0 0 JUN 2024

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

Total No. of Pages : 03

Total No. of Questions : 09

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

# ENGINEERING GRAPHICS & DESIGN

Subject Code : BTME101/21

M.Code : 91335

Date of Examination : 19-06-2024

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 short notes on :**

a) Draw projections of a line inclined to VP and lying on HP with a suitable freehand drawing. Also, show traces.

b) What are isometric lines and non-isometric lines?

c) How will you represent Liquid and Glass on a drawing sheet?

d) Write the following statement using single stroke capital vertical letters of 12 mm size: "CLEANLINESS IS A SIGN OF OUR TRUE BEAUTY, NOT JUST A DUTY"

e) What do you mean by representative fraction (RF)?

f) Draw a regular Pentagonal Lamina of side 52mm.

g) Explain the methods of placement of Dimensions with a suitable freehand drawing.

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

i) Draw projections of a line lying on a Profile Plane whose front view is larger than its top view. Which angle is bigger "θ" or "ϕ"? Show with the help of a suitable free hand drawing.

j) Explain Frustum and Truncated Solids with a suitable freehand drawing.

## SECTION-B

2. A point "R" is 49mm behind VP and 65mm below HP. Draw its projections and find out its shortest distance from the reference line.

3. End "P" of line 'PK' is 15 mm above HP and 44 mm in front of VP and end "K" 10 mm behind VP and 29 mm below HP. The end projectors are 58 mm apart. Draw the projections and find TL, $\theta$, $\phi$, HT and VT.

4. Line "MK" 68 mm long has its end "M" both in HP and VP. It is inclined at 42° to the "HP" and 37° to the "VP". Draw its projections when the line is lying in first quadrant.

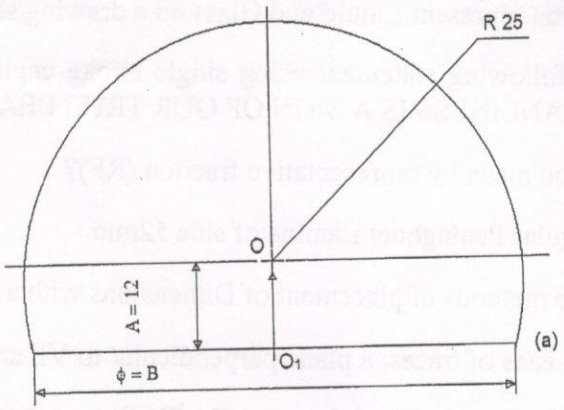
5. The distance between Delhi and Agra is 200 km. In a railway map it is represented by a line 5 cm long. Find its R.F. Draw a diagonal scale to show single km and maximum 600 km.

## SECTION-C

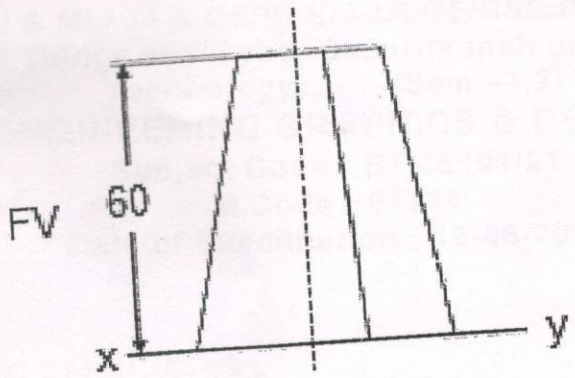
6. A cone of base diameter 48 mm and axis 62 mm long is lying on HP on its generator with axis parallel to VP. Draw its projections assuming the cone lying in first quadrant.

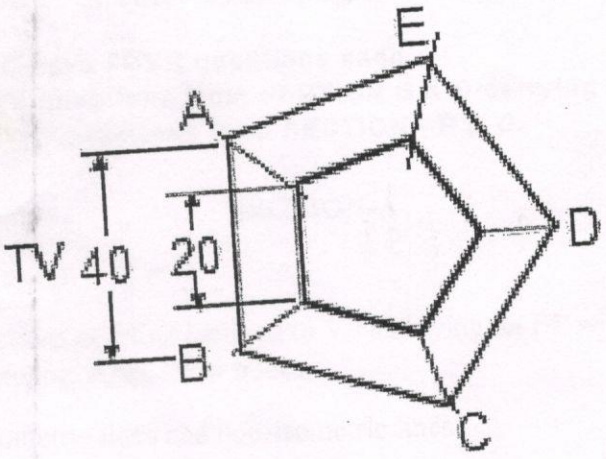
7. A circular lamina of diameter 54mm, having a central square hole of side 25mm, is resting on HP on a point on its circumference. The sides of the square hole are equally inclined to HP. Draw its projections when the said lamina is perpendicular to HP and parallel to and 20 mm from VP.

8. Draw isometric drawing of the following cut sphere:



9. Draw isometric view of the Frustum of a Pentagonal Pyramid whose orthographic projections are given as follows:

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

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B.Tech. (AI & DS/ AI & ML / Block Chain / CE / CSE / (AI & ML) (Cyber Security)/(DS) / CS & D / EE / ECE / EEE / ETE / FT / IT / ME / R & AI / CSE (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 : 24-05-2024

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 short notes on :**

   a) Define unit cell.

   b) Show that at 0 K, the probability of finding an electron in an energy level below the fermi level is 1.

   c) What destroys the superconducting state of a current carrying wire?

   d) Why paramagnetic behavior decreases with increase in temperature?

   e) What is atomic polarizability?

   f) Solve the gradient of 1/r, where $\vec{r} = x\hat{\imath} + y\hat{\jmath} + z\hat{k}$.

   g) What information can be obtained from Wave function?

   h) Write a note on three level laser.

   i) What is total internal reflection?

   j) An electron has a speed of 500 m/s, correct upto 0.01%, with what minimum accuracy, can you locate the electron?

## SECTION-B

2. Explain the measurement of wavelength of X-ray using Bragg's spectrometer. Calculate the minimum wavelength of continuous X-rays emitted from an X-ray tube whose operating voltage is 40 kV.

3. What is Tunnel diode? Why it is called so? Discuss the VI characteristics of Tunnel diode.

4. a) What is Hysteresis loop?

   b) What are ferromagnetic materials? Explain ferromagnetism using domain theory.

5. Solve the electromagnetic wave equation for isotropic homogeneous medium and show that a wave propagate through a non-conducting medium with constant amplitude.

## SECTION-C

6. Explain the construction and working of He-Ne laser with the help of energy level diagram. What is the role of He in He-Ne laser?

7. Derive the expression for group velocity and show that group velocity is equal to particle velocity.

8. What are different modes of propagation of signal in optical fibre? Derive the expression for total number of reflections in a fibre of length L.

9. What are Carbon nanotubes? What are the different types of Carbon nanotubes? Discuss top-down method of synthesis of nano particles.

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Total No. of Pages : 02

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

# PROGRAMMING FOR PROBLEM SOLVING

Subject Code : BTPS-101-18

M.Code : 75346

Date of Examination : 22-05-2024

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. How is a source program converted into executable code? Explain each step.

   b. List various symbols used in flowchart.

   c. Give an example of logical error.

   d. What is an array? How can we create and initialize an array?

   e. What is a structure? Write syntax to create a structure.

   f. Explain various user-defined data types.

   g. Differentiate between call by value and call address using functions.

   h. What is break statement? Give an example using for loop.

   i. What is a string? How can be copy the content of string into another string?

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

## SECTION-B

2. What are the advantages of using flowchart? Create a flowchart to find the largest of three numbers.

3. What is for loop? Write syntax for the same. Write a program to print first n numbers using for loop.

4. What is an Operating System? Explain different types of Operating Systems.

5. What is an operator? Explain in detail different types of operators used in C Programming language.

## SECTION-C

6. What are the benefits of using recursion? Write a program to find the factorial of a number using recursion.

7. Explain in detail various string functions.

8. Explain in detail all types of control statements with the help of syntax for each.

9. Differentiate between array and structure. Write a program to create a simple structure for storing student information.

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BM-03

04 JUN 2024

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

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (AI & ML/CSE/DS/IT/Robotics & Artificial Intelligence/Internet of Things and Cyber Security including Block Chain Technology/ME)

(Sem.–1,2)

# SEMI-CONDUCTOR PHYSICS

Subject Code : BTPH/104/18

M.Code : 75360

Date of Examination : 15-05-2024

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

**Write briefly :**

1. What is effective mass?
2. Define Fermi energy.
3. In a solid, consider the energy level lying 0.02 eV above Fermi level. What is the probability of this level being occupied by an electron at 100 K?
4. What is Schottky junctions?
5. What kind of semiconductor materials can be used for optoelectronics devices?
6. Obtain the probability of emission for Spontaneous emission.
7. When a laser has 2 V applied to it, it draws 20 mA and produce 2 mW of optical power. What is the efficiency of laser?
8. What is Hot-point probe measurement?
9. Define laser divergence.
10. Discuss the advantages of four probe method over two probe method.

## SECTION-B

11. Discuss the failure of Classical free electron theory. What are the special features of quantum free electron theory of metals? Derive an expression for the electrical conductivity of a metal.

12. State Bloch's theorem for particles in a periodic potential. Explain the origin of energy bands using Kronig-Penny model.

13. What are diffusion and drift current? Explain the origin of contact potential, while formation of p-n junction.

14. Obtain the expression for carrier concentration in n-type extrinsic semiconductor.

## SECTION-C

15. Explain the principle, construction and working of a homo-junction semiconductor laser with diagram. Discuss the demerits of homojunction semiconductor laser.

16. (a) What is Fermi's Golden rule?

    (b) Write a note on Optical loss and gains.

    (c) Explain Photovolatic effect.

17. What is Four-point probe method? How to calculate the hall mobility using Four-point probe method?

18. What is Capacitance-voltage measurements? What information can be obtained using it?

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

Total No. of Pages : 02

Total No. of Questions : 05

B.Tech. (AI&ML)/(Civil Engg.)/(Computer Engg.)/(R & AI)/ (Internet of Things and Cyber Security including Blockchain Technology)/(CSE/DS) /(EE)/(ECE)/(Electronics & Electrical)/( IT)/(ME) (Sem.–1,2)

# ENGLISH

Subject Code : BTHU/101/18

M.Code : 75349

Date of Examinaton : 11-05-2024

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. All Questions Are COMPULSORY.
2. Q1,Q2 & Q3 carry TEN marks each.
3. Q4 & Q5 carry FIFTEEN marks each.

1. (a) Use the following phrases in sentences : at all costs, at the top of his voice, in a hurry, under lock and key, to my satisfaction.

   (b) Correct the following :

   i. John play football every day.

   ii. She don't like spinach.

   iii. I have went to the concert last night.

   iv. They enjoys reading books.

   v. My brother can plays the guitar.

2. Draft a business letter to the manager of a bank asking for extension of tenure to pay loan. Cite financial reasons.

3. (a) Draft a business email to the employees of the company asking them to put in extra efforts to expand business of the company.

   (b) Elaborate features of an introduction in writing.

4. Write an essay in about 500 words on "*Technology in Our Lives*" **OR** "*Importance of Reading Books*".

(S17)-1397

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

Once upon a time two brothers who lived on adjoining farms fell into conflict. It was the first serious rift in 40 years of farming side by side. They had been sharing machinery, trading a labour and goods as needed without a hitch. Then the long collaboration fell apart. It began with a small misunderstanding and it grew into a major difference which exploded into an exchange of bitter words followed by weeks of silence. One morning there was a knock on elder brother's door. He opened it to find a man with a carpenter's toolbox. "I am looking for a few days of work", he said. "Perhaps you would have a few small jobs here and there. Could I help you?" "Yes!" said the elder brother. "I do have a job for you. Look across the creek at that farm. That's my neighbour, in fact, it's my younger brother and we don't get along. Last week he dug a wider passage for water into his farm. But he ended up creating a very wide creek in between our farms and I am sure he did it just to annoy me. I want you to build me something so that we don't have to stand and see each other's face from across." The carpenter said "I think I understand the situation. I will be able to do a job that will please you." The elder brother had to go to town for supplies, so he helped the carpenter get the materials ready and then he was off for the day. The carpenter worked hard all that day measuring, sawing, nailing. At sunset when the elder brother returned, the carpenter had just finished his job. The elder brother's eyes opened wide and his jaw dropped. It was not what he had even thought of or imagined. It was a bridge stretching from one side of the creek to the other! A fine piece of work, beautiful handrails. And to his surprise, his younger brother across the creek was coming to meet him with a big smile and arms wide open to hug him. "You are really kind and humble my brother! After all I had done and said to you, "you still shown that blood relations can never be broken! I am truly sorry for my behaviour", the younger brother said as he hugged his elder brother. They turned to see the carpenter hoist his toolbox on his shoulder. "No, wait! Stay a few days. I have a lot of other projects for you," said the older brother. "I'd love to stay on", the carpenter said, "but, I have many more bridges to build!"

**Questions :**

(a) What was the reaction of the Elder brother to the job done by the carpenter?

(b) Why did the younger brother hug the elder brother despite having animosity towards him?

(c) Why had the carpenter come to the elder brother's home?

(d) How were the relations between the two brothers before conflict?

(e) Make sentences to clarify the meaning of the following words : rift, creek, hoist.

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B.Tech. (AI & DS / AI & ML / Block Chain / CE / CSE / CS / DS / CSD / EE / EEE / ETE / FT / IT / ME / Robotics & Artificial Intelligence / 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 : 09-06-2024

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) Reduce in echelon form : $A=\begin{pmatrix}1 & 3 & 2\\ 1 & 6 & 1\\ 2 & 3 & 6\end{pmatrix}$

(b) State Cayley-Hamilton theorem.

(c) Determine the value of $k$ for which the homogeneous system of equations : $x-ky+z=0;\ kx+3y-kz=0;\ 3x+y-z=0$ has only trivial solution.

(d) Determine the eigen values of the matrix $\begin{pmatrix}1 & 4\\ 3 & 2\end{pmatrix}$.

(e) $T:\mathbb{R}\to\mathbb{R}^2$ defined by $T(x) = (2x, 3x)$. Check whether $T$ is a Linear Transformation or not.

(f) Check the exactness of the differential equation : $e^x(\cos y\,dx - \sin y\,dy) = 0$.

(g) Solve the following differential equation $\sin x\frac{dy}{dx} + y\cos x = \cos x\sin^2 x$.

(S2)-957

(h) Check whether the Differential equation $y'' + yx^3 = 0$ is Linear and Non-linear?

(i) Solve the partial differential equation $(4D^3 - 3DD'^2 + D'^3)\, z = 0$.

(j) Eliminate the arbitrary constants $a$ and $b$ from $z = ax + by + a^2b^2$, to obtain the partial differential equation governing it.

## SECTION-B

2. Solve the system of linear equations : $x + 2y - z = 3$, $3x - y + 2z = 1$, $2x - 2y + 3z = 2$, using inverse of a matrix.

3. Use Gauss-Jordon method to find the inverse of the matrix $A = \begin{bmatrix} 0 & 2 & 1 & 3 \\ 1 & 1 & -1 & -2 \\ 1 & 2 & 0 & 1 \\ -1 & 1 & 2 & 6 \end{bmatrix}$.

4. For the linear transformation $T : \mathbb{R}^2 \to \mathbb{R}^3$, defined by, $T(x, y) = (x + y, x - y, y)$, find a basis and dimension of (*i*) its range space and (*ii*) its null space. Hence verify rank-nullity theorem.

5. Let $T$ be a linear operator on $\mathbb{R}^2$ defined by $T(x, y) = (4x - 2y, 2x + y)$.

   (a) Find the matrix $T$ relative to basis $B = \{(1, 1), (-1, 0)\}$.

   (b) Also verify that $[T : B][v : B] = [T(v) : B]$ for any vector $v \in \mathbb{R}^2$.

## SECTION-C

6. Solve the differential equation $(D^2 + D + 1)\, y = \sin x$ using method of undetermined coefficients.

7. Solve $y' + 4xy + xy^3 = 0$.

8. Find the general solution of the partial differential equation $xy^2 p + y^3 q = (zxy^2 - 4x^3)$.

9. Solve $p = (qy + z)^2$ using Charpit's method.

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Total No. of Pages : 04

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B.Tech. (AI & ML/DS)(CE)(CSE)(IT)(Robotics & Artificial Intelligence) (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 : 08-05-2024

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 EACH from SECTION - B & C.

## SECTION-A

1. **Explain briefly:**

a) Verify Lagrange's Mean value theorem for $f(x) = \sin x$ in $[0, \pi]$.

b) Show that $\sin^p \cos^p \theta$ attains a maximum when $\theta = \tan^{-1}(p/q)$.

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

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 set of vectors forir a basis in $\mathbb{R}^3$ :

$\{(k, 1-k, k), (0, 3k-1, 2), (-k, 1, 0)\}$.

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

h) Examine whether the matrix A is similar to the matrix B where

$$A=\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix} \text{ and } B=\begin{bmatrix}1 & 1\\ 0 & 1\end{bmatrix}.$$

i) For any square matrix $A$, show that $A^T A$ is symmetric.

j) Show that the eigen values of an orthogonal matrix are of unit magnitude.

## SECTION-B

2. a) Expand $e^{\sin x}$ by Maclaurin's series.

b) Evaluate $\lim_{x\to 0}\frac{(1+x)^{1/x}-e}{x}$.

3. a) Find the volume of the solid formed by revolving about x-axis, the area enclosed by the parabola $y^2 = 4ax$, its involute $27ay^2 = 4(x-2a)^3$ and the $x-$axis.

b) Prove that $\int_0^{\pi/2}\sqrt{\tan\theta}d\theta=\frac{\pi}{\sqrt{2}}$.

4. a) Solve the equations $3x+y+2z=3$, $2x-3y-z=3$, $x+2y+z=4$ 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 $\lambda$ and $\mu$, 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 liner 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 $X = \left\{\begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix}, \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix}\right\}$ in $\mathbb{R}^3$ and

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

b) If $x, y, z$ are 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

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

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

9. Show that the matrix $A = \begin{bmatrix} 3 & 1 & -1 \\ -2 & 1 & 2 \\ 0 & 1 & 2 \end{bmatrix}$ is diagonalizable. Hence find $P$ such that $P^{-1}AP$ is a diagonal matrix. Thus, obtain the matrix $B = A^2 + 5A + 3I$.

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

# BASIC ELECTRICAL ENGINEERING

**Subject Code: BTEE/101/18**

**M.Code : 75339**

**Date of Examination : 04-05-2024**

Time : 3 Hrs.

Max. Marks: 60

INSTRUCTIONS TO CANDIDATES :

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

## SECTION-A

1. **Answer following questions in brief :**

   a) What is the difference between real and reactive power?

   b) What is voltage regulation of a single-phase transformer?

   c) What is the importance of power factor?

   d) What are various components of LT switchgear?

   e) Differentiate between the dependent and independent voltage-current sources.

   f) *Series RLC circuit is also called voltage circuit at resonance*. Justify.

   g) Derive an equation for rotor speed for an induction motor.

   h) Enlist the types of batteries.

   i) What is the difference between active and passive elements?

   j) What are three-phase balanced circuits?

## SECTION-B

2. In a particular RL series circuit a voltage of 10 V at 50 Hz produces a current of 700 mA while the same voltage at 75 Hz produces 500 mA. What are the values of R and L in the circuit?

3. State and explain the Norton's theorem. Give one example to prove this.

4. Explain the torque-speed curve of a three-phase induction motor. Hence, enlist its any two applications.

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

## SECTION-C

6. Explain the types of wires and cables along with its applications in Electrical Systems.

7. Derive an equation for resonant frequency for a series RLC circuit at resonance.

8. Derive the voltage and current equations for a series RL circuit excited by an AC source.

9. A single-phase 50 Hz transformer has 30 primary and 350 secondary turns. The net cross-sectional area of the core is 250 $cm^2$. If the primary winding is connected to a 230 V, 50 Hz supply, calculate :

   a) peak value of flux density in the core

   b) voltage induced in the secondary winding. Neglect losses, what is the primary current when the secondary current is 100 A?

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Total No. of Pages: 02

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B.Tech (Sem. – 1)

# MATHEMATICS-I

Subject Code: BTAM- 104-18

M Code: 75362

Date of Examination : 11-01-2023

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, carrying EIGHT marks each.
3. Attempt any FIVE questions from SECTION B & C, selecting atleast TWO questions from each of these SECTIONS B & C.

## SECTION-A

1. **Answer the following:**

a) Can Rolle's theorem be applied to the function $f(x) = x(x+3)^2, x \in [-3,1]$.

b) Define *gamma* function.

c) Evaluate $\lim_{x\to 0} \frac{x-\sin x}{\sin x(1-\cos x)}$

d) If $A+B = \begin{bmatrix} 1 & -1 \\ 3 & 0 \end{bmatrix}$ and $A-B = \begin{bmatrix} 3 & 1 \\ 1 & 4 \end{bmatrix}$, then find values of $A$ and $B$

e) Find adjoint of $\begin{bmatrix} 2 & 1 \\ 2 & 3 \end{bmatrix}$

f) Define the dimension of vector spaces.

g) Give the statement of rank nullity theorem.

h) Give any two properties of Eigen values.

i) Define skew symmetric matrix with an example.

j) Find sum and product of latent roots of the matrix $\begin{bmatrix} 1 & -1 \\ -2 & 1 \end{bmatrix}$

## SECTION-B

2. a) Expand $f(x) = \tan^{-1} x$ by Maclaurin's theorem.

   b) Evaluate $\lim_{x\to 1} \frac{x^x - x}{-1+x-\log x}$.

3. a) Evaluate the integral $\int_0^{\pi/2} \sqrt{\tan x}\, dx$ in terms of beta function.

   b) Find minima of $f(x, y) = 4x^2 + 9y^2 - 8x - 12y + 4$.

4. a) Prove that $\begin{vmatrix} (b+c)^2 & a^2 & a^2 \\ b^2 & (c+a)^2 & b^2 \\ c^2 & c^2 & (a+b)^2 \end{vmatrix} = 2abc(a+b+c)^2$.

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

5. a) Are the vectors (1,1,1,3), (1,2,3,4), (2,3,4,9) linearly dependent.

   b) Find the rank of the matrix: $\begin{bmatrix} 4 & 2 & 1 & 3 \\ 6 & 3 & 4 & 7 \\ 2 & 1 & 0 & 1 \end{bmatrix}$.

## SECTION-C

6. Show that the matrix $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & -3 \\ 2 & -1 & 3 \end{bmatrix}$ satisfies the equation $A^3 - 6A^2 + 5A + 11I = 0$.

7. Let $T: R^3 \to R^2$ be the linear transformation defined by $T\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} y+z \\ y-z \end{pmatrix}$, then find the matrix renresentation of $T$ w.r.t. the ordered basis $X = \{(1,0,1), (1,1,0), (0,1,0)\}^T$ in $R^3$ and $Y = \{(1,0), (0,1)\}^T$ in $R^2$.

8. a) Is the matrix $\begin{bmatrix} 5 & 3 & 7 \\ 3 & 26 & 2 \\ 7 & 2 & 10 \end{bmatrix}$ orthogonal?

   b) Write the matrix $\begin{bmatrix} 2 & 0 & -1 \\ 5 & 1 & 0 \\ 0 & 1 & 3 \end{bmatrix}$ as the sum of symmetric and skew symmetric matrices.

9. Reduce the matrix $\begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$ to the diagonal form.

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Total No. of Pages: 02

Total No. of Questions: 09

B.Tech (Sem. – 1)

# MATHEMATICS-I

Subject Code: BTAM-101-18

M Code: 75353

Date of Examination : 11-01-2023

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, carrying EIGHT marks each.
3. Attempt any FIVE questions from SECTION B & C, selecting atleast TWO questions from each of these SECTIONS B & C.

## SECTION-A

1. Answer the following:

a) Give geometric interpretation of mean value theorem.

b) Can Rolle's theorem be applied to the function:

$f(x) = \begin{cases} x, & 0 \le x \le 1 \\ 2 - x, & 1 \le x \le 2 \end{cases}$ in the interval $[0, \pi]$.

c) Evaluate $\lim_{x \to 0}[x^n(\ln x)]$.

d) Does the limit $\lim_{(x,y)\to(0,0)} \frac{xy}{x^2+y^2}$ exists?

e) Give the coordinates of the center of gravity of solid of mass $M$.

f) Define convergence, divergence and oscillation of a series.

g) Define D'Alembert's ratio test to check the convergence of the positive term series $\sum u_n$.

h) Find sum and product of Eigen values of the matrix $\begin{bmatrix} 1 & -1 \\ 2 & -5 \end{bmatrix}$.

i) Find the inverse of the matrix $\begin{bmatrix} 3 & 1 \\ 1 & 4 \end{bmatrix}$.

j) Find rank of the matrix $\begin{bmatrix} 0 & 1 & -3 \\ 1 & 0 & 1 \\ 3 & 1 & 0 \end{bmatrix}$.

## SECTION-B

2. a) Expand $f(x) = e^x$ in powers of $(x-1)$ upto four terms.

   b) Evaluate the limit $\lim_{x\to 0} \frac{e^x - e^{-x} - 2\log(1+x)}{x\sin x}$

3. a) Find the volume of the loop generated by the revolving the curve $y^2(a+x) = x^2(3a-x)$ about the $x$ axis.

   b) Find extremum of the function $2\sin x + \cos 2x, 0 \le x \le 2\pi$.

4. a) Discuss the continuity of the function $f(x,y) = \begin{cases} \frac{x^2+y^2}{xy}, & (x,y) \neq (0,0) \\ 0, & (x,y) = (0,0) \end{cases}$ at (0,0).

   b) Find extreme values of $2x + 3y + z$ subject to the conditions $x + z = 1$ and $x^2 + y^2 = 5$.

5. a) Evaluate the integral $\iint_R e^{x^2} dxdy$, where $R$ is the region given by $R: 2y \le x \le 2$ and $0 \le y \le 1$

   b) Evaluate $\iiint_T (x + 3y - 2z)\, dxdydz$, over the boundary of $T: 0 \le y \le x^2, 0 \le z \le x + y, 0 \le x \le 1$.

## SECTION-C

6. Examine the convergence of the series $\sum \frac{3\cdot 6\cdot 9\cdots(3n)}{7\cdot 10\cdot 13\cdots(3n+4)} x^n$.

7. a) Examine the convergence of the series $\frac{1}{1.2.3} + \frac{1}{2.3.4} + \frac{1}{3.4.5} + \cdots$.

   b) Examine the convergence of the alternating series $1 - \frac{1}{2^k} + \frac{1}{3^k} - \frac{1}{4^k} + \cdots$, for $k > 0$.

8. Find the characteristic equation of the matrix $\begin{bmatrix} 1 & 4 \\ 2 & 3 \end{bmatrix}$ and hence compute $A^{-1}$. Find the matrix represented by $A^5 - 4A^4 - 7A^3 + 11A^2 - A - 10I$.

9. Reduce the matrix $\begin{bmatrix} 5 & 3 & 7 \\ 3 & 26 & 2 \\ 7 & 2 & 10 \end{bmatrix}$ to the diagonal form.

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B.Tech. (AI & ML / AI & DS / CSE / DS / ECE / Robotics & Artificial Intelligence / Internet of Things and Cyber Security including Block Chain Technology) (Sem.–3)

# DEVELOPMENT OF SOCIETIES

Subject Code : HSMC-18

M.Code : 76439

Date of Examination : 21-06-2024

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. Family

   b. Social System

   c. Social Structure

   d. Capitalism

   e. Jajmani System

   f. Development

   g. Buddhist Economics

   h. Swaraj

   i. Marxism

   j. Small is Beautiful.

## SECTION-B

2. Differentiate between family and clan.

3. Discuss the idea of development in current context.

4. Distinguish between monarchy and democracy.

5. Discuss the significance of decentralization in development.

6. Discuss the concept of development in pre-British.

## SECTION-C

7. Describe the features of Capitalism.

8. Write a note on the different models of Social Structure.

9. Elaborate Gandhi's idea of economic development.

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Total No. of Pages : 02

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

# MATHEMATICS-III

Subject Code : BTAM304-18

M.Code : 76438

Date of Examination : 19-06-2024

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. **Solve the following :**

a) Show that the function $f(x, y) = \begin{pmatrix} 2x^2 + y & (x, y) \neq (1, 2) \\ 0 & (x, y) = (1, 2) \end{pmatrix}$ is discontinuous at (1, 2).

b) Change the order of integration in $\int_0^a \int_y^a \frac{x\,dx\,dy}{x^2 + y^2}$.

c) State Cauchy's root test.

d) State Cauchy Convergence criteria for sequence.

e) Find the integrating factor of the differential equation $ydx - xdy + 3x^2y^2 e^{x^3} dx = 0$.

f) Write Bernoulli's equation.

g) Solve $\frac{d^2x}{dt^2} + 6\frac{dx}{dt} + 9x = 0$.

h) Write Cauchy's Homogeneous linear equation.

i) Use wronskian to show that the functions $1, x, x^2$ are linearly independent.

j) If $U = \text{Sin}\frac{x}{y}$, $x = e^t$, $y = t^2$ find $\frac{du}{dt}$.

## SECTION-B

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

3. Evaluate by changing to polar coordinates $\int_{-1}^{1}\int_{-\sqrt{1-y^2}}^{\sqrt{1-y^2}} \log_e (x^2 + y^2 + 1)\, dx\, dy$.

4. Using Cauchy.s integral test show that the series $\sum_{1}^{\infty} \frac{1}{n^p}$ converges if $p > 1$ and diverges if $0 < p < 1$.

5. Solve by the method of variation of parameters $\frac{d^2y}{dx^2} + 4y = \text{Sec } 2x$.

6. Solve $e^y y' = e^x(e^x - e^y)$.

## SECTION-C

7. Find the maximum and minimum distances of the point (3, 4, 12) from the sphere $x^2 + y^2 + z^2 = 1$.

8. (a) Examine the convergence of the series

$$1 + \frac{1}{2^2} - \frac{1}{3^2} - \frac{1}{4^2} + \frac{1}{5^2} + \frac{1}{6^2} - \frac{1}{7^2} - \frac{1}{8^2} + \ldots\ldots\infty.$$

(b) Solve $p^2 + 2py \cot x = y^2$

9. Solve $(3x+2)^2 \frac{d^2y}{dx^2} + 3(3x+2)\frac{dy}{dx} - 36y = 3x^2 + 4x + 1$.

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Total No. of Pages : 02

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B.Tech.(AIML/ CSE/DS/Internet of Things and Cyber Security including Block Chain Technolog) (Sem.–3)

# OBJECT ORIENTED PROGRAMMING

Subject Code : BTCS302/18

M.Code : 76437

Date of Examiantion : 15-06-2024

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) Discuss different data types in C++.

   b) Define class and object.

   c) What are function components?

   d) Write about this pointer.

   e) What is meant by friend function?

   f) Write use of *f*stream.

   g) Discuss virtual base class.

   h) Discuss dynamic allocation.

   i) What is the use of abstract class?

   j) What is early binding?

## SECTION-B

2. Write a C++ program to show opening and closing of files.

3. Explain the concept of dynamic allocation of objects.

4. What is function overloading? Write an example using C++?

5. What are virtual functions? Explain with an example.

6. What are constructors? Write its different types.

## SECTION-C

7. Explain public, private and protected and show how they are declared in Inheritance.

8. What is the use of operator overloading? Write an algorithm to illustrate its concept.

9. Give the fundamentals of Exception Handling? Explain the use of throwing and catching mechanism.

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Total No. of Pages : 02

Total No. of Questions : 09

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

# DATA STRUCTURE & ALGORITHMS

Subject Code : BTCS-301-18

M.Code : 76436

Date of Examination: 13-06-2024

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 Analysis of Algorithm.

b) Write about binary search.

c) Discuss applications of Linked Lists.

d) Distinguish between stack and queue.

e) Write applications of stack.

f) What is garbage collection in Data Structure.

g) Give the working of AVL tree.

h) What is the main use of heap sort?

i) Define a cycle in a graph.

j) Write the importance of hashing.

## SECTION-B

2. What are the types of queues? Explain the operation on queues?

3. Write the applications of Binary tree by taking examples.

4. Write an algorithm to convert infix expression to postfix expression.

5. Show the algorithm of Bubble sort.

6. What are the different ways of representing a graph?

## SECTION-C

7. What is complexity? How it can be performed on different algorithms?

8. What is Circular Linked List? State the advantages and disadvantages of Circular Link List over Doubly Linked List and Singly Linked List.

9. How the search and traversing is done on Graphs? Illustrate by taking example.

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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.–3)

# DIGITAL ELECTRONICS

Subject Code : BTES301/18

M.Code : 76435

Date of Examination : 28-05-2024

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

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

## SECTION-A

1. Write briefly :

   a. What is the need of Digital Electronics? Discuss.

   b. State and prove DeMorgan's theorems.

   c. Compare combinational and sequential circuits.

   d. Draw the symbol of Exclusive-NOR gate and write down its truth table.

   e. What do you mean by donot care condition? What is its importance?

   f. Discuss the significance of FPGA.

   g. List the advantages and disadvantages of Digital Signals.

   h. What do you mean by memory cycle? Discuss.

   i. Write down the advantages and disadvantages of dual slope A/D converter.

   j. What do you mean by MOD of a counter? How many flip-flops are required for MOD-10 counter?

## SECTION-B

2. Convert the 324.25 decimal number to equivalent binary, hexadecimal and octal numbers.

3. Reduce the following expression to simplest forms using Karnaugh map minimization

   $F(A, B, C, D) = \sum m\ (1,3,5,11,12,13) + d\ (0,14)$ where d stands for Don't care.

4. Discuss the need of memory. Differentiate between PROM, EPROM, EEPROM and RAM.

5. Discuss the working of a master slave J K flip-flop. Write down its advantages and disadvantages also.

6. How R-2R type D/A converter is different from weighted type D/A converter? Explain its working in detail.

## SECTION-C

7. Explain in detail the working of Counter type and successive approximation A/D converters. Also mention their advantages and disadvantages.

8. Discuss :

   a) BCD to 7 segment decoder

   b) Programmable logic array.

9. Design a 4 bit synchronous counter having the following states

   0000, 0001, 0010, 0011, 0100, 0101, 0110, 0000, 0001.....

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IV

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

Total No. of Pages : 6 Pages

Total No. of Questions : 09

B.Tech. (AI&ML / AI and Data Science /CSE / DS / ECE)

(Sem–4)

# UNIVERSAL HUMAN VALUES

Subject Code : HSMC-122-18

M.Code : 77630

Date of Examination : 21-05-2024

Time : 3 Hrs. Max. Marks : 60

## INSTRUCTIONS TO CANDIDATES :

1. SECTION-A Fill in the Blanks/ True/False.
2. SECTION-B contains FIVE questions in this section. Attempt ANY FOUR questions.
3. SECTION-C contains THREE questions with internal choice in this section. Attempt any two questions.

## SECTION-A

1. Fill in the blanks / True / False : (2 × 10 = 20)

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

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

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

b) To be in a state of liking is ..... .

पसंद के हिसाब से एक अवस्था में होना ..... है।

ਪਸੰਦ ਦੇ ਹਿਸਾਬ ਵਲੋਂ ਇੱਕ ਦਸ਼ਾ ਵਿੱਚ ਹੋਣਾ ..... ਹੈ।

c) Physical facilities are necessary but ..... for humans.

भौतिक सुविधाओं मनुष्य के लिए आवश्यक है, लेकिन ..... हैं।

ਭੌਤਿਕ ਸਹੂਲਤਾਂ ਮਨੁੱਖ ਲਈ ਜ਼ਰੂਰੀ ਹਨ, ਲੇਕਿਨ ..... ਹਨ ।

d) ..... is right evaluation.

..... सही मूल्यांकन है।

..... ਠੀਕ ਲੇਖਾ ਜੋਖਾ ਹੈ।

e) Animal order in nature contains ..... and ..... .

प्रकृति में पशु आदेश में ..... और ..... होता है।

ਕੁਦਰਤ ਵਿੱਚ ਪਸ਼ੂ ਆਦੇਸ਼ ਵਿੱਚ ..... ਅਤੇ ..... ਹੁੰਦਾਂ ਹੈ।

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 realted with body.

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

ਮੁੱਲ ਧਿਆਨ ਸਰੀਰ ਦੇ ਨਾਲ਼ ਸਬੰਧਤ ਹੈ।

## SECTION-B

(5 × 4 = 20)

2. What do you mean by reaction and response? Give some examples.

आप का प्रतिक्रिया और अनुक्रिया से क्या मतलब है? कुछ उदाहरण दें।

ਤੁਹਾਡਾ ਯੁਕਤ-ਕਿਰਿਆ ਅਤੇ ਪ੍ਰਤੀ-ਕਿਰਿਆ ਤੋਂ ਕੀ ਮਤਲਬ ਹੈ? ਇਸ ਦੇ ਕੁਝ ਉਦਾਹਰਣ ਦਿਓ।

3. Explain harmony in family.

परिवार में तालमेल के बारे में बताएं।

ਪਰਿਵਾਰ ਵਿੱਚ ਤਾਲਮੇਲ ਦੇ ਬਾਰੇ ਦੱਸੋ।

4. What are the basic guidelines of value education?

मूल्य शिक्षा की बुनियादी दिशा-निर्देश क्या हैं?

ਮੁੱਲ ਸਿੱਖਿਆ ਦੀ ਬੁਨਿਆਦੀ ਦਿਸ਼ਾ-ਨਿਰਦੇਸ਼ ਕੀ ਹਨ?

5. Explain Competence in Professional-Ethics.

पेशेवर नैतिकता में क्षमता समझाओ।

ਪੇਸ਼ੇਵਰ ਨੈਤਿਕਤਾ ਵਿੱਚ ਸਮਰੱਥਾ ਸਮਝਾਓ।

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

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

ਮਨੁੱਖ ਸਵੈ ਅਤੇ ਸਰੀਰ ਦਾ ਸਹਿ-ਅਸਤਿਤਵ ਕਿਵੇਂ ਹੈ? ਪੂਰਵ-ਮਾਨਤਾ, ਸੰਵੇਦਨਾ ਅਤੇ ਸਹਿਜ-ਸਵਿਕਰਿਤੀ ਸਮਝਾਓ।

## SECTION-C

$(10 \times 2 = 20)$

7. Describe in brief the salient values in human relationships.

मानवीय रिश्तों में संक्षिप्त मुख्य मूल्यों का विवरण दें।

ਮਾਨਵੀ ਰਿਸ਼ਤਿਆਂ ਵਿੱਚ ਸਬੰਧਿਤ ਮੁੱਖ ਮੁੱਲਾਂ ਦਾ ਵਰਨਣ ਕਰੋ।

**OR**

What is happiness and prosperity? What are the wrong notions about attaining happiness and prosperity?

सुख और समृद्धि क्या है? खुशी और समृद्धि को प्राप्त करने के बारे में गलत धारणा क्या है?

ਖੁਸ਼ੀ ਅਤੇ ਖੁਸ਼ਹਾਲੀ ਕੀ ਹੈ? ਖੁਸ਼ੀ ਅਤੇ ਖੁਸ਼ਹਾਲੀ ਨੂੰ ਪ੍ਰਾਪਤ ਕਰਨ ਦੇ ਬਾਰੇ ਗਲਤ ਧਾਰਨਾ ਕੀ ਹੈ?

8. What is the meaning and purpose of Self-Exploration?

स्वयं-अन्वेषण के अर्थ और उद्देश्य क्या हैं?

ਆਤਮ ਅਧਿਐਨ ਦੇ ਮਤਲੱਬ ਅਤੇ ਉਦੇਸ਼ ਕੀ ਹਨ?

**OR**

What is the expanse of human living? Why it is necessary to understand harmony at all levels? Critically evaluate the current state of living at the level of Self.

मानव जीवन का फैलाव कितना है? सभी स्तरों पर सामंजस्य समझना क्यों ज़रूरी है? सटीकता से स्वयं के स्तर पर रहने की वर्तमान स्थिति का मूल्यांकन करें।

ਮਨੁੱਖ ਜੀਵਨ ਦਾ ਫੈਲਾਵ ਕਿੰਨਾ ਹੈ? ਸਾਰੇ ਸਤਰਾਂ ਉੱਤੇ ਤਾਲਮੇਲ ਸਮਝਣਾ ਕਿਉਂ ਜਰੂਰੀ ਹੈ? ਆਪਣੇ ਸਵੈ ਦੇ ਆਧਾਰ ਦੇ ਪੱਧਰ ਉੱਤੇ ਰਹਿਣ ਦੀ ਵਰਤਮਾਨ ਹਾਲਤ ਦਾ ਅਲੋਚਨਾਤਮਿਕ ਮੁਲਾਂਕਣ ਕਰੋ।

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

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

ਮੁੱਖ ਪਹਿਲੂਆਂ ਦੇ ਆਧਾਰ ਉੱਤੇ ਕੁਦਰਤ ਵਿੱਚ ਚਾਰ ਆਦੇਸ਼ਾਂ ਦੀ ਤੁਲਣਾ ਕਰੋ।

**OR**

What are the salient unethical practices in the profession at present? Analyze the root cause and possible solution.

मौजूदा समय में पेशे के मुख्य अनैतिक तरीके क्या हैं? मूल कारण और संभव समाधान का विश्लेषण करें।

ਮੌਜੂਦਾ ਸਮਾਂ ਵਿੱਚ ਪੇਸ਼ੇ ਦੇ ਮੁੱਖ ਅਨੈਤਿਕ ਤਰੀਕੇ ਕੀ ਹਨ? ਮੂਲ ਕਾਰਨ ਅਤੇ ਸੰਭਵ ਸਮਾਧਾਨ ਦਾ ਵਿਸ਼ਲੇਸ਼ਣ ਕਰੋ।

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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 realted with body.

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

ਮੁੱਲ ਧਿਆਨ ਸਰੀਰ ਦੇ ਨਾਲ਼ ਸਬੰਧਤ ਹੈ।

## SECTION-B

(5 × 4 = 20)

2. What do you mean by reaction and response? Give some examples.

आप का प्रतिक्रिया और अनुक्रिया से क्या मतलब है? कुछ उदाहरण दें।

ਤੁਹਾਡਾ ਯੁਕਤ-ਕਿਰਿਆ ਅਤੇ ਪ੍ਰਤੀ-ਕਿਰਿਆ ਤੋਂ ਕੀ ਮਤਲਬ ਹੈ? ਇਸ ਦੇ ਕੁਝ ਉਦਾਹਰਣ ਦਿਓ।

3. Explain harmony in family.

परिवार में तालमेल के बारे में बताएं।

ਪਰਿਵਾਰ ਵਿੱਚ ਤਾਲਮੇਲ ਦੇ ਬਾਰੇ ਦੱਸੋ।

4. What are the basic guidelines of value education?

मूल्य शिक्षा की बुनियादी दिशा-निर्देश क्या हैं?

ਮੁੱਲ ਸਿੱਖਿਆ ਦੀ ਬੁਨਿਆਦੀ ਦਿਸ਼ਾ-ਨਿਰਦੇਸ਼ ਕੀ ਹਨ?

5. Explain Competence in Professional-Ethics.

पेशेवर नैतिकता में क्षमता समझाओ।

ਪੇਸ਼ੇਵਰ ਨੈਤਿਕਤਾ ਵਿੱਚ ਸਮਰੱਥਾ ਸਮਝਾਓ।

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

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

ਮਨੁੱਖ ਸਵੈ ਅਤੇ ਸਰੀਰ ਦਾ ਸਹਿ-ਅਸਤਿਤਵ ਕਿਵੇਂ ਹੈ? ਪੂਰਵ-ਮਾਨਤਾ, ਸੰਵੇਦਨਾ ਅਤੇ ਸਹਿਜ-ਸਵਿਕਰਿਤੀ ਸਮਝਾਓ।

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B.Tech. (AI & ML/CSE/DS/IT/ Internet of things and Cyber Security including Blockchain Technology) (Sem.–4)

# COMPUTER ORGANIZATION AND ARCHITECTURE

Subject Code : BTES-401-18

M.Code : 77627

Date of Examination : 23-05-2024

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) Write functioning of USB?

b) What do you mean by floating point arithmetic?

c) What is difference between SPMD and MIMD machine?

d) What do you mean by I/O processors?

e) Differentiate between program interrupt and subroutine call.

f) What is meant by Interleaved memory?

g) Write down two properties of SIMD.

h) Distinguish between Isolated and Memory-Mapped I/O.

i) Distinguish between static RAM and dynamic RAM.

j) Name various interrupts in 8085.

## SECTION-B

2. Show a step-by-step multiplication process using Booth's algorithm to multiply two numbers 17 * (-7).

3. Explain what different types of memories are available and differentiate between them according to their application?

4. Discuss the fetch-decode and execute cycles of a processor.

5. Write the basic feature of static and dynamic memory. Also give an example.

6. Discuss the role of cache coherency in parallel processors.

## SECTION-C

7. Explain in detail the different mappings used for cache memory. Compare them.

8. With a neat block diagram, explain how the DMA controller is initialized for DMA data transfer?

9. Write short notes on the following :

   a) SMIMD

   b) Pipelining in CPU design.

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Total No. of Pages : 02

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

# DESIGN & ANALYSIS OF ALGORITHMS

Subject Code : BTCS/403/18

M.Code : 77629

Date of Examination : 17-05-2024

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 an algorithm?

b) Define dynamic programming.

c) Define implicit constraint.

d) What are static trees?

e) Define Branch-and-Bound method.

f) What is worst-case efficiency?

g) What is Topological sorting?

h) Define the term transitive closure.

i) What is Bin Packing Problem?

j) What is the basic principal of divide-and-conquer?

## SECTION-B

2. What are the requirements that are needed for performing Backtracking?

3. What are the features of dynamic programming?

4. List the types of Randomized Algorithms.

5. Explain Breath First Traversal Method for Graph with algorithm and examples.

6. Find the longest common subsequence for the following two sequences using dynamic programming. Show the complete process.

   X = 100101001

   Y = 101001.

## SECTION-C

7. Explain the characteristics of Greedy algorithms. Compare Greedy algorithms with Dynamic Programming Method giving example of Knapsack Problem.

8. Write a detailed note on Approximation Algorithms.

9. What are NP-hard and NP-complete problems? Explain with examples.

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

# OPERATING SYSTEM

Subject Code : BTCS-402-18

M.Code : 77628

Date of Examination : 14-05-2024

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. Why System calls are used?

   b. Difference between multitasking and multiprogramming OS.

   c. Define Context Switching.

   d. What is turnaround time?

   e. What are four necessary, conditions for deadlock to occur?

   f. What is thrashing?

   g. When page fault occurs?

   h. Define Semaphores.

   i. Difference between linked allocation and indexed allocation.

   j. What is bad block?

## SECTION-B

2. Explain the concept of process. Draw a process transition diagram and explain the various process states.

3. What is a critical section problem? What are the requirements to solve critical section problem?

4. What is disk scheduling? Explain the following types of disk scheduling by giving an example

   a. SSTF Scheduling

   b. C-SCAN Scheduling.

5. Define Deadlock. Explain the banker's algorithm with the help of a suitable example.

6. What is free space management? Discuss the bit vector method along with advantages and disadvantages.

## SECTION-C

7. Define CPU Scheduling. Consider the following set of process with the length of CPU burst time in milliseconds :

| Process | Burst Time | Priority |
|---|---|---|
| P1 | 7 | 3 |
| P2 | 9 | 2 |
| P3 | 2 | 1 |
| P4 | 1 | 4 |
| P5 | 3 | 5 |

The processes are assumed to have arrived in the order P1, P2, P3, P4, P5 and all at time 0.

   a. Draw Gantt chart, illustrating the execution of these processes using FCFS, SJF, pre-emptive priority and RR (quantum = 1) scheduling.

   b. What is turnaround time of each process for each of the scheduling algorithm mentioned above?

   c. What is the waiting time for each process for each of the scheduling algorithms?

8. Explain different memory management techniques in detail with the help of examples.

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

   a. Resource Allocation Graph

   b. Real Time Operating System.

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B.Tech. (AI&ML/CSE/ AI & Data Science/AI/CSE/IOT/IT/Data Science/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 : 09-05-2024

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) Give an example of a relation which is reflexive, transitive, but not symmetric.

b) How many people among 200000 people are born at same time (hour, minute, seconds).

c) How many 8 – letter words can be made using the letters of the words "TRIANGLE", if each word is to begin with T and end with E?

d) State and Prove Idempotent Laws of Logic Of Proposition.

e) Define integral domain (I.D).

f) Find k, if a regular graph with 7 vertices has 12 edges.

g) Define minimal spanning tree.

h) Draw a multigraph G whose adjacency matrix $A = \begin{bmatrix} 1 & 3 & 0 \\ 3 & 1 & 2 \\ 0 & 2 & 0 \end{bmatrix}$

i) Define cut vertex with an example.

j) Define POSET.







## SECTION-B

2. Show that R is a relation in the set $A = \{x \in Z : 0 \le x \le 12\}$, given by $R = \{(a, b): |a - b|$ is a multiple of 4$\}$. Prove that R is an equivalence relation. Find the set of all elements related to 1 in each case.

3. a) The number of diagonals of a polygon is 20. Find the number f its sides.

   b) Find the number of positive integers from 1 to 1000 which are divisible by none of 5, 6 and 8.

4. a) Prove that $(p \wedge q) \rightarrow (p \vee q)$ is a tautology.

   b) Test the validity of the following argument:

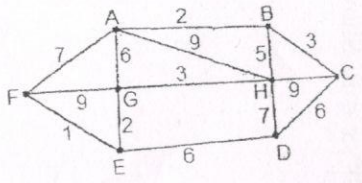
   If my brother stands first in the class, I will give him a watch. Either he stood first or I was out of station. I did not give my brother a watch this time. Therefore I was out of station.

5. Show that if the quotient group G/H is abelian, then G may not be abelian.

6. Prove that the number of edges in a complete graph with n vertices is $\frac{n(n-1)}{2}$.

## SECTION-C

7. Use Kruskal algorithm to find spanning tree of minimal weight by showing each step.




8. A subgroup H of a group G is a normal subgroup of G iff the product of two right cosets of H in G is again a right coset of H in G.

9. a) Prove that the function $f: C \to R$, defined by $f(z) = |z|$ is neither one - one nor onto.

b) Let $f: R \to R$ and $g: R \to R$ be a real valued function defined by $f(x) = 2x^3 - 1, x \in R$ and $g(x) = \left[\frac{x+1}{2}\right]^{\frac{1}{2}}, x \in R$. Show that f and g are bijective.

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B.Tech. (CSE) (Sem.–5)

# WEB TECHNOLOGIES

Subject Code : BTCS-520-18

M.Code : 78326

Date of Examination : 28-06-2024

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 external style sheet?

   b) Write a note on Exception handling.

   c) Comparison of HTML *vs*. DHTML.

   d) Differentiate between HTTP and DNS.

   e) Write the JAVA script to print "Good-Day" using IF-ELSE condition.

   f) What are the advantages of JSP over Java Servlets?

   g) What are the JDBC API components?

   h) Difference between Get and Post methods.

   i) Write a note on Strings in PHP.

   j) What are W3C standards?

## SECTION-B

2. Give the difference between Client Side scripting and Server Side Scripting. Write a short note on HTML.

3. Write a HTML source Code to generate a student Admission form.

4. Explain the different types of drivers in JDBC.

5. How are cookies used for session tracking in JSP?

6. What is the process for connecting to MySQL database in PHP?

## SECTION-C

7. a) Explain all the JSP Directives with an example.

   b) Write a program in Javascript to find the factorial of a given number.

8. Discuss the role of PHP in web development. Explain Looping statements available in PHP with an example.

9. a) How to use JSON with AJAX? Explain with example.

   b) What is CSS? Explain its types with suitable examples.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Artificial Intelligence (AI) and Data Science) (Sem–5)

# ARTIFICIAL INTELLIGENCE

Subject Code : BTAIML502-20

M.Code : 93940

Date of Examination : 25-06-2024

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 Agents in AI?

b) Define Problem Space.

c) Discuss Breadth First Search.

d) What is First order logic?

e) Write the process of forward chaining.

f) What are Bayesian networks?

g) Give an overview of Bayes' Rule.

h) Define Learning.

i) Write about decision trees.

j) What is the role of shell?

## SECTION-B

2. Explain some of the strategies for uniformed search.

3. What are the key concepts of basic probability theory?

4. Write and explain the applications of AI.

5. Discuss fundamental challenges in knowledge representation.

6. How are decision trees are utilized in the learning process?

## SECTION-C

7. Discuss the fundamental purpose of an expert system in representing domain knowledge.

8. How the Heuristic search is used in AI? Write about Hill climbing Algorithm.

9. Explain the concept of A* search and its significance in problem-solving.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.–5)

# COMPUTER NETWORKS

Subject Code : BTCS504-18

M.Code : 78323

Date of Examination : 24-06-2024

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) Write advantages of Bus Topology.

b) Define the term Frequency Division Multiplexing.

c) Explain the term Block Coding in brief.

d) What is Error? Explain types of error.

e) Explain in brief about the term RARP.

f) What do you mean by Unicast Routing protocols.

g) What is the main advantage of UDP over TCP?

h) Explain in brief about Quality of service.

i) Explain in brief about the term WWW.

j) Discuss TELNET in brief.

## SECTION-B

2. Explain Wired LAN and Wireless LANs in detail.

3. Explain CSMA/CA in detail.

4. Write a detailed note on IPV6.

5. Write a detailed note on Transmission Control Protocol (TCP).

6. Write a detailed note on Firewalls.

## SECTION-C

7. Write a detailed note on OSI Model.

8. **Explain in detail about following algorithms :**

   a) Leaky Bucket

   b) Token Bucket.

9. **Write a detailed note on the following :**

   a) Domain Name Space (DNS)

   b) DDNS

   c) SNMP.

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Total No. of Questions : 09

B.Tech. (CSE) (Sem.–5)

# SOFTWARE ENGINEERING

Subject Code : BTCS-503-18

M.Code : 78322

Date of Examination : 20-06-2024

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 software prototype?

   b. What is a software requirement?

   c. What does the term "refactoring" refer to in software development?

   d. Define Software Metric.

   e. Define unit testing.

   f. Difference between validation and verification.

   g. Role of GANTT chart.

   h. What is need of ISO in software engineering process.

   i. What is Software Reliability?

   j. What is IDE?

## SECTION-B

2. What is feasibility analysis? Discuss different types of feasibility studies using in software development.

3. What are coding reviews? Explain the purpose and benefits of code reviews in software development.

4. What are the main challenges associated with estimating software development costs?

5. Explain the importance of project planning in managing software processes.

6. What is software maintenance? Discuss four types of software maintenance.

## SECTION-C

7. What is the significance of requirements engineering in software development? Discuss the process of gathering and analyzing requirements and the impact of poor requirements management on a project.

8. Describe the different stages of testing in software development. How do unit testing, integration testing, and system testing differ, and what are their respective purposes?

9. **Write a short note on**

   a. Capability Maturity Model Integration (CMMI)

   b. SQA.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (AI & DS) (Sem.–5)

# PROGRAMMING IN PYTHON

Subject Code : BTAIML501/20

M.Code : 93939

Date of Examination : 14-06-2024

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 :**

   i. List the prominent features of Python.

   ii. Explain the importance of indentation in Python code.

   iii. What are the different data types available in Python?

   iv. Differentiate between sets and dictionaries.

   v. How can you convert a string to uppercase in Python?

   vi. Write a Python function to check if a number is prime or not.

   vii. What is the use of the 'finally' block in exception handling?

   viii. How can you open a file in read mode in Python?

   ix. Illustrate the usage of recursion in functions.

   x. What is the purpose of the if-else statement in Python?

## SECTION-B

2. Discuss the principles of object-oriented programming in Python. Describe the process of defining and using classes in Python.

3. Discuss the various types of iterative structures available in Python. Provide examples for each.

4. Write a note on operators and expressions in python. Write a program to illustrate the use of logical operators.

5. What is the importance of modules? Discuss any two in-built modules available in Python. How are user defined modules created?

6. Define the usage of namedtuple(), deque, ChainMap, UserDict, and UserList with the help of examples.

## SECTION-C

7. Differentiate between the usage of generators and iterators. Write a program to create a generator that reverses a string.

8. Write a detailed note on

   i. Tuples

   ii. Lists.

9. Write a detailed note on the steps of file management in Python. Write a program that provides various file management functionalities, such as creating, deleting, and renaming files.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (AI & DS) (Sem.–5)

# FORMAL LANGUAGE & AUTOMATA THEORY

Subject Code : BTCS 502/18

M.Code : 93938

Date of Examination : 20-05-2024

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) DFA

   b) GNF

   c) Moore

   d) Ambiguity

   e) Rice theorem

   f) Right context

   g) Chain Rule

   h) Acceptability of a string

   i) Universal turing machine

   j) Type-3 grammar

## SECTION-B

2. Construct a Moore m/c equivalent to the Mealy m/c M defined by following table:

| Present State | Next State | | | |
|---|---|---|---|---|
| | a = 0 | | a = 1 | |
| | state | Output | state | output |
| → $q_1$ | $q_1$ | 1 | $q_2$ | 0 |
| $q_2$ | $q_4$ | 1 | $q_4$ | 1 |
| $q_3$ | $q_2$ | 1 | $q_3$ | 1 |
| $q_4$ | $q_3$ | 0 | $q_1$ | 1 |

3. Discuss the formal properties of LL(k) and LR(k) grammars.

4. Explain in detail the Chomsky classification of languages.

5. Prove that P + PQ*Q = a*bQ* where P = b + aa*b and Q is any regular expression.

6. Discuss the Universality of Cellular Automata.

## SECTION-C

7. What is a Derivation Tree and Grammar? Explain the concept of ambiguous grammar.

8. Design PDA for $\{a^m b^n \mid m > n\}$.

9. Design Turing Machine of $\{0^n 1^n \mid n >= 1\}$.

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Total No. of Pages : 02

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B.Tech. (AI/AI &DS) (Sem.–5)

# DATABASE MANAGEMENT SYSTEM

Subject Code : BTCS 501-18

M.Code : 93937

Date of Examination : 18-05-2024

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 data abstraction?

   b Discuss storage strategies.

   c What is join in database?

   d Give primary functions of a Data Manipulation Language (DML).

   e What are SQL servers?

   f Write about DB2.

   g Write about B-trees.

   h Define the database security.

   i Discuss Database recovery.

   j Define DAC.

## SECTION-B

2. Describe different types of databases and database languages.

3. How does Oracle differ from MySQL in terms of features?

4. Define SQL injection and explain how it is used in database.

5. Discuss the importance of Hashing in Databases.

6. What are the key principles of web databases?

## SECTION-C

7. What are data models in DBMS? Explain the significance of each model.

8. Explain the ACID properties in the context of database transactions. How do they ensure data integrity?

9. Explain in detail the authentication and access control in database security.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.–6)

# ARTIFICIAL INTELLIGENCE

Subject Code : BTCS602/18

M.Code : 79250

Date of Examination : 18-06-2024

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 Artificial Intelligence.

   b. What is declarative knowledge?

   c. What do you mean by utility theory?

   d. Explain Fuzzy logic.

   e. Define Inference engine.

   f. Define probability.

   g. What is a search graph?

   h. What is state space?

   i. Define conditional probability.

   j. What is dynamic programming?

## SECTION-B

2. Explain adaptive dynamic programming with suitable example.

3. Explain Breath First Search in detail with suitable example.

4. Explain Bayesian Network with suitable examples.

5. What do you mean by Utility functions, explain in detail?

6. Explain Passive reinforcement learning in detail.

## SECTION-C

7. Explain A* algorithm in detail with suitable examples.

8. Explain adaptive dynamic programming and active reinforcement learning in detail with appropriate examples.

9. Define conditional probability and explain Bayes rule in detail.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.–6)

# COMPILER DESIGN

Subject Code : BTCS-601-18

M.Code : 79249

Date of Examination : 06-05-2024

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) NFA, DFA and Transition Table

   b) Language Translators

   c) Type checking

   d) Parse tree

   e) Jumping code

   f) Syntactic Error *vs* Semantic Error

   g) Syntax tree

   h) DAG

   i) Backpatching

   j) Left recursion.

## SECTION-B

2. How does Input Buffering help in recognizing tokens? Explain in detail.

3. Consider the grammar

   $E \rightarrow 2E2$

   $E \rightarrow 3E3$

   $E \rightarrow 4$

   Perform Shift Reduce parsing for input string "32423".

4. Explain in detail the design of a simple code generator.

5. Explain the implementation of quadruple, triple and indirect triple in detail.

6. Write a note on Yacc.

## SECTION-C

7. Write a note on global data flow analysis used in basic blocks.

8. Explain in detail various types of optimizations with a suitable example.

9. How SLR(1) parsing is performed on the given below grammar, create its parsing table and explain in detail.

   $E \rightarrow T+E \,/T$

   $T \rightarrow id$

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Total No. of Pages : 02

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B.Tech. (AI & DS) (Sem.–6)

DEEP LEARNING

Subject Code : BTCS 704-18

M.Code : 93966

Date of Examination : 27-05-2024

Max. Marks : 60

Time : 3 Hrs.

INSTRUCTIONS TO CANDIDATES :

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

## SECTION-A

1. **Write briefly :**

a) Explain the concept of bias in a machine learning model.

b) What is dropout in the context of neural networks?

c) What does L2 regularization aim to achieve?

d) What is a kernel in a convolutional layer?

e) What is the role of computational graph in neural networks?

f) Define the term "data augmentation."

g) Why are CNNs commonly used for image processing?

h) What problem do LSTM networks address?

i) What is a generative model?

j) What does a Deep Belief Network consist of?

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## SECTION-B

2. Explain the difference between underfitting and overfitting in machine learning. Provide examples of each.

3. Describe the back-propagation algorithm and its importance in training deep neural networks.

4. What is pooling in the context of CNNs? Compare max pooling and average pooling.

5. What are echo state networks, and how do they differ from traditional RNNs?

6. Explain the structure and functioning of Restricted Boltzmann Machines (RBMs).

## SECTION-C

7. Explain the encoder-decoder architecture with attention mechanisms for sequence-to-sequence modeling and discuss its applications.

8. Explain Maximum Likelihood Estimation (MLE) and its application in logistic regression and Gaussian mixture models.

9. Describe Recurrent Neural Networks (RNNs) and Long Short-Term Memory (LSTM) networks. Explain how they handle sequential data and address issues like the vanishing gradient problem?

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Total No. of Pages : 02

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B.Tech. (CSE) (Sem.–6)

# MACHINE LEARNING

Subject Code : BTCS618-18

M.Code : 79257

Date of Examination : 22-05-2024

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) Write a short note on well-posed learning problems.

(b) What are the benefits associated with data preprocessing?

(c) Write various applications of regression.

(d) Explain the terms sensitivity and specificity.

(e) In the context of tree induction algorithms, how do split algorithms based on information theory and Gini index vary from one another?

(f) How are genes represented in genetic algorithms, and how is the effectiveness of various solutions assessed using the fitness function?

(g) Discuss some key applications of association rules learning.

(h) How do hierarchical and density-based clustering approaches differ from each other in terms of their approach to clustering data points?

(i) Differentiate between supervised and unsupervised learning approaches.

(j) Explain the term "data integration".

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## SECTION-B

2. What is feature scaling? Differentiate between standardisation and normalisation and discuss scenarios where one if preferred over the other?

3. Differentiate between 'regression' and 'classification' discussing various evaluation metrics associated with them.

4. What are decision trees? Explain with the help of an example how splitting of nodes is done using information theory and Gini Index.

5. What benefits and limitations do neural networks have over Conventional Machine Learning Models?

6. What is Machine Learning? Differentiate between supervised and unsupervised learning with the help of examples.

## SECTION-C

7. What are the key applications of clustering, and how do the different types of clustering algorithms, such as partitioned, hierarchical, and density-based methods, differ in their approach and performance?

8. Explain the basic architecture of a neural network and how it processes input data to produce predictions. Also, explain how back propagation is used to modify the weights of the network during training as well as the purpose of activation functions in neural network computation?

9. Describe the process of building a regression model, including the steps involved in data preparation, model selection, and model evaluation.

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

Total No. of Questions : 09

B.Tech. (Computer Science & Engg.) (Sem.–6)

# CLOUD COMPUTING

Subject Code : BTCS612/18

M.Code : 79254

Date of Examination : 20-05-2024

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) Need for Cloud Computing

   b) Utility Computing

   c) Big data

   d) Resources Scalability

   e) Pay per-use Model

   f) Elasticity

   g) Authentication and Authorization

   h) SaaS

   i) Azure

   j) IT as a service.

## SECTION-B

2. Explain in detail the Types of Hypervisors and multitenancy available in cloud computing.

3. Write a note on the Driving factors and Challenges of Cloud Computing.

4. Compare available various Cloud service delivery models

5. Explain in detail the criteria used for cloud deployment.

6. What are the principal security dangers of Cloud Computing? Explain in detail.

## SECTION-C

7. Explain the migration path used for the cloud by taking a suitable example.

8. Write a note on Internal security breaches and service hijacking and their countermeasures.

9. Compare existing Cloud Platforms and Web services by taking a case study.

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Total No. of Pages : 02

Total No. of Questions : 09

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 : 18-05-2024

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 Warehousing.

   b) What are Data cube operations?

   c) ROLAP *versus* MOLAP.

   d) Discuss Data Quality.

   e) What is Gini Index?

   f) What are Decision Trees?

   g) Give an overview of predictive accuracy.

   h) Define Large Databases.

   i) Write about Search Engine.

   j) Define Web Content Mining.

## SECTION-B

2. Explain the concept of OLAP and its significance in data analysis.
3. Briefly explain the primary tasks involved in data mining.
4. What is direct hashing and pruning?
5. What is the fundamental principle of ranking web page?
6. Discuss the role of web mining software.

## SECTION-C

7. Discuss the basic concept of the Naive algorithm in association rules mining.
8. How would you assess the performance of association rules mining algorithms?
9. Explain the concept of cluster analysis. Discuss the partition method in cluster analysis.

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Total No. of Pages : 02

Total No. of Questions : 09

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

# DATA ANALYTICS USING R

Subject Code : BTITCS 601/20

M.Code : 93954

Date of Examination : 16-05-2024

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 :**

   i. List the applications of Data Analytics.

   ii. Discuss the various data types available in R.

   iii. What is a package in R? Give examples.

   iv. With the help of an example, explain how functions are defined in R?

   v. Discuss the syntax of the switch statement in R.

   vi. Describe the concept of active learning and how it can be used to create data for analytics?

   vii. Explain how R package "randomForest" is used to create random forests?

   viii. With the help of an example, illustrate how histograms and scatterplots are created in R?

   ix. Write a brief note on performing time series analysis in R.

   x. Explain various ways of creating vectors in R.

## SECTION-B

2. Discuss the nature of data and its classification into structured, semi-structured, and unstructured forms. Provide examples of each type of data.

3. Give an overview of R programming and explain the steps to set up the environment using R Studio. Discuss the advantages of using R for data analysis.

4. Describe the process of reading external data into R, including CSV files, XML files, web data, JSON files, databases, and Excel files. Provide step-by-step instructions for each method.

5. Define normal and binomial distributions and discuss their properties. Discuss the built-in functions of R that are used to generate normal distribution.

6. Discuss reinforcement learning techniques for creating data for analytics. Provide examples of reinforcement learning algorithms and their applications in Data Analysis.

## SECTION-C

7. Define logistic regression and survival analysis and explain how these techniques are implemented in R? Discuss their applications in predictive modeling and provide examples of real-world scenarios where they are used?

8. Explain how data can be created for analytics through designed experiments? Discuss the process of designing experiments to collect relevant data for analysis.

9. 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?

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

# DATA ANALYTICS USING R

Subject Code : BTITCS 601/20

M.Code : 93954

Date of Examination : 16-05-2024

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

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

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   ii. Discuss the various data types available in R.

   iii. What is a package in R? Give examples.

   iv. With the help of an example, explain how functions are defined in R?

   v. Discuss the syntax of the switch statement in R.

   vi. Describe the concept of active learning and how it can be used to create data for analytics?

   vii. Explain how R package "randomForest" is used to create random forests?

   viii. With the help of an example, illustrate how histograms and scatterplots are created in R?

   ix. Write a brief note on performing time series analysis in R.

   x. Explain various ways of creating vectors in R.

## SECTION-B

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5. Define normal and binomial distributions and discuss their properties. Discuss the built-in functions of R that are used to generate normal distribution.

6. Discuss reinforcement learning techniques for creating data for analytics. Provide examples of reinforcement learning algorithms and their applications in Data Analysis.

## SECTION-C

7. Define logistic regression and survival analysis and explain how these techniques are implemented in R? Discuss their applications in predictive modeling and provide examples of real-world scenarios where they are used?

8. Explain how data can be created for analytics through designed experiments? Discuss the process of designing experiments to collect relevant data for analysis.

9. 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?

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Total No. of Questions : 09

B.Tech. (CE / CSE / AI&ML / EE / ECE / EEE / IT/ DS / Internet of Things and Cyber Security including Block Chain Technology / BCA) (Sem–6)

# WIRELESS COMMUNICATION

Subject Code : BTEC-601-18

M.Code : 79373

Date of Examination : 11-05-2024

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

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

## SECTION-A

1. **Answer briefly :**

   a. Define cellular system.

   b. What is a cluster?

   c. What is the need for diversity?

   d. What is channel modeling?

   e. What is Pure ALOHA?

   f. Define SDMA.

   g. List GSM services.

   h. What is IMSI and TMSI?

   i. Define reduction factor.

   j. List disadvantages of cell splitting.

## SECTION-B

2. What is FDMA? Explain different features of FDMA.

3. What is fading? Differentiate :

   a. Fast and slow fading

   b. Flat and selective fading.

4. What is the principle of frequency reuse in the context of cellular networks? List the ways of increasing the capacity of a cellular system.

5. In GSM network, explain the role of Network and Switching subsystems.

6. Explain wireless cable television in detail.

## SECTION-C

7. Describe Spread spectrum technologies.

8. Explain different types of GSM Channels.

9. Explain diversity techniques in detail.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(CSE) (Sem.–6)

# MOBILE APPLICATION DEVELOPMENT

Subject Code : BTCS620/18

M.Code : 79258

Date of Examination : 08-05-2024

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) Android SDK

   b) Intents

   c) User Interface

   d) Threads

   e) Shared preferences

   f) Android user

   g) Android Graphics

   h) Android Architecture

   i) Application context

   j) Mobile apps Testing

## SECTION-B

2. Explain about tools of mobile application development.

3. Describe various components of an Android application in detail.

4. How broadcast and telephony APIs are used in Android studio?

5. Discuss briefly about the various factors in developing mobile applications.

6. Discuss mobile application development process.

## SECTION-C

7. What is an Activity? Explain activity lifecycle with the help of block diagram.

8. (a) Write a note on SQLite.

   (b) What is Android multimedia?

9. **Define the following terms:**

   (a) System permissions

   (b) SQLite

   (c) Security

   (d) Hacking

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Total No. of Pages : 02

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

# AGILE SOFTWARE DEVELOPMENT

Subject Code : BTCS710/18

M.Code : 90501

Date of Examination : 24-04-2024

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) Agile.

   b) Does Waterfall Model follows the Agile flexibility?

   c) Sprint Agile.

   d) Scrum.

   e) Open-Closed principle.

   f) Dependency - Inversion principle.

   g) Software Engineering.

   h) Role of Kanban board in Agile project management.

   i) Coe refactoring.

   j) White Box testing.

## SECTION-B

2. Explain the concept of 3 C's model in agile software development in detail.

3. What are the various agile manifesto's principles that are followed in software development?

4. Explain Liskov Substitution Principle used in Agile design methodology.

5. What do you mean by the term Agile Lifecyclic and how it effects the software testing?

6. The current size of the Agile team is increasing from 9 to 15. As a result, it is observed that the team is unable to complete their daily stand-up meetings within the stipulated 15 minutes. As a Scrum Master, what options you are most likely to explore and why?

## SECTION-C

7. List down 12 practices of XP.

8. Explain the need and the detailed history of agile in detail.

9. **Distinguish between :**

   a) Verification and Validation

   b) Scrum framework and Kanban framework.

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

Total No. of Pages : 03

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 : 11-06-2024

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 different types of data that can be mined?

b) What is cluster analysis?

c) What are the measures of similarity and dissimilarity?

d) What is web usage mining?

e) What is Gini Index?

f) What is precision?

g) Write briefly characteristics of search engines.

h) What is the significance of high false negative results?

i) What is direct hash pruning?

j) What is web mining software?

## SECTION-B

2. What is data preprocessing. Explain major tasks in data preprocessing.

3. Explain the process of ranking of web pages.

4. Explain k-means clustering method by taking a suitable example.

5. How to we evaluate classifier's accuracy? Explain different techniques for accuracy estimation

6. Explain the process of web data mining in detail.

## SECTION-C

7. Consider the training examples shown in below table for classification problem.

| Gender | Car Type | Shirt Size | Class |
|---|---|---|---|
| M | Family | Small | C0 |
| M | Sports | Medium | C0 |
| M | Sports | Medium | C0 |
| M | Sports | Large | C0 |
| M | Sports | Extra Large | C0 |
| M | Sports | Extra Large | C0 |
| F | Sports | Small | C0 |
| F | Sports | Small | C0 |
| F | Sports | Medium | C0 |
| F | Luxury | Large | C0 |
| M | Family | Large | C1 |
| M | Family | Extra Large | C1 |
| M | Family | Medium | C1 |
| M | Luxury | Extra Large | C1 |
| F | Luxury | Small | C1 |
| F | Luxury | Small | C1 |
| F | Luxury | Medium | C1 |
| F | Luxury | Medium | C1 |
| F | Luxury | Medium | C1 |
| F | Luxury | Large | C1 |

Apply the split algorithm based on information theory to perform classification of the given dataset. Indicate all intermediate steps properly.

8. **Write short notes on :**

   a) Hierarchy in the web

   b) Web structure mining

9. Explain OLAP server architecture. Differentiate ROLAP, MOLAP and HOLAP.

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

Total No. of Questions : 09

B.Tech. (CSE) (Sem.–7,8)

# NETWORK SECURITY AND CRYPTOGRAPHY

Subject Code :BTCS-701-18

M.Code : 90487

Date of Examination : 24-05-2024

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 cryptanalysis.

   b. Give an example of few passive threats.

   c. State Euler's theorem.

   d. What is the difference between term authentication and authorization?

   e. What is a ceaser cipher?

   f. What is the difference between encryption and hashing?

   g. Why do we need honeypots?

   h. What is S/MIME?

   i. What is the purpose of launching DDoS attack?

   j. What is role of DMZ?

## SECTION-B

2. Discuss the few vulnerabilities present in Internet architecture.

3. What is DES? Explain the various modes in which DES can be used.

4. Discuss the difference between MD5 and SHA algorithms

5. Discuss the different steps taken by PGP to create a secure email at sender site.

6. What is the difference between software and hardware Firewall? How does a Firewall work?

## SECTION-C

7. List out the elements of cryptosystems and explain different types of cipher techniques with the help of suitable examples.

8. Explain the working of RSA algorithm with an example of two prime numbers : p = 1, 1 and q = 13 and M = 5. Find Cipher text C and also M for decryption.

9. **Write a Short note on :**

   a. Diffie-Hellman key exchange

   b. Elliptic Curve Cryptography.

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

Total No. of Questions : 09

B.Tech. (CSE/IT/ME)(Sem.–7,8)

# ROUTING AND SWITCHING

Subject Code : BTEC/905A/18

M.Code : 90691

Date of Examination : 09-05-2024

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 ICMP used for?

b) What is the difference between dynamic IP and static IP addressing?

c) What is Distance Vector Routing?

d) What is ADSL Internet service?

e) List the advantages of IPV6 routing.

f) What are the different network security techniques?

g) Describe Flow Control and Buffering in Transport Layer.

h) Define wireless LAN.

i) Difference between host name and IP address.

j) Why should you use CLI?

## SECTION-B

2. What is DSL and ADSL? Explain the principle of establishing DSL/ADSL networks with PPPoE.

3. What is Generic Routing Encapsulation? How does it work?

4. Briefly explain the various fields of IPV6 address format.

5. What is network address translation? Explain translation method in brief.

6. Explain the term Authentication, Authorization and Accounting (AAA) used in network security.

## SECTION-C

7. What are some of the possible services that a link-layer protocol can offer to the network layer? Which of these link-layer services have corresponding services in IP?

8. What are the services provided by application layer? Explain FTP and SMTP application Layer protocol in detail.

9. Explain the following :

   a) Link state Routing.

   b) Bridging Enterprise Networks with Serial WAN Technology.

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