵਿੱਚ ਆਪਣੀ ਭੂਮਿਕਾ ਕੀ ਹੋ ਸਕਦੀ ਹੈ?

10. What have been your achievements through this course ? List the achievements in your thought, behaviour and work.

इस पाठ्यक्रम से आपकी क्या उपलब्धियाँ रही हैं? अपने विचार, व्यवहार और कार्य की उपलब्धियों को सूचीबद्ध करें ।

ਇਸ ਕੋਰਸ ਰਾਹੀਂ ਤੁਹਾਡੀਆਂ ਪ੍ਰਾਪਤੀਆਂ ਕੀ ਹਨ? ਆਪਣੇ ਵਿਚਾਰ, ਵਿਹਾਰ ਅਤੇ ਕੰਮ ਵਿੱਚ ਪ੍ਰਾਪਤੀਆਂ ਦੀ ਸੂਚੀ ਬਣਾਓ ।

11. List some suggestions to make value education more effective in the present scenario.

वर्तमान परिदृश्य में मूल्य शिक्षा को और अधिक प्रभावी बनाने के लिए कुछ सुझाव सूचीबद्ध करें ।

ਮੌਜੂਦਾ ਸਥਿਤੀ ਵਿੱਚ ਮੁੱਲ ਸਿੱਖਿਆ ਨੂੰ ਹੋਰ ਪ੍ਰਭਾਵਸ਼ਾਲੀ ਬਣਾਉਣ ਲਈ ਕੁਝ ਸੁਝਾਵਾਂ ਦੀ ਸੂਚੀ ਬਣਾਓ।

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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.

SECTION-B

(4 × 5 = 20)

2. Explain self-organisation and health.

   आत्म संगठन और स्वास्थ्य के बारे में बताएं।

   ਆਤਮ ਸੰਗਠਨ ਅਤੇ ਸਿਹਤ ਦੇ ਬਾਰੇ ਵਿੱਚ ਦੱਸੋ।

3. Explain harmony in family.

   परिवार में तालमेल के बारे में बताएं।

   ਪਰਿਵਾਰ ਵਿੱਚ ਤਾਲਮੇਲ ਦੇ ਬਾਰੇ ਵਿੱਚ ਦੱਸੋ।

4. What are the basic guidelines of value education ?

   मूल्य शिक्षा की बुनियादी दिशानिर्देश क्या हैं?

   ਮੁੱਲ ਸਿੱਖਿਆ ਦੀ ਬੁਨਿਆਦੀ ਦਿਸ਼ਾਨਿਰਦੇਸ਼ ਕੀ ਹਨ?

5. What is prosperity? What is the difference between prosperity and wealth?

   समृद्धि क्या है? समृद्धि और धन के बीच क्या अंतर है?

   ਖੁਸ਼ਹਾਲੀ ਕੀ ਹੈ? ਖੁਸ਼ਹਾਲੀ ਅਤੇ ਪੈਸੇ ਦੇ ਵਿੱਚ ਕੀ ਅੰਤਰ ਹੈ?

6. Differentiate between intention and competence. How do we come to confuse between the two ?

   इरादा और क्षमता के बीच क्या अंतर है? कैसे हम गलती करते हैं?

   ਇਰਾਦਾ ਅਤੇ ਸਮਰੱਥਾ ਦੇ ਵਿੱਚ ਕੀ ਅੰਤਰ ਹੈ? ਕਿਵੇਂ ਅਸੀ ਗਲਤੀ ਕਰਦੇ ਹਾਂ?

SECTION-C

(4 × 7.5 = 30)

7. What are the broad holistic criteria for evaluation of technologies, management models and production systems ?

   प्रौद्योगिकी, प्रबंधन मॉडल और उत्पादन प्रणालियों के मूल्यांकन के लिए व्यापक समग्र मापदंड क्या हैं?

   ਸਰਬਾਂਗੀ ਤਕਨੀਕੀ, ਪਰਬੰਧਨ ਮਾਡਲ ਅਤੇ ਉਤਪਾਦਨ ਪ੍ਰਣਾਲੀਆਂ ਦੇ ਲੇਖੇ ਜੋਖਾ ਲੀ ਇਵਆਪਕ ਮਾਪਦੰਡ ਕੀ ਹਨ?

8. What are the four orders in nature ? Explain.

   प्रकृति में चार आदेश क्या हैं? समझाओ।

   ਕੁਦਰਤ ਵਿੱਚ ਚਾਰ ਅਵਸਥਾਂਵਾਂ ਕੀ ਹਨ? ਸਮਝਾਓ।

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B.Tech. (CSE /AI&DS /AI & ML/Cyber Security/DS/ CSE (IOT and Cyber Security including Block chain Technology)) (Sem.–4)

DESIGN & ANALYSIS OF ALGORITHMS

Subject Code : BTCS-403-18

M.Code : 77629

Date of Examination : 19-05-2025

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 a recurrence relation?

b) How the worst case behavior of an algorithm is mentioned?

c) What is brute force technique?

d) What is bin packing problem?

e) Compare BFS vs. DFS.

f) What is transitive closure?

g) Write about the different computability classes.

h) Differentiate between tractable and intractable problems.

i) What is an approximate solution?

j) What is a random variable?

SECTION - B

2. **Look at the following recurrence when n is a power of 2 :**

$$T(n) = \begin{cases} T(1) & n = 1 \\ T\left(\frac{n}{2}\right) + c & n > 1 \end{cases}$$

Solve the above recurrence relation for the following choices of a, b and $f(n)$ (c being a constant) $a = 5$, $b = 4$ and $f(n) = cn^2$.

3. What are different elements of greedy strategy?

4. Write the algorithm for breadth first search. Take a suitable example to show its working.

5. What are non deterministic algorithms? Give an example of non-deterministic search algorithm.

6. Explain heuristics and its characteristics.

SECTION - C

7. **Consider the traveling salesperson instance defined by the cost matrix :**

∞	7	3	12	8
3	∞	6	14	9
5	8	∞	6	18
9	3	5	∞	11
8	14	9	8	∞

Obtain the reduced cost matrix.

8. What is Kruskal's algorithm? Explain its steps. Analyze its time complexity too.

9. **Write a short notes on :**

a) Network Flow Algorithm

b) Branch and bound methodology.

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

OPERATING SYSTEMS

Subject Code : BTCS-402-18

M.Code : 77628

Date of Examination: 05-05-2025

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 access methods of a file.

b) Differentiate between physical and logical address space.

c) Discuss criteria used to measure CPU performance.

d) What is real time operating system? Explain briefly.

e) Briefly explain the functions performed by an Operating System.

f) Discuss directory structure.

g) Discuss architecture of operating system.

h) What is a thread? Discuss types of threads.

h) What are Boot Block and Bad Block?

j) What do you understand by Disk Formatting? How it is done?

SECTION - B

2. What do you understand by a process? Draw the state transition diagram and explain the purpose of each state.

3. Explain with example FCFS and Round Robin scheduling algorithms.

4. Compare static and dynamic contiguous partitioned memory management schemes.

5. Explain various methods which are used for free space management during file management.

6. Explain Multi programming and Time Sharing operating systems.

SECTION - C

7. What is a deadlock? Explain the necessary conditions for deadlock occurrence. Discuss any method used for deadlock avoidance with example.

8. What do you mean by virtual memory? How it is implemented? Explain various techniques used to manage the virtual memory.

9. What do you mean by disk scheduling? Explain in detail the various disk scheduling algorithm with the help of suitable example.

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B.Tech. (AI & ML/ AI & DS/CSE/Cyber Security/DS/IOT and Cyber Security including Block chain Technology) (Sem.–4)

COMPUTER ORGANIZATION AND ARCHITECTURE

Subject Code : BTES-401-18

M.Code : 77627

Date of Examination : 06-06-2025

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) CPU

b) Memory transfer instruction

c) Control Unit

d) Three address instruction

e) DMA

f) Cache memory

g) SCII

h) USB

i) I's complement

j) Carry look ahead adder

SECTION - B

2. Explain any 5 addressing modes with example.

3. Discuss the various representations of positive and negative number. Which representation is used by computer and why?

4. Differentiate between synchronous and asynchronous data transfer.

5. What is virtual memory? What is the concept of page replacement?

6. Write a note on cache coherency and concurrent access to memory.

SECTION - C

7. Explain how addition and subtraction takes place in computer system.

8. Differentiate between privileged and non-privileged instructions, hardware and software interrupts.

9. Describe memory hierarchy and memory interleaving in detail.

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

DISCRETE MATHEMATICS

Subject Code : BTCS-401-18

M.Code : 77626

Date of Examination : 02-06-2025

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) Prove that the inverse of a bijective function is unique.

   b) Find GCD (119, 884) using Euclid Algorithm.

   c) In a group of 150 people how many friends are there who have an identical number of friends in that group?

   d) A and B are two sets such that $n(A - B) = 14 + x$, $n(B - A) = 3x$ and $n(A \cap B) = x$. Find X such that $n(A) = n(B)$.

   e) Make the truth table of $p \wedge (\neg q)$ of two statements p and q.

   f) Prove that $\neg(\neg p) \equiv p$.

   g) In a Boolean algebra B, simplify the Boolean expression $x.(x' + y)$.

   h) Prove that the group $\{1, -1, \iota, -\iota\}$ under multiplication is a cyclic group.

   i) Prove that the maximum degree of any vertex in a simple graph having n vertices is $n-1$.

   j) Give an example of a perfect graph.

SECTION - B

2. Suppose R and S are symmetric relations on a set A. Show that $R \cap S$ is also symmetric.

3. In a group of 50 persons, 14 drink tea but not coffee and 30 drink tea. Find

   a) How many drink tea and coffee both?

   b) How many drink coffee but not tea?

4. Prove that $p \rightarrow q \equiv (\neg p) \vee q$.

5. Prove that finite integral domain is a field.

6. Prove that in any non-trivial tree, there are at least two vertices of degree 1.

SECTION - C

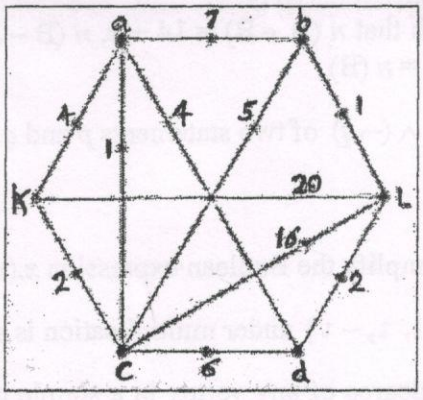
7. Find the Boolean expression that defines the function f by $f\ (0, 0, 0) = 0$; $f\ (0, 0, 1) = 0$; $f\ (1, 0, 0) = 1$; $f\ (1, 1, 0) = 0$: $f\ (0, 1, 0) = 1$: $f\ (0, 1, 1) = 0$; $f\ (1, 0, 1) = 1$; $f\ (1, 1, 1) = 1$.

8. a) If S is a set containing finite number of elements and f is a function from S into S, then prove that f is one-one, then f is onto.

   b) Show that $p \wedge q$ logically implies $p \leftrightarrow q$.

9. a) Find n if ${}^nC_4$, ${}^nC_5$ and ${}^nC_6$ are in AP.

   b) Find the shortest distance between K and L in the following graph :



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Total No. of Pages : 02

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B.Tech. (CSE/IOT) (AI&DS/DS) (Sem.–5,6)

MACHINE LEARNING

Subject Code : BTCS 618-18

M.Code : 93947

Date of Examination : 27-05-2025

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 do you mean by Unsupervised Learning?

   b) Write the key elements of Reinforcement learning.

   c) What do you mean by Data Cleaning?

   d) Explain in brief about Data Reduction.

   e) Write advantages of Multiple Linear Regression.

   f) Write at least two applications of Regression.

   g) What is the need of Clustering?

   h) Define the term Sensitivity and Specificity in reference to Evaluating Classification Models Performance.

   i) List various activation functions used in Artificial Neural Networks.

   j) Explain in brief about Elitism in reference to Genetic Algorithms.

SECTION - B

2. Explain the concept of supervised learning along with its advantages and disadvantages.

3. Write a detailed note on Splitting dataset into Training and Testing Set.

4. **Explain the following in relation to evaluating Regression Models Performance :**

   a) RSquare

   b) Scatter plot

5. Explain in detail about K-NN algorithm.

6. Explain in detail about Naïve algorithm.

SECTION - C

7. Write a detailed note on following :

   a) Simple Linear Regression

   b) Polynomial Regression

8. Explain in detail about Hierarchical methods of Clustering.

9. Write a detailed note on need and applications of Artificial Neural Network.

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B.Tech. (CSE) (Sem.–6)

COMPILER DESIGN

Subject Code : BTCS601-18

M.Code : 79249

Date of Examination : 23-05-2025

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 are the techniques behind the code optimization phase?

b) What is compiler? Explain at least 4 classifications of Compilers.

c) What is LL(1) parser? What are the necessary conditions for a grammar to be in LL(1).

d) What do you mean by Context free grammar? List its 4 components.

e) Eliminate Left Recursion from the grammar :

E-> E + T| E - T|T

T-> T * F| T / F|F

F -> (E) | id

f) Define preprocessor. What are its functions?

g) What is front-end and back-end of the compiler?

h) Differentiate between stack allocation and static allocation.

i) Write a brief note on symbol tables.

j) What is left Factoring? What are the rules to make a grammar free from left Factoring?

SECTION - B

2. Explain the working and algorithm of LR parser.

3. Explain the various phases of a compiler in detail. Also write the output for the following expression after each phase a=b*c-d.

4. Write algorithm to convert NFA from Regular expression.

5. Explain in detail about run time storage management.

6. Explain about peep hole optimization.

SECTION - C

7. Construct the canonical LR parsing Table for the following grammar:

   S→L=R

   S→R

   L→ *R

   L→id

   R→L

8. What are the basic Blocks and Flow Diagram, explain Efficient Data Flow algorithm in detail.

9. Explain how different phases of Compilation will operate and convert the following statement Interest = principal * rate / 100 (assuming Rate data-type is Float)

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B.Tech. (CSE/IOT) (AI&DS/DS) (Sem.–5,6)

MACHINE LEARNING

Subject Code : BTCS 618-18

M.Code : 93947

Date of Examination : 27-05-2025

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 do you mean by Unsupervised Learning?

b) Write the key elements of Reinforcement learning.

c) What do you mean by Data Cleaning?

d) Explain in brief about Data Reduction.

e) Write advantages of Multiple Linear Regression.

f) Write at least two applications of Regression.

g) What is the need of Clustering?

h) Define the term Sensitivity and Specificity in reference to Evaluating Classification Models Performance.

i) List various activation functions used in Artificial Neural Networks.

j) Explain in brief about Elitism in reference to Genetic Algorithms.

SECTION - B

2. Explain the concept of supervised learning along with its advantages and disadvantages.

3. Write a detailed note on Splitting dataset into Training and Testing Set.

4. **Explain the following in relation to evaluating Regression Models Performance :**

   a) RSquare

   b) Scatter plot

5. Explain in detail about K-NN algorithm.

6. Explain in detail about Naïve algorithm.

SECTION - C

7. Write a detailed note on following :

   a) Simple Linear Regression

   b) Polynomial Regression

8. Explain in detail about Hierarchical methods of Clustering.

9. Write a detailed note on need and applications of Artificial Neural Network.

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Total No. of Pages : 02

Total No. of Questions : 09

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

MACHINE LEARNING

Subject Code : BTCS-619-18

M.Code : 93666

Date of Examination : 03-05-2025

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 issues on machine learning?

b) What are the applications of supervised ML in modern business?

c) What is data reduction?

d) RMSE

e) Write different applications of clustering.

f) What do you mean by active function?

g) Reinforcement learning.

h) Training set.

i) What is a confusion matrix and why do we need it?

j) Fitness function

SECTION-B

2. What is the ANN? Explain any three activation functions used in NN.

3. Differentiate classification and clustering.

4. What is Gene representation and fitness function, explain?

5. How is KNN different from K-mean clustering? Give detail.

6. What are the needs and applications of association rule learning?

SECTION-C

7. What do you mean by machine learning? Explain its types.

8. What are the data preprocessing methods? Explain any four methods with suitable examples.

9. What is linear regression? Explain in detail using example and list all the assumptions to be met before starting the linear regression.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.–6)

MACHINE LEARNING

Subject Code : BTCS618-18

M.Code : 79257

Date of Examination :12-06-2025

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 machine learning differs from traditional programming approaches?

b) Describe feature selection and its importance. List at least two feature selection methods.

c) Discuss the concept of data normalization and its impact on model training and performance.

d) What is regression analysis in the context of machine learning, and how does it differ from classification?

e) Define support vector machines (SYMs) and discuss their role in classification in brief.

f) What is logistic regression, and how is it used for binary classification?

g) Define the terms "feature vector" and "feature space" in the context of classification.

h) Explain the purpose of a decision boundary in a classification problem.

i) Define the terms "class" and "label" in classification tasks and explain their significance.

j) Define sensitivity.

SECTION - B

2. Analyze the impact of feature selection on classification performance. Provide a step- by-step explanation of how feature selection can improve model efficiency and discuss a practical example where feature selection would be crucial.

3. Explain the Apriori algorithm, its core principles and how it contributes to association rule mining.

4. Explain Naïve algorithm with its role and applications.

5. Explain the potential benefits of using association rule learning in recommendation systems and its impact on user experience and business performance.

6. Explain the various performance measures used in regression.

SECTION - C

7. Describe the function of a split algorithm in the construction of a decision tree. How does it identify the optimal feature and split point for data partitioning?

8. Provide a detailed explanation of multiple and polynomial linear regression models, including their respective algorithms.

9. Explain multiple and polynomial linear regression models in detail with its algorithm.

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Total No. of Pages : 02

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

BIG DATA ANALYTICS

Subject Code : BTDS 603-20

M.Code : 93960

Date of Examination : 30-04-2025

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 short notes on :**

a) Why is data science important in modern industries?

b) What are the key challenges associated with big data?

c) Differentiate between structured and unstructured data.

d) What are the key deliverables in the deployment phase?

e) Differentiate between Hadoop and traditional databases.

f) Define feature engineering with an example.

g) What are association rules in data mining?

h) What is the significance of dashboards in data analytics?

i) Explain supervised learning with the help of an example.

j) Differentiate between descriptive and predictive analytics.

SECTION - B

2. Explain the Hadoop architecture with a neat diagram.
3. How is model evaluation performed in analytics?
4. Explain the k-means clustering algorithm with steps.
5. Explain the process of creating final deliverables in an analytics project.
6. Explain Linear and logistic regression with the help of examples.

SECTION -C

7. Discuss challenges in data preparation and how to address them with suitable techniques?
8. Describe the Apriori algorithm for association rule mining with the help of an example.
9. Discuss various data visualization techniques and their applications in analytics.

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B.Tech. (AI & ML) (Sem.–6)

BIG DATA ANALYTICS

Subject Code : BTDS-603-20

M.Code : 93675

Date of Examination : 14-06-2025

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) List out the best practices of big data analytics.

b) Name some final deliverables in big data.

c) Define Big Data Analytics.

d) What is a symbol map?

e) Differentiate between classification and clustering.

f) What is web usage mining?

g) What are the measures of similarity and dissimilarity?

h) What is data preprocessing?

i) What is a text mining?

j) List some big data platforms.

SECTION-B

2. Write down the characteristics of big data analytics.

3. Explain in detail about HDFS.

4. Briefly discuss about MapReduce and YARN.

5. The distance between some Indian cities are given below, apply the clustering algorithm to make three clusters. Indicate intermediate steps.

	Bathinda	Patiala	Delhi	Amritsar	Mathura
Bathinda	0	190	400	250	460
Patiala	190	0	240	225	300
Delhi	400	240	0	450	60
Amritsar	250	225	450	0	510
Mathura	460	300	60	510	0

6. Write in detail the steps in operationalizing analytics model.

SECTION-C

7. **Write short notes on :**

   a) Naïve Bayes

   b) Association Rule Mining.

8. a) Map Reduce Framework.

   b) What is web content mining? Write its different steps.

9. **Explain :**

   a) Core deliverables in big data.

   b) Big data visualization.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Artificial Intelligence and Data Science) / DS (Sem.–6)

DATA ANALYTICS USING R

Subject Code : BTITCS 601-20

M.Code : 93954

Date of Examination : 20-05-2025

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 prominent characteristics of data.

   b. Differentiate between structured and unstructured data.

   c. What is a factor in R? Give examples.

   d. Discuss the usage of the function randomForest() in R.

   e. Explain the process of giving names to the rows, columns and matrices in an array.

   f. Explain various ways of creating vectors in R.

   g. Discuss the usage of functions surv() and survfit().

   h. Explain the usage of the package "party" and the function ctree() in creating and analyzing decision tree.

   i. Discuss the various loop control statements available in R.

   j. How is data read from csv and xml files into R Illustrate?

SECTION - B

2. Define data analytics and explain its significance in modern business environments. Provide examples of real-world applications of data analytics.

3. Explain variables and data types in R programming. Provide examples of different data types and their usage in R.

4. Discuss various R charts and graphs used for data visualization, including histograms, boxplots, bar charts, line graphs, scatterplots and pie charts. Explain when to use each type of visualization.

5. Describe time series analysis techniques using R. Discuss how time series data is analyzed and interpreted in the context of data analytics.

6. Discuss reinforcement learning techniques for creating data for analytics.

SECTION – C

7. Define linear regression and logistic regression. Explain how the functions lm() and glm() are used to create linear regression model and logistic regression model, respectively in R. Discuss the applications of regression techniques in predictive modeling and provide examples of real-world scenarios where they are used.

8. Describe the concept of active learning and how it can be used to create data for analytics? Discuss the advantages and challenges of active learning approaches.

9. Discuss the characteristics of normal and binomial distributions. Discuss the built-in functions of R that are used to generate :

   a) normal distribution

   b) binomial distribution.

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B.Tech. (Computer Science & Engineering/AI & ML/ECE) (Sem.–6)

CLOUD COMPUTING

Subject Code : BTCS612-18

M.Code : 79254

Date of Examination : 20-05-2025

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) Challenges of Cloud Computing.

   b) Resources of Cloud Computing.

   c) Cloud Migration

   d) Hypervisor

   e) Hybrid Cloud

   f) Grid Computing

   g) SaaS

   h) Vision of Cloud Computing.

   i) IT as a Service

   j) Data security

SECTION - B

2. Explain the importance of Elasticity and Scalability in cloud computing.

3. Explain in detail about the various types of Hypervisors.

4. Define the role played by IaaS. Explain by taking suitable example.

5. What do you understand by user account and service Hijacking?

6. Compare existing available cloud platforms.

SECTION - C

7. Explain in detail the historical development and challenges of cloud computing in detail.

8. Illustrate Selection criteria for cloud deployment in detail.

9. List various measures to reduce cloud security breaches.

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

DATA MINING AND DATA WAREHOUSE

Subject Code : BTCS 702-18

M.Code : 93953

Date of Examination : 06-05-2025

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 Data Mining.

   b) What is Data cube computation?

   c) MOLAP Versus HOLAP.

   d) Discus Data Preprocessing.

   e) Write about split algorithm.

   f) What are decision trees?

   g) Give an overview of Data warehousing.

   h) Define cluster software.

   i) Write about enterprise search.

   j) What is Locality and Hierarchy in the web?

SECTION - B

2. Explain the main characteristics of OLAP systems.
3. What are some common challenges encountered in data mining?
4. Explain the concept of dynamic Item set counting.
5. Discus fundamental characteristics of search engine.
6. How does web mining help in website searching?

SECTION - C

7. Discuss the basic concept of the Apriori algorithm in rules mining?
8. What are the underlying assumptions of the Naïve Bayes method and how do they used in Data Mining?
9. Explain the concept of cluster analysis. Discuss the hierarchical method in cluster analysis.

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B.Tech.(CSE) (Sem.–6)

MOBILE APPLICATION DEVELOPMENT

Subject Code : BTCS620-18

M.Code : 79258

Date of Examination :10-06-2025

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) Mobility Landscape

   b) Bytecode

   c) SQLite

   d) Layouts

   e) SDK

   f) Service

   g) Broadcast Receiver

   h) Context

   i) Notifications

   j) User Interface

SECTION - B

2. Discuss the Activity life cycle in detail.
3. Explain and differentiate between various App development approaches.
4. Build an app to differentiate between checkbox and radio button.
5. Write a note on telephony and SMS APIs.
6. Discuss the process of database connectivity using SQLite.

SECTION - C

7. Describe with the help of diagram Android Architecture.
8. Explain Threads, Async task and shared preferences.
9. Discuss the various factors in developing up Mobile Apps.

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B.Tech. (CSE) (Sem.–6)

ARTIFICIAL INTELLIGENCE

Subject Code : BTCS602-18

M.Code : 79250

Date of Examination : 06-06-2025

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. Express Modus Ponen's rule in propositional logic.

b. Find the output of the following :

```
father(jack, susan).      /* Fact 1 */
father(jack, ray).        /* Fact 2 */
father(david, liza).      /* Fact 3 */
father(david, john).      /* Fact 4 */
father(john, peter).      /* Fact 5 */
father(john, mary).       /* Fact 6 */
mother(karen, susan).     /* Fact 7 */
mother(karen, ray).       /* Fact 8 */
mother(amy, liza).        /* Fact 9 */
mother(amy, john).        /* Fact 10 */
mother(susan, peter).     /* Fact 11*/
mother(susan, mary).      /* Fact 12 */

parent(X, Y) :- father(X, Y). /* Rule 1 */
parent(X, Y) :- mother(X, Y). /* Rule 2 */
```

c. Major reasons for the growth of rational agents.

d. What is the Horn Sentence?

e. What are the five causes of uncertainty?

f. Need of heuristic functions.

g. *"A rule is sound if its conclusion is true whenever the premise is true".* Write inference rule for this statement.

h. Express in universal quantification formula *"There is a fox that is faster than all snails".*

i. What is state space search?

j. Illustrate with the help of suitable example, FOPL.

SECTION - B

2. Explain with the help of suitable example Markov decision process.

3. Write an algorithm for calculating minimax decisions. What is the role of alliances in the multiplayer games?

4. What is the concept of fuzzy sets and fuzzy logic? Explain with the help of suitable example.

5. Differentiate between perfect decision game and imperfect decision game.

6. Write the alpha-beta search algorithm. Explain the role of it with the help of suitable example.

SECTION - C

7. What is A* algorithm and How it is different from other search strategies? Explain with the help of suitable example.

8. Write the various components of natural language processing. Describe syntactic analysis and semantic analysis in brief.

9. Compare and contrast Expert Systems and Knowledge Acquisition. Illustrate with the help of suitable example.

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

ADVANCE COMPUTING AND NETWORK TECHNOLOGIES

Subject Code : BTAML-607-20

M.Code : 93681

Date of Examination: 03-06-2025

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 Mobile cloud computing?

b) What is WPWAN?

c) What are Hybrid clouds?

d) What are Azure Services Platform?

e) What is Network Slicing?

f) Define Cloud Computing.

g) What are benefits of Fog computing?

h) How does fog computing reduce latency and the resources necessary to transport data for processing?

i) What is meant by on-demand provisioning? State its purpose in cloud.

j) What is Public Cloud?

SECTION - B

2. What are Hypervisors? Discuss its various types.

3. Explain Upper Gigahetrz and Terahertz wireless communication in detail.

4. Differentiate between On-Demand Routing Protocol and Table Driven Routing Protocol.

5. Discuss communication challenges and protocols for micro UAV's.

6. Discuss Network Slicing Management in Edge and Fog in Detail.

SECTION - C

7. Discuss in detail the various design goals of a MAC Protocol for Ad Hoc Wireless Networks.

8. What is Fog Computing? Discuss its various characteristics, Issues and Challenges.

9. Outline the various deployment models of Cloud with a neat sketch and identify which among them could be applied to formulate cloud structure for a small firm.

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B.Tech. (AI & DS) (Sem.–6)

DEEP LEARNING

Subject Code : BTCS 704-18

M.Code : 93966

Date of Examination : 03-05-2025

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) Gradient Decent

   b) Maximum Likelihood

   c) Bagging

   d) Multi-task Learning

   e) Recurrent Neural Network

   f) Pooling

   g) Convolution Network

   h) Echo State Networks

   i) Directed Generative Net

   j) Auto-Encoders

SECTION - B

2. Differentiate between overfitting and underfitting.

3. Discuss the various characteristics of feed-forward networks.

4. Explain any two application areas of convolution networks.

5. Write a short note on bidirectional RNNs.

6. How deep generative models are used for image generation?

SECTION - C

7. Compare the characteristics of supervised learning with unsupervised learning technique.

8. Discuss the various application areas of computational graphs.

9. Discuss the convolution algorithm in detail.

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B.Tech. (AI&ML) (Sem.–6)

COMPUTER NETWORKS

Subject Code : BTCS-504-18

M.Code : 93665

Date of Examination : 30-04-2025

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 do you mean by spread spectrum? Explain in brief.

b) What are the advantages of twisted pair as a transmission media?

c) Define the term Piggybacking.

d) Explain the term hamming distance in reference to error detecting codes.

e) Why IPv6 is required?

f) Explain the term sub-netting in brief.

g) Differentiate between Distance vector and Link State routing algorithms.

h) What are the advantages of User Datagram Protocol (UDP)?

i) Explain in brief about the term Firewall.

j) What do you mean by Domain Name Space? Discuss.

SECTION-B

2. **Explain the following in brief :**

   a) Frequency Division Multiplexing

   b) Time Division Multiplexing.

3. Write a detailed note on CDMA/CA .

4. Explain in detail about ARP protocol.

5. What is SCTP congestion control? Explain in detail.

6. Write a brief note on TELNET and FTP.

SECTION-C

7. Write a detailed note on the OSI reference model.

8. **Explain the following terms in detail :**

   a) Pure ALOHA

   b) Slotted ALOHA.

9. **Explain the following Algorithms in details :**

   a) Leaky Bucket Algorithm

   b) Token Bucket Algorithm .

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BCA / B.Sc. (IT) / B.Tech. (CE / CSE /EE / ECE / EEE / IT/ AI & ML / AI & DS/ CSE(IoT) / DS / IoT and cyber security including block chain technology) (Sem.–6)

WIRELESS COMMUNICATION

Subject Code : BTEC-601-18

M.Code : 79373

Date of Examination : 31-05-2025

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 cellular system.

   b) What do you mean by reduction factor?

   c) Explain ISI.

   d) What is fading?

   e) What is the significance of combining methods?

   f) Differentiate between FDM and TDM.

   g) Define the term AMPS.

   h) How CDMA is better than previous systems?

   i) What is Zigbee?

   j) Write the communicating range of Bluetooth.

SECTION-B

2. Explain the operation of cellular system.

3. Draw and explain switched combining and maximal ratio combining techniques.

4. Derive the expression for frequency reuse parameters.

5. Explain CDMA2000 standards and its specifications.

6. With the help of diagrams, explain spread spectrum multiple access.

SECTION-C

7. Draw and explain the system architecture of global system for mobile (GSM).

8. Describe Pure ALOHA and Slotted ALOHA.

9. Explain cell splitting and the various methods and techniques of cell splitting.

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Total No. of Pages : 02

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B.Tech. (CSE) (Sem–7, 8)

ADHOC AND WIRELESS SENSOR NETWORKS

Subject Code : BTCS716-18

M.Code : 90507

Date of Examination : 19-05-2025

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 are routing protocols?

   b) Explain fault tolerance issue in wireless sensor networks.

   c) Define transceivers in wireless sensor networks.

   d) List the type of nodes that distinguish on the MAC layer.

   e) What are the challenges posed by sensor network MAC protocol?

   f) What do you mean by proactive routing?

   g) How do you define the term flooding attack?

   h) Explain SPINS.

   i) What are security attacks in WSN?

   j) Enlist enabling technologies for WSN.

SECTION - B

2. Explain destination sequenced distance-vector routing protocol with the help of an example of 15 nodes in which all nodes maintain global topology information.

3. Draw and explain S-MAC protocol in detail.

4. Give classification of Transport layer solutions- TCP over Ad Hoc wireless.

5. Explain energy consumption of sensor nodes.

6. Describe Key distribution arid management in network security.

SECTION - C

7. Explain secure requirements issues and challenges in security provisioning network.

8. Describe MAC protocol for wireless sensor networks in detail.

9. Explain Table driven routing protocol - DSDV with suitable diagrams.

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Total No. of Questions : 09

B.Tech. (CSE) (Sem.–7,8)

DATA MINING AND DATA WAREHOUSING

Subject Code : BTCS702-18

M.Code : 90488

Date of Examination : 02-05-2025

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 Operational Data Store (ODS) and Data Warehouse.

b) Name at least 3 large IT giants which provide Data Warehousing solutions.

c) What is predictive modeling based Data Mining?

d) What is density based clustering?

e) How is database different from Data Warehouse?

f) What are the steps in Data Mining process?

g) What are Association rules, why are they used?

h) What do you mean by web content mining?

i) Mention the strategies of Data Mining.

j) What do you mean by ranking of web pages?

SECTION - B

2. Explain the 3 tier architecture of Data Warehouse.

3. Explain the concept of Data Mining, its strategies and classification.

4. Compare and contrast various clustering methodologies.

5. Explain search engine architecture.

6. Discuss Web content mining, Web usage mining and Web structure mining, compare each type with suitable example.

SECTION - C

7. a) Discuss Decision tree and rule induction as methods of Data mining with examples.

   b) Explain various types of OLAP servers.

8. How clustering helps for data mining in large databases? List clustering methods, explain any two.

9. What are most important factors for Page ranking on Internet? Explain in detail, what are methods to improve page ranking? List some tools helpful to improve page rank.

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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 : 28-04-2025

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) Security Threat

   b) Passive Attack

   c) Mod of an expression.

   d) Cryptography

   e) Access control

   f) Need of Wireless Security.

   g) Honeypot

   h) Purpose of Firewall.

   i) Message Authentication code

   j) Content Integrity

SECTION - B

2. How conventional Encryption model works? Explain in detail.

3. Write a note on modular arithmetic.

4. Explain in detail principles of public-key cryptography.

5. How MD5 Message Digest Algorithm Works? Explain in detail.

6. Explain in detail design and Types of Firewalls.

SECTION - C

7. Explain in detail about Fermat and Euler's Theorem.

8. Write a short note on Elliptic Curve Cryptography.

9. Compare RSA Algorithm with AES Algorithm on different parameters. Explain their used cases also.

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