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

Total No. of Pages : 03

Total No. of Questions : 09

B.Tech. (Artificial Intelligence & Data Science/AIML/ Block Chain/CE/CSE/EE/EEE/FT/IT/ME/Internet of Things and Cyber Security including Block Chain Technology)(Sem.-1)

ENGLISH

Subject Code : BTHU101-18

M.Code : 93806

Date of Examination : 29-12-2023

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

SECTION-A

1. **Do as directed :**

   a) Give full form of the abbreviations : ICJ, IMO

   b) Give full form of the abbreviations : NATO, EU

   c) Give two synonyms : Begin

   d) Give two antonyms : Fortunate

   e) Give two words with prefix : anti

   f) Give two words with suffix : ful

   g) Punctuate : have you ever been to taj mahal

   h) What is describing?

   i) What should we bear in mind while writing conclusion?

   j) What are redundancies?

SECTION-B

2. Discuss creating coherence in writing.

3. Discuss sentence structures.

4. **a) Fill in with articles :**

   i) My mother is ... English teacher.

   ii) It was ... bolt from the blue.

   iii) She is .... MLA.

   iv) I shall meet ....President today.

   b) Use the following phrases in your own sentences :

   i) in search of

   ii) at the end

   iii) under the table

   iv) in spite of

5. a) **Fill in the blanks with prepositions :**

   i) She always stands .... him in the house.

   ii) The child was run ..... by a car.

   iii) He sits....the fire.

   iv) You have to complete your work ..... courage.

   b) Correct the following :

   i) I have not seen him since six years.

   ii) He or Raju are guilty.

   iii) I prefer tea than coffee.

   iv) He is brave than his friends.

SECTION-C

6. Write a report on climate change suggesting ways to save the environment.

7. Make a precis of the following passage :

For many years now the Governments has been promising for the eradication of child labour in hazardous industries in India. But the truth is that despite all the rhetoric no Government so far has succeeded in eradicating this evil, nor has any been able to ensure compulsory primary education for every Indian child. Between 60 and 100 million children are still at work instead of going to school, and around 10 million are working in hazardous industries. India has the biggest child population of 380 million in the world; plus the largest number of children who are forced to earn a living. We have many laws that ban child labour in hazardous industries. According to the Child Labour (Prohibition and Regulation) Act 1986, the employment of children below the age of 14 in hazardous occupations has been strictly banned. But each state has different rules regarding the minimum age of employment. This makes the implementation of these laws difficult. Also, there is no ban on child labour in non-hazardous occupations. The act applies to the organised or factory sector and not the unorganized or informal sector where most children find employment as cleaners, servants, porters, waiters, among other forms of unskilled work. Thus, child labour continues because the implementation of the existing law is lax.

8. Draft a business letter placing an order of furniture items required by your company. Imagine details.

9. Write an essay on "*Health and Physical Exercising.*"

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

0 0 DEC 2023

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (AI&ML/IOS/CE/DS/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 : 23-12-2023

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

SECTION-A

1. **Answer briefly :**

a) Calculate $\left(\frac{1}{2}\right)$.

b) Show that $\beta(m,n)=\beta(n,m)$.

c) Compute $\lim_{x\to 0}\frac{x\cos x-\sin x}{x^2\sin x}$.

d) If $A=\begin{bmatrix}0 & 1\\ 9 & 1\end{bmatrix}$ and $B=\begin{bmatrix}1 & 2\\ 5 & 7\end{bmatrix}$ Compute AB.

e) Find the eigen values of the matrix $\begin{bmatrix}2 & 3\\ 5 & 7\end{bmatrix}$.

f) Define symmetric and skew-symmetric matrices.

g) State rank and nullity theorem.

h) Evaluate $\int_1^{\infty}\frac{dx}{x}$.

i) Find the rank of the matrix $\begin{bmatrix} 3 & 2 & 4 \\ 1 & -2 & 3 \\ -3 & -10 & 1 \end{bmatrix}$.

j) State Mean value theorem.

SECTION - B

2. Find the eigen value and eigen vector of the following matrix $A = \begin{bmatrix} 1 & 2 \\ 3 & 9 \end{bmatrix}$

3. Find the maximum and minimum value of $f(x,y) = xy + \frac{1}{x} + \frac{1}{y}$

4. Verify Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 3 & 7 \\ 4 & 2 & 3 \\ 1 & 2 & 1 \end{bmatrix}$

5. Find the volume generated by revolving the area bounded by the parabola $y^2 = 8x$ and its latus rectum about the x-axis.

SECTION - C

6. Solve the following system using Gauss elimination $2x - 2y = -6$, $x - y + z = 1$, $3y - 2z = -5$.

7. a) Find the volume of the solid generated by the revolution of the cardioid $r^2 = a^2 \cos 2\theta$ about the line $\theta = \frac{\pi}{2}$.

   b) Show that $\int_0^{\frac{\pi}{2}} \frac{\sin x}{\sin x + \cos x}\, dx = \frac{\pi}{4}$.

8. a) Use Cramer's rule to solve : $-x + 3y - 2z = 5$, $4x - y - 3z = -8$, $2x + 2y - 5z = 7$.

   b) Prove that $\beta(m,n) = \frac{rmrn}{r(m+n)}$

9. a) Show that the transformation $T : R^3 \to R^3$ define by $T(x, y, z) = ax + by + cz$ is linear, where a, b and c are fixed real numbers.

   b) Let $T : R^3 \to R^3$ define by $T\{x, y, z) = (x, x + y, x + y + z)$. Find the associated matrix corresponding to standard basis.

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

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

Total No. of Questions : 09

Total No. of Pages :03

B.Tech. (AI&DS/M.L./Block Chain/CE/CSE/EE/EEE/ECE/Cyber Security/E&TE/FT/IT/ME/Internet of Things and Cyber Security including Block Chain Technology) (Sem.–1)

CHEMISTRY-I

Subject Code : BTCH101-23

M.Code : 93800

Date of Examination: 16-12-2023

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

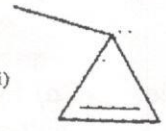
SECTION-A

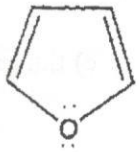
1. **Write briefly :**

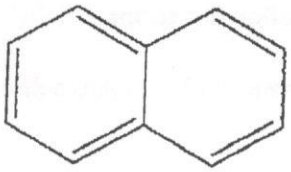
a) What are N type and p-type semiconductors?

b) What are Chromophores? Give examples.

c) Out of the following compounds write which are aromatic or antiaromatic.

i) 

ii) 

iii) 

d) Distinguish between an Ideal gas and Real gas.

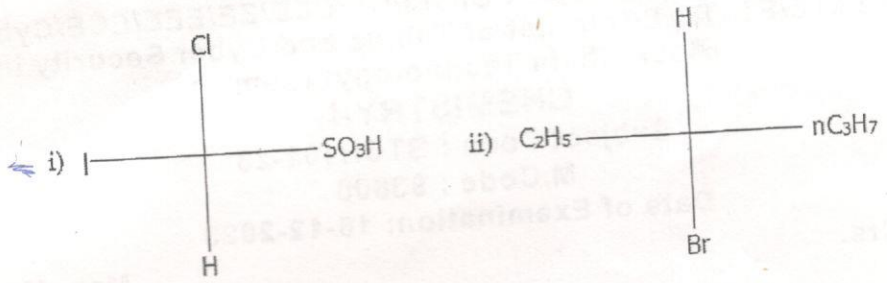
e) What is electrochemical corrosion? Discuss.

f) What is Markownik of Rule? Give an example.

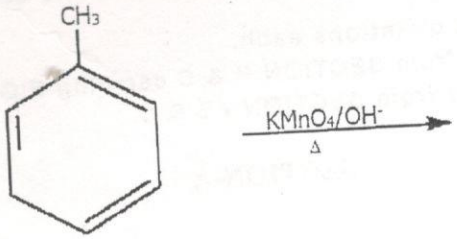
g) What is Lewis concept of Acids and Bases?

h) Why electron affinity of noble gases are Zero?

i) Assign R/S configuration to each of the following compounds.



j) Complete the following reaction:



SECTION-B

2. a) Explain crystal field theory in detail. How it can be utilized in explaining the octahedral complexes of transition metal ions.

   b) Differentiate between bonding and antibonding molecular orbitals.

3. **Define the following terms:**

   a) Bathochromic shift b) Auxochromes c) fluorescence d) hyperchromic shift

4. Explain in detail the vander waal Equation of state for real gases.

5. a) The e.m.f. of the cell reaction $3Sn^{+4} + 2Cr \rightarrow 3Sn^{+2} + 2Cr^{+3}$ is 0.89. Calculate the standard free energy change for the reaction.

   b) Discuss the Zeolite process for softening of water.

SECTION-C

6. **Explain why:**

   a) Electron affinity of fluorine is less than that of chlorine.

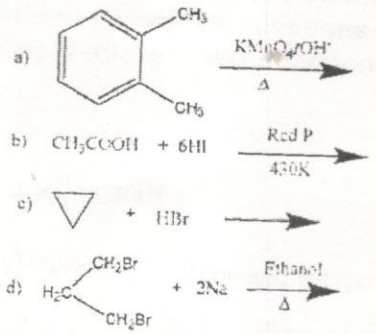
   b) Ionisation energy decreases down the group and increases along the period.

   c) Which has the smallest size (Cl or Cl^-) and why?

7. a) What is diastereomerism? Explain by giving at least two examples.

   b) Discuss the conformational analysis of propane.

8. **Complete the following reactions:**



9. **Explain the following :**

   a) HSAB principle

   b) Enatiomerism

   c) Electronegativity

   d) Free energy.

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

(S1 1739

00 DEC 2023

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(AI&ML/AI&DS/Data Science/Block Chain/CE/CSE/Cyber Security/EE/ECE/Cyber Security/Electronics & Telecommunication Engineering/FT/IT/ME/Internet of Things and Cyber Security including Block Chain Technology) (Sem.–1)

PROGRAMMING FOR PROBLEM SOLVING

Code : BTPS101-18

M.Code : 93803

Date of Examination: 13-12-2023

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.
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) What are bitwise operators? Explain any two bitwise operators with proper syntax.

   b) Draw the block diagram of computer and explain in brief each component of computer.

   c) What is an algorithm? Give an example.

   d) Give an example of logical error in C.

   e) Write the syntax of switch control statement.

   f) What is an array? How to initialize each element of the array?

   g) What is a function? Differentiate between user-defined and library function.

   h) What is structure? Write the syntax to create a structure.

   i) What is a pointer? How can we access a variable using pointer?

   j) Differentiate between while and do-while loop.

(S1)-1954

SECTION-B

2. What is recursion? Write a program to compute the Fibonacci series using recursion.
3. Write a program to find the smallest element in an array.
4. Explain in detail various types of operators in C.
5. Explain various data types in C.

SECTION-C

6. Write a program or algorithm to implement selection sort.
7. Explain in detail various string library functions with the help of proper syntax.
8. What is the role of compiler? What is object and executable code?
9. Write a program to display sum of first n natural numbers.

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

00 DEC 2023

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

Total No. of Questions : 09

B.Tech. (CE/ME/ECE/EE/A&R/CSE/EEE/IT) (Sem.–1)

MATHEMATICS-I

Subject Code : BTAM-101-18

M.Code : 75353

Date of Examination : 04-12-2023

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

SECTION-A

1. **Answer Briefly :**

a) Test the convergence of the following series $\sum \frac{n!}{n^n}$.

b) State the Raabe's test.

c) State Rolle's theorem.

d) State Langrange's mean value theorem.

e) Prove that $\int_0^{\frac{\pi}{2}} \sin 2x \log \tan x \, dx = 0$

f) Evaluate $\int_0^3 \int_0^1 (x^2 + 3y^2) \, dy \, dx$.

g) Change the order of integration of $\int_0^1 \int_x^{\sqrt{x}} f(x, y) dy dx$.

h) Find the first order derivative of $z = x^2 + y^2 + 2x + 3axy$.

i) Find the rank of the following matrix $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 3 & 5 & 7 \end{bmatrix}$

j) Find the determinant of the following matrix $\begin{bmatrix} 2 & 3 & 4 \\ 1 & 7 & 1 \\ 8 & 2 & 3 \end{bmatrix}$

SECTION - B

2. If $z(x+y) = x^2 + y^2$. Show that $\left(\frac{\partial z}{\partial x} - \frac{\partial z}{\partial x}\right)^2 = 4\left(1 - \frac{\partial z}{\partial x} - \frac{\partial z}{\partial x}\right)$

3. Evaluate $\iint e^{ax+by}\, dxdy$ over the triangle bounded by $x = 0, y = 0, ax + by = 1$.

4. Test the convergence of the series $\sum \frac{(n!)^2}{(2n)!} x^{2n}$.

5. Verify if the matrix $A = \begin{bmatrix} \cos\phi & -\sin\phi & 0 \\ \sin\phi & \cos\phi & 0 \\ 0 & 0 & 1 \end{bmatrix}$ is orthogonal and hence find its inverse.

SECTION - C

6. Find the maximum and minimum value of $xy + \frac{a^3}{x} + \frac{a^3}{y}$.

7. a) Solve the simultaneous equations $3x + 2y + 4z = 7, 2x + y + z = 4, x + 3y + 5z = 2$.

b) Find the inverse of the matrix $\begin{bmatrix} 1 & 2 & 2 \\ -1 & 1 & 1 \\ 3 & -2 & 1 \end{bmatrix}$.

8. a) Find the area of the surface of revolution of the solid generated by revolving the ellipse $\frac{x^2}{16}+\frac{y^2}{4}=1$ about the x-axis.

b) Evaluate $\int_0^1\int_0^{\sqrt{1-x^2}}\int_0^{\sqrt{1-x^2-y^2}} xyz\,dx\,dy\,dz$

9. a) Test the convergence of the series $\frac{1^2}{4^2}+\frac{5^2}{8^2}+\frac{9^2}{12^2}+\frac{13^2}{16^2}+\ldots\ldots\ldots\ldots$

b) Using Maclaurin's series, expand tan z upto the term containing x^5.

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

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

Total No. of Pages : 02

Total No. of Questions : 09

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

Subject Code : BTEE-101-18

M.Code : 75339

Date of Examination: 30-12-2023

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.
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) When the entire current flow (let's say I) and connected voltage source (let's say V) are split into two parallel routes with resistors (let's say R_1 and R_2), how do you get the equation for two currents (I_1 and I_2).

b) Define the resonant frequency.

c) What is the relation between bandwidth and quality factor in RLC series resonant circuit?

d) Compare active and reactive power use in AC machines.

e) What is an ideal transformer?

f) State and explain Ohm's law.

g) Enumerate the applications of single-phase induction motor.

h) What is a fuse? Discuss the advantages and disadvantages of a fuse.

i) Discuss the concept of power factor.

j) Distinguish the average value from the r.m.s. value.

SECTION-B

2. With respect to DC circuit, state and explain Kirchhoffs voltage and current law with the help of a suitable diagram.

3. A coil has a resistance of 5 Ω and an inductance of 31.8 mH. Calculate the current taken by the coil, power factor and average power when connected to 200V, 50 Hz supply.

4. Explain the construction and working principle of a single-phase induction motor.

5. Describe the efficiency of a transformer and how it can be calculated. Deduce a condition for maximum efficiency.

SECTION-C

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

   a) Switch Fuse Unit (SFU), and

   b) Miniature Circuit Breaker (MCB).

7. Explain the principle of operation of transformer. Derive an expression for the e.m.f. of an ideal transformer winding.

8. State and explain Thevenin's theorem. In figure 1, Find the current through the load resistance (R_L) using Thevenin's theorem.

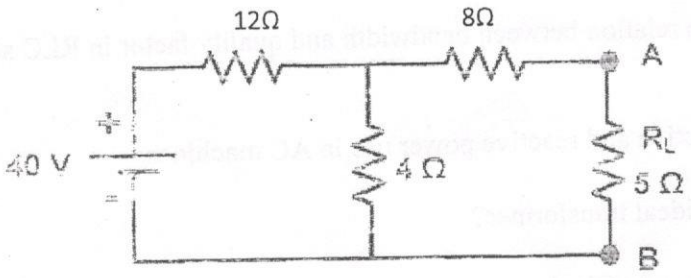


Figure 1

9. Derive an expression for power in a 3-phase star-connected system in term of

   a) Phase values and

   b) Line values of voltage and current

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

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

Total No. of Questions: 09

Total No. of Pages: 02

B.Tech (Sem. – 1,2)

SEMI-CONDUCTOR PHYSICS

Subject Code: BTPH-104-18

M Code: 75360

Date of Examination : 20-01-23

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. **Write briefly:**

a) Describe the main drawbacks of classical free electron theory.

b) What do you understand by Fermi level? Explain its significance in semiconductors.

c) What do you mean by effective mass of an electron?

d) Enumerate some of the properties of semiconductors.

e) What are Brillouin zones?

f) Explain the terms: spontaneous and stimulated emission of radiation.

g) What property of materials can be measured with Hot-point probe?

h) Discuss salient characteristics of laser beam.

i) What do you mean by population inversion?

j) What do you mean by photovoltaic effect?

SECTION-B

2. Derive an expression for Fermi energy of a system of free electrons. Discuss briefly the effect of temperature. (6+2)

3. Discuss the Kronig-Penny model. Using the model show the energy spectrum of electron consisting of a number of allowed energy bands separated by forbidden bands. (8)

4. Derive an expression for the densities of electrons and holes in the conduction and valence bands respectively of an intrinsic semiconductor. (8)

5. a) Distinguish between intrinsic and extrinsic semiconductors with suitable examples. (4)

   b) What do you mean by direct and indirect band gaps materials. (4)

SECTION-C

6. Discuss Einstein's coefficient. Derive relation between them. (8)

7. How does a semiconductor laser differ from other laser? Explain main features of the semiconductor laser and its applications. (8)

8. Describe a method for the measurement of divergence and wavelength of light. What physical parameters can be extracted from current-voltage characteristics. (5+3)

9. Explain with a proper diagram about the measurement of carrier density and resistivity by four probe method. (8)

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

00 DEC 2023

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

Total No. of Pages : 02

Total No. of Questions : 05

B.Tech. (AIML/CE/CSE/DS/EEE) (Sem.–1,2)

ENGLISH

Subject Code : BTHU-101-18

M.Code : 75349

Date of Examination : 19-12-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. All Questions are compulsory.
2. Question no. 1,2 and 3 carry TEN marks each and question no. 4 and 5 carry FIFTEEN marks each.

1. a) **Use the following phrases in sentences:**

As a matter of Fact, Take it easy, Give someone a hand, As long as, About to

b) **State whether the following sentences are compound or complex**

i. Although studying French seems difficult, it's simpler than you think.

ii. She loved flowers and I always bought her flowers, however she didn't like to get them.

iii. My father's job is very difficult, but He enjoys going to work every day.

iv. Because he was late again, he would be docked a day's pay.

v. While I am a passionate basketball fan, I prefer football.

2. a) **Condense the following passage retaining the main idea and using the minimum number of words:**

All the great things that have been done on earth have not been done for gold. The Lord Jesus did not come down and die on the cross for gold. The Spartans sought no reward when they fought and died at Thermopylae. The wise Socrates demands no salary from his countrymen but lives all day poor and barefoot only to make them good and noble. And even in our own time, there are heroes who do noble things but not for gold. Our discoverers did not go out to enrich themselves when they set out on one terrible frozen sea after another: even the women who went to labour in Oriental hospitals did not impoverish themselves that they might become rich in great works.

b) **Use the appropriate preposition in the following sentences:**

i. He sat ..... the chair.

ii. There is some milk ..... the fridge.

iii. She was hiding ..... the table.

iv. The cat jumped ..... the counter.

v. Barry drove ..... the bridge.

3. **Do as directed:**

i. Synonym of Pretty, Correct

ii. Antonym of Brave, Success

iii. She is ..... Intelligent and ..... brave girl. (Fill in article)

iv. Punctuate the following sentence: Lord rama spent fourteen years in forest accompanied by sita and laxman

v. Full form of w.e.f., misc.

4. Write an essay in about 500 words on "Politics and Religion".

5. Being the manager of a bank, draft your report on the new accounts opened and old accounts closed in your branch, to be submitted to the General Manager of your bank.

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

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

Total No. of Pages : 02

Total No. of Questions : 09

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

ENGINEERING GRAPHICS & DESIGN

Subject Code : BTME101-21

M.Code : 91335

Date of Examination: 15-12-2023

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.**
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 HP and parallel to VP with a suitable freehand drawing. Also, show traces.

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

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

   d) Write the following statement using single stroke capital vertical letters of 12 mm size: "IKGPTU KAPURTHALA".

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

   f) What are right solids and oblique solids? Explain with a suitable freehand drawing.

   g) Explain the types of Dimensions with a suitable drawing.

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

   i) Explain with the help of an example the Unidirectional system of placement of dimensions.

   j) Explain any two types of Lines used in Engineering Drawing.

SECTION-B

2. A point "G" is 31mm behind VP and 45mm below HP. Draw its projections and find out its shortest distance from the reference line.

3. A line "AB" is contained by a profile plane. Its end "A" is 49 mm in front of VP and 11 mm above HP and end "B" is 7 mm in front of VP and 59 mm above HP. Draw its projection and find TL, θ, ϕ, HT and VT.

4. Line "CD" 72 mm long; has its end "C" both in HP and VP. It is inclined at 45° to the "HP" and 39° to the "VP". Draw its projections when the line is lying in first quadrant.

5. Distance between two railway stations is 360 km, which is represented on a railway map by a line 12 cm long. Construct a Diagonal Scale to read up to single km and indicate distance of 295 km on the scale.

SECTION-C

6. A cone of base diameter 50 mm and axis 65 mm long; is lying on HP on a point of its circumference such that its generator is perpendicular to HP. Draw its projections assuming the object lying in first quadrant.

7. A regular pentagonal lamina of side 20 mm, perpendicular to HP and lying on HP on one of its sides. The plane is parallel to VP and 20 mm from VP. Draw its projections and show traces.

8. A right regular hexagonal pyramid side of base 35mm and height 65mm rests on its base on the HP such that one of its base edges is perpendicular to VP. Draw its projections.

9. A cube of 30 mm edge is placed centrally on top of a cylindrical block of diameter 52 mm and 20 mm height. Draw its isometric drawing.

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

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

Total No. of Pages: 02

Total No. of Questions: 05

B.Tech (Sem. – 1,2)

ENGLISH

Subject Code: BTHU-101-18

M Code: 75349

Date of Examination : 18-01-23

Time: 3 Hrs.

Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:

1. All questions are COMPULSORY.
2. Questions 1,2 and 3 carry TEN marks each.
3. Questions4 and 5 carry FIFTEEN marks each.

1. a) Use the following phrases in sentences: (5)

   i) Covid-19

   ii) epidemic

   iii) however

   iv) moreover

   v) pandemic.

   b) State whether the following sentences are compound or complex (5)

   i) I think I will buy the red car, or I will lease the blue one.

   ii) I really want to go to work, but I am too sick to drive.

   iii) I am counting my calories, yet I really want dessert.

   iv) She returned the computer after she noticed it was damaged.

   v) Whenever prices goes up, customers buy less products.

2. a) Explain the importance of writing skills and how writing skills can be improved through understanding and practicing providing suitable examples. (5)

   b) What should be taken care of while drafting business Emails? (5)

3. Use the following transitional/ connecting devices in a sentence of your own: (10)

   a) See you soon

   b) Top of the world

   c) By all means

   d) Looking forward

   f) Stands out

4. Write a report to the Editor of a newspaper drawing the attention of the concerned authorities towards the problem COVID-19 epidemic, and suggest the preventive measures for the control. (15)

5. Your school is celebrating ANTI - DRUG Day. Write an essay in $450 - 500$ words on the topic Minimization of usage of drugs is the only way to make a happy and progressive society. (15)

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

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

Total No. of Pages : 02

Total No. of Questions : 10

MBA / IB (Sem.–1)

MANAGERIAL ECONOMICS

Subject Code : MBA-102-18

M.Code : 75403

Date of Examination : 16-01-23

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A contains EIGHT questions carrying TWO marks each and students has to attempt ALL questions.
2. SECTION-B consists of FOUR Subsections : Units-I, II, III & IV. Each Subsection contains TWO questions each carrying EIGHT marks each and student has to attempt any ONE question from each Subsection.
3. SECTION-C is COMPULSORY and consist of ONE Case Study carrying TWELVE marks.

SECTION-A

1. **Answer briefly :**

   a) Production Possibility Curve

   b) Income Elasticity

   c) IS-LM

   d) Cost Function

   e) Average Cost

   f) Monopolistic Competition

   g) Factor Pricing

   h) Liquidity Preference

SECTION-B

UNIT-I

2. How the demand is determined in an economy? Explain the factors that influence the price elasticity of demand.

3. How consumer equilibrium is determined in indifference analysis? Explain the importance of indifference theory.

UNIT -II

4. What is the difference between Short term and Long term production function? Explain Long run production function.

5. Explain different determinants of cost. Explain short run and long run cost theory and its application.

UNIT -III

6. How price of a commodity is determined? Explain different types of pricing strategies.

7. What is perfect competition? Explain its different assumptions. How price and output is determined in perfect competition?

UNIT -IV

8. What is money market? Explain different motives of holding money. How money market equilibrium is determined?

9. Explain different types of Inflation. Elaborate theories of inflation and explain different measures which can be adopted by government to curb the inflation.

SECTION-C

10. **Case Study :**

The market of hamburgers has the following supply and demand schedule :

Price (S)	Quantity Demanded	Quantity Supplied
1	200 hamburgers	110 hamburgers
1.25	170	130
1.50	145	145
1.75	125	155
2.00	110	160
2.25	100	165

Answer the following questions:

a) Graph the supply and demand curve.

b) What is the equilibrium price and quantity in this market?

c) If the actual price in this market were above the equilibrium price, what would drive the market toward equilibrium?

d) If the actual price in this market were below the equilibrium price, what would drive the market toward equilibrium?

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

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Sem.–1, 2)

ENGINEERING GRAPHICS AND DESIGN

Subject Code : BTME-101-121

M.Code : 91335

Date of Examination : 27-01-2023

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.
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) Differentiate between Frustum and Truncated Solid.

   b) Differentiate between Isometric Projections and Isometric View.

   c) Explain with the help of an example the Unidirectional system of placement of dimensions.

   d) What is difference between plane scale and diagonal scale?

   e) Explain the types of Dimensions with a suitable drawing.

   f) Define primary and secondary planes.

   g) Give examples (with suitable drawing) of solids of revolution.

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

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

   "LABORATORY IS A TEMPLE WHERE SEARCH FOR TRUTH IS MADE"

   j) Draw a regular Hexagonal Lamina of side 45mm.

SECTION-B

2. Construct a Plain Scale of R.F.=1/50 to read meters and decimeters and long enough to measure up to 8m. Show 7.4m and 4m 5dm on the scale.

3. A point "M" is 31mm behind of VP and 54 mm below HP. Draw its projections and find out its shortest distance from the reference line.

4. A line CD, 60 mm long, has its end 'C' in HP and 15 mm in front of VP. The line is inclined at 45° to the HP and 30° to the VP. Draw its projection when the end 'D' is in first quadrant. Also find its HT and VT.

5. Line "AB" is lying on profile plane. Its end "A" is 44mm in front of VP & 12 mm above HP and end "B" is 8mm in front of VP & 52mm above HP. Draw its projection and find, True Length, inclinations with the principle planes, HT and VT.

SECTION-C

6. A regular hexagonal thin plate of 45mm side has a central circular hole of 45mm diameter at its center. It is resting on one of its corners in HP. Draw its projections when the plate surface is vertical and inclined to VP at 30°.

7. A cone of base rim diameter 45mm and axis 65 mm lying on HP on a point of its circumference such that the generator is perpendicular to HP. Draw its projections assuming the cone lying in first quadrant.

8. A right regular square pyramid of base edge 42mm and axis 65 mm long; rests on its base on HP with its base edges equally inclined to VP. Draw its projections assuming the pyramid in 1st quadrant.

9. A cube of 25 mm edge is placed centrally on the top of another square block, of 40mm edge and 15mm thick. Draw the isometric drawing of the two solids.

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

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

Total No. of Pages: 02

Total No. of Questions: 09

B.Tech (Sem. – 1,2)

PROGRAMMING FOR PROBLEM SOLVING

Subject Code: BTPS-101-18

M Code: 75346

Date of Examination : 16-01-23

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. Write briefly:

a) What is the syntax of nested If statement?

b) What are looping statements?

c) What is a complier?

d) What is the need for an operating system?

e) Differentiate between compiler & interpreter.

f) What are the various types of software used in computers?

g) How many bytes are required for Int a[20] statement?

h) What is an algorithm?

i) How syntax of a program is different from semantics?

j) What is a conditional statement?

SECTION-B

2. Write a program in 'C' language to find the greatest common divisor of two numbers.

3. What is a function? What is the difference between call by value & call by reference? Explain with help of an example.

4. Write a program to sort a given list of numbers in ascending order.

5. Describe the various data types used in 'C'.

SECTION-C

6. What is an array? Write a program to find the sum of the rows, columns and non diagonal elements of a matrix.

7. What is the syntax of various input output statements available in programming language?

8. Describe briefly about recursion with suitable examples.

9. Write the syntax with two different examples each for:

   a) struct

   b) union

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

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

Total No. of Pages: 03

Total No. of Questions: 09

B.Tech (Sem. – 1,2)

CHEMISTRY-I

Subject Code: BTCH- 101-18

M Code: 75343

Date of Examination : 25-01-23

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. **Write briefly:**

a) What is the difference between scattering and reflection?

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

c) What do you understand by substitution/elimination ratio?

d) Which of the following will show IR spectrum?

O_2, N_2, HI, CO_2

e) What is standard reduction potential?

f) What information can be drawn from Ellingham diagrams?

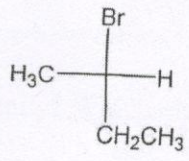
g) Why d and f orbitals show poor shielding effect?

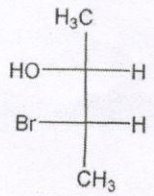
h) List the factors on which Δ_0 depends.

i) The following compounds show only one signal in ^{1}HNMR. Write their structural formula

$C_2H_4Br_2C_4H_6$

j) Indicate R or S configuration at stereogenic center(s). Assign priorities to each group.





SECTION-B

2. a) Deduce the time-independent Schrodinger equation. (6)

   b) Give the significance of wave function. (2)

3. a) Under the influence of crystal field, predict the electronic arrangement on the metal ions and nature of ligands in the following complexes:

   i) $[Fe(H_2O)_6]^{2+}$ ii) $[Fe(CN)_6]^{4-}$ iii) $[Fe(CN)_6]^{3-}$

   How many unpaired electrons are there in each complex and what would be their magnetic moments? (6)

   b) What is meant by band theory? What is the difference between conduction band and valence band? (2)

4. a) Explain the theory of NMR spectroscopy. (6)

   b) What is the difference between diffraction and scattering? (2)

5. a) Define excluded volume. Show that excluded volume, designated as b, is four times the actual volume of gas molecules. (5)

   b) Calculate the pressure exerted by one mole of CO_2 gas in 1.36 dm^3 vessel at 48°C using van der Waals equation. Given: $a = 3.59 dm^6 atm mol^{-2}$ and $b = 0.0427 dm^3 mol^{-1}$. (3)

SECTION-C

6. a) What is corrosion? Discuss mechanism of dry corrosion. (5)

   b) Calculate the standard free energy change ($\Delta G°$) of the reaction:

   $1/2H_2(g) + 1/2I_2(s) \rightarrow HI(g) \quad \Delta H° = 25.95 kJ$

   The standard entropy of $HI(g)$, $H_2(g)$ and $I_2(s)$ are 206.27, 130.60 and $116.73 JK^{-1}mol^{-1}$, respectively. Is this reaction feasible at standard state? (3)

7. a) Discuss the molecular geometries of the following:

   i) NH_3

   ii) SF_6 (Atomic number: N = 7, S = 16) (4)

   b) What is the difference between oxidation number and oxidation state? (2)

   c) What is electron affinity? Which element has highest electron affinity? (2)

8. a) Discuss the following: (4)

   i) Enantiomers ii) Diastereomers

   b) Discuss isomerism in transitional metal complexes. (4)

9. a) Compare and contrast the S_N1 and S_N2 mechanisms of substitution of alkylhalides. (4)

   b) Write short notes on the following organic reactions: (4)

   i) Cyclization reactions

   ii) Reduction reactions

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

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

Total No. of Pages: 03

Total No. of Questions: 09

B.Tech (Sem. – 1,2)

BASIC ELECTRICAL ENGINEERING

Subject Code: BTEE-101-18

M Code: 75339

Date of Examination : 13-01-2023

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. **Write briefly:**

a) State Thevenin's theorem.

b) What do you mean by the term time domain analysis? Explain.

c) What do you mean by real power? Explain.

d) What do you mean by power factor? Explain its importance.

e) Define peak and rms value.

f) What is the need of a battery? List its different types.

g) What do you mean by energy consumption? Explain.

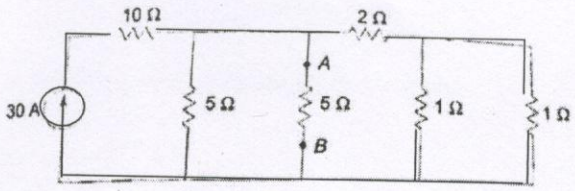
h) Discuss the principle of a dc motor.

i) Define the term efficiency.

j) Explain the principle of a transformer.

SECTION-B

2. Determine the current flowing through the 5 ohm resistor in the circuit given below using Norton's theorem.



3. Explain the following:

   a) Series resonance

   b) Three phase balanced circuits

4. A circuit having a resistance of 12 ohm, an inductance of and a capacitance of in series, is connected across a supply. Calculate

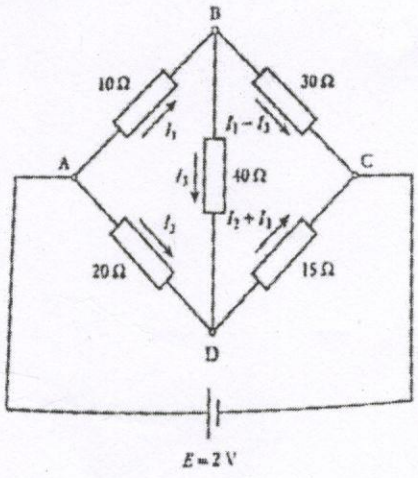
   a) Impedance

   b) Current

   c) The voltage across R, L and C

   d) The phase angle between the current and the supply voltage

5. Determine the value and direction of the current in BD using Kirchoff's Laws for the Wheatstone bridge shown below:



SECTION-C

6. Explain the principle, construction, and working of an autotransformer in detail. Howis it different from an ordinary transformer?

7. Discuss the construction and working of synchronous generators.

8. Explain:

   a) MCB

   b) ELCB

9. Discuss:

   a) Types of wires and cables

   b) Power factor improvement and battery backup

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

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

Total No. of Questions : 09

Total No. of Pages : 02

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

OBJECT ORIENTED PROGRAMMING

Subject Code : BTCS302-18

M.Code : 76437

Date of Examination : 29-12-2023

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

SECTION-A

1. **Explain the following :**

   a) Float

   b) Operator

   c) Inline function

   d) Object

   e) Public

   f) Destructor

   g) Inheritance

   h) Catch

   i) Call by value

   j) Friend function.

SECTION-B

2. Explain with help of an example how to overload '++' operator?
3. Differentiate between virtual and pure virtual function with help of an example.
4. Write a program to read a file and copy character by character into another file.
5. Discuss the use of exceptional handling in programming.
6. Explain the concept of access specifiers with an example.

SECTION-C

7. Explain different types of inheritance and the concept of ambiguity.
8. Differentiate between functions and recursive functions with help of an example.
9. Write a detailed note on exceptional handling mechanism.

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

0 0 DEC 2023

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

Total No. of Questions : 09

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

DIGITAL ELECTRONICS

Subject Code : BTES-301-18

M.Code : 76435

Date of Examination : 04-01-2024

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) Differentiate between Minterms and Maxterms.

b) What do you mean by principle of duality?

c) What are the applications of Gray codes?

d) Draw full adder circuit.

e) How can you define BCD codes?

f) What is the significance of excitation table?

g) What is the difference between asynchronous and synchronous counters?

h) What do you mean by PLA?

i) What are the various types of ROM?

j) Draw sample and hold circuit.

SECTION-B

2. With the help of examples, explain Boolean laws.

3. Convert hexadecimal number "7C" into other number systems.

4. Design mod-6 counter.

5. Draw and explain field programmable gate array.

6. Design R-2R ladder type converter.

SECTION-C

7. Explain ASCII and Excess-3 codes.

8. Design master slave flip - flop and explain its working.

9. Draw and explain 3 bit parity checker.

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

00 DEC 2023

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

Total No. of Questions : 09

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

MATHEMATICS-III

Subject Code : BTAM304-18

M.Code : 76438

Date of Examination : 23-12-2023

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 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) State Euler's theorem

b) If $z = \log(x^2 + xy + y^2)$, Prove that $x\frac{\partial z}{\partial x} + y\frac{\partial z}{\partial y} = 2$.

c) State Gauss Test

d) State Cauchy's root test

e) Test the convergence of the series $\sum \frac{(-1)^{n-1}}{n}$

f) Evaluate $\int_1^2 \int_1^3 dx\,dy$

g) Evaluate $x\frac{dy}{dx} - y - 2x^3 = 0$

h) Evaluate $\frac{dy}{dx} + \frac{y}{x^2} = x, (x > 0)$

i) Solve $(y - xp)(p - 1) = p$

j) If $x = r\cos\theta$, $y = r\sin\theta$, find $\frac{\partial(x, y)}{\partial(r, \theta)}$.

SECTION-B

2. If $V = r^m$ where $r^2 = x^2 + y^2 + z^2$, show that $\frac{\partial^2 V}{\partial x^2} + \frac{\partial^2 V}{\partial y^2} + \frac{\partial^2 V}{\partial z^2} = m(m+1)r^{m-2}$.

3. Test the convergence or divergence of the series

$$\frac{2}{1^2}x + \frac{3^2x^2}{2^3} + \frac{4^3x^3}{3^4} + \text{----------}\infty.$$

4. Solve the differential equation $(3xy^2 - y^3)\,dx - (2x^2y - xy^2)\,dy = 0$.

5. Change the order of integration and hence evaluate $\int_0^\infty \int_0^x xe^{\frac{-x^2}{y}}\,dy\,dx$.

6. Apply the method of variation of parameters to solve $\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 9y = \frac{e^{3x}}{x^2}$.

SECTION-C

7. The temperature 'T' at any point (x, y, z) in space $400xyz^2$. Find the highest temperature on surface of unit $x^2 + y^2 + z^2 = 1$.

8. a) Solve $y - 2px = \tan^{-1}(xp^2)$

   b) Evaluate $\frac{dy}{dx} - \frac{dx}{dy} = \frac{x}{y} - \frac{y}{x}$.

9. Solve the differential equation $x^2\frac{d^2y}{dx^2} - 3x\frac{dy}{dx} + y = \frac{\log x \sin(\log x) + 1}{x}$.

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

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (AI & ML) / (Data Science / Computer Engg) / (CSE) / (Cyber Security) (AI) / (CE / CSE / ECE) / (IOT) (Internet of Things and Cyber Security including Block Chain Technology) (Sem.–3)

DEVELOPMENT OF SOCIETIES

Subject Code : HSMC-101-18

M.Code : 76439

Date of Examination : 24-01-23

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) Role

   c) Norms

   d) Culture

   e) Dictatorship

   f) Theocracy

   g) Economic development

   h) Patron-client relationship

   i) Globalization

   j) Self-sufficient society

SECTION-B

2. Distinguish between Clan and Society.

3. Differentiate between Status and Role.

4. Compare any two modes of governing system prevalent in modern societies.

5. Discuss the political system best suited for economic development in current context.

6. Discuss social impact of technology.

SECTION-C

7. How does economic development lead to social development? Explain.

8. Discuss the idea of decentralization and its significance in economic development.

9. Discuss India's economic development before British period.

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

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(CE / AI & ML / AI & Data Science) / AI / CSE / (Cyber Security) / Data Science/ (IOT) / (Internet of Things and Cyber Security including Block Chain Technology) / Computer Engg. /) (Sem.–3)

MATHEMATICS-III

Subject Code : BTAM304-18

M.Code : 76438

Date of Examination : 19-01-23

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

Solve the following :

1. a) State Geometrical Interpretation of Partial Derivative.

   b) Whether the function $f(x, y, z) = 3x^2 yz + 5xy^2 z + 4z^4$ is homogenous if yes state its degree.

   c) Evaluate $\int_1^2 \int_1^3 dxdy$.

   d) What do you mean by divergent infinite series?

   e) Discuss the behavior of the series $\sum \frac{n(n+1)}{(n+2)^2}$.

   f) Find the integration factor of the differential equation : $xdy + ydx = 0$.

   g) Define Bernoulli's equation with example.

   h) Find the particular integral of the equation : $4\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + y = e^{\frac{x}{2}}$.

i) Define Cauchy's Linear Differential equation.

j) Write down the solution of $\frac{dx}{dy} + Px = Q$, where P and Q are functions of y alone.

SECTION-B

2. If $u = 1(-2xy + y^2)^{-\frac{1}{2}}$, prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} + z\frac{\partial u}{\partial z} = y^2u^3$.

3. Evaluate $\iint e^{2x+3y}\ dxdy$ over the triangle bounded by the lines $x = 0$, $y = 0$, and $x + y = 1$.

4. Test for convergence or divergence the series $\sum_{n=1}^{\infty} \frac{1}{n} \sin \frac{1}{n}$.

5. Solve the differential equation : $x^2\left(\frac{dy}{dx}\right)^2 - 2xy\frac{dy}{dx} + 2y^2 - x^2$.

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

SECTION-C

7. Prove that $\iiint \sqrt{1 - \frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2}}\ dxdydz = \frac{\pi^2 abc}{4}$.

8. Apply the method of variation of parameter to solve the equation $\frac{d^2y}{dx^2} + 16y = 32\sec 2x$.

9. Solve the differential equation : $(3x + 2)^2\frac{d^2y}{dx^2} + 5(3x + 2)\frac{dy}{dx} - 3y = x^2 + x + 1$.

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

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

Total No. of Questions : 09

B.Tech. (Artificial Intelligence & Machine Learning) / AI and Data Science) / AI / (CSE) / (Cyber Security) / (IOT) / (Data Science) / (Internet of Things and Cyber Security including Block Chain Technology) (Computer Engg) (Sem.–3)

OBJECT ORIENTED PROGRAMMING

Subject Code : BTCS-302-18

M.Code : 76437

Date of Examination : 17-01-23

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. Advantage of copy constructors.

   b. What are the various access modifiers?

   c. Multilevel inheritance

   d. Differentiate between call by value and call by reference

   e. Need of abstract class

   f. Friend class

   g. Difference between equal to (==) and assignment operator (=).

   h. How will memory allocated to values of a 2D integer array?

i. How global variable is difference from local variable?

j. Illustrate difference in early and late binding.

SECTION-B

2. What is friend function? Explain by giving suitable example.

3. Write a program to read two numbers from the keyboard and display their average on screen.

4. How exception handling is beneficial for the programming? Write a program to multiply two arrays while catching and handling exceptions.

5. How procedural programming is different from object oriented programming? Explain.

6. Write a C++ program to overload the binary operator '+' to add two complex numbers.

SECTION-C

7. Design three classes – student, college and university where college is derived from university and student is derived from college. Write suitable function to initialize values and write a main function for execution by creating objects.

8. Write a C++ program by using classes in which user enter the three angles a1, a2, and a3 and then program will check that its valid triangle or not. If it's valid triangle, then find the factorial of al with while loop, and find that a2 is a palindrome number or not. If a2 is palindrome, then find the factorial of a2.

9. **Write short note on :**

   a. Friend Function

   b. Pure Virtual Function

   Also write suitable program for each of these concepts to illustrate their usage.

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

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech (CE) / B.Tech.(CSE) (Sem.–3)

DATA STRUCTURE & ALGORITHMS

Subject Code : BTCS-301-18

M.Code : 76436

Date of Examination : 14-01-23

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 advantages of linked list?

   b. What is Big O notation?

   c. Write the routine to delete an element from queue.

   d. Convert the infix (a + b) * (c + d)/f into postfix expression.

   e. What are the applications of binary tree?

   f. Define B^+ tree.

   g. What is simple path?

   h. What is an acyclic graph?

   i. What is the output of selection sort after the 3rd iteration on this 17, 4, 45, 8, 27, 13 sequences?

   j. Which sorting algorithm is best if the list is already sorted? Why?

SECTION-B

2. Write an Algorithm to traverse a graph using Depth First Search.

3. Write an algorithm to insert an element at n^{th} position in doubly linked list. Also, discuss the merits and demerits of doubly linked list.

4. What is polish notation? Explain the step-by-step procedure to evaluate the following postfix expression 623 + - 382/ + * 243 +

5. What is max heap. Construct max heap for the following: 140, 80, 30, 20, 10, 40, 30, 60, 100, 70, 160, 50, 130, 110, 120.

6. How linked list can be used for representing polynomials? Explain using a suitable example.

SECTION-C

7. Write an algorithm for insertion sort. Compare its best-case, average-case, and worst-case time complexity with merge sort with suitable example.

8. Suppose the following list of letters is inserted in order into an empty binary search tree: J, R, D, G, T, E, M, H, P, A, F, Q. Construct the binary search tree and find the in-order, pre-order and post-order traversal of BST created.

9. What is AVL Tree? Construct a Balanced AVL Tree for the following sequence of numbers: 50, 20, 60, 10, 8, 15, 32, 46, 11, 48.

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

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

Total No. of Questions : 09

B.Tech.(3D Animation Engineering/CSE/IT) (Sem.–3)

MATHEMATICS – III

Subject Code : BTAM-302

M.Code : 70808

Date of Examination : 21-01-2023

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

SECTION-A

1. Answer briefly :

a) What do you mean by periodic functions? Also write period of cos100x.

b) Explain Euler's formula.

c) Define derivatives of the function of complex variables.

d) Write down Runge-kutta Method

e) Explain Binomial distributions

f) Evaluate L $[t^2 e^{-3t}]$

g) Find the differential equation of all spheres of fixed radius having their centres in the *xy*-plane.

h) Discuss the difference between Euler's method & Euler's modified methods.

i) Explain *f* distribution.

j) Define mean & variance.

SECTION-B

2. If $f(x) = |x|$, expand $f(x)$ as a fourier series in the interval $(-\pi, \pi)$

3. Evaluate the integral by using Laplace transform $\int_0^\infty t e^{-3t} \sin t \, dt$

4. Solve the following partial differential equations

   a) $p - q = \log(x + y)$

   b) $xp - yp = y^2 - x^2$

5. Solve $4r + 12s + 9t = e^{3x-2y}$ where symbol's have their usual meaning.

6. Determine the analytic function whose real part is $e^{3x}(x \cos 2y - y \sin 2y)$

SECTION-C

7. Apply Gauss-Seidel iteration method to solve the equations :

   $20x + y - 2z = 17$, $3x + 20y - z = -18$, $2x - 3y + 20z = 25$

8. Out of 800 families with 4 children each, how many families would be expected to have : a) 2 boys & 2 girls b) at least one boy c) no girl d) at most two girls Assume equal probabilities for boy's & girl's.

9. Two random samples are drawn from two normal populations are shown below:

A	17	27	18	25	27	29	13	17
B	16	16	20	27	26	25	21	

   Test whether the samples are drawn from the same normal population.

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

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE/ECE/IT/ETE/EE/ (3D Animation Engineering) / (Electronics & Computer Engineering)) (Sem.–3)

OBJECT ORIENTED PROGRAMMING USING C++

Subject Code : BTCS-305

M.Code : 56595

Date of Examination : 19-01-23

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

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

SECTION-A

1. **Explain the following :**

   a) Interface

   b) Object

   c) Destructor

   d) This pointer

   e) Static Class

   f) Nested class

   g) Friend function

   h) Call by value

   i) Identifier

   j) Pure virtual function.

SECTION-B

2. Write a note on manipulators and i/o streams.

3. What is function overriding? Discuss with help of example.

4. Discuss the features of Constructors.

5. Write a program to overload "+" operator.

6. Differentiate between static and dynamic memory allocation.

SECTION-C

7. Discuss the use of exceptional handling in programming.

8. What are the various file opening modes? Explain.

9. What are different types of inheritance? Explain.

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

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

Total No. of Pages :02

Total No. of Questions : 09

B.Tech.(3D Animation & Graphics) / (CSE) / (IT)

(Sem.–3)

DATA STRUCTURES

Subject Code : BTCS-304

M.Code : 56594

Date of Examination : 17-01-23

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

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

SECTION-A

1. **Explain the following :**

   a) Overflow

   b) Dangling pointers

   c) Deque

   d) Infix expression

   e) Heaps

   f) In degree in graphs

   g) Arrays

   h) Sparse matrix

   i) Rehashing

   j) Big 'O' notation.

SECTION-B

2. Write a note on Arrays.

3. Write an algorithm to insert a node in doubly linked list.

4. Differentiate between BFS and DFS in graphs.

5. Write an algorithm for binary search.

6. Perform bubble and quick sort on given array.

   55, 47, 88, 12, 30, 99, 23, 65, 71

SECTION-C

7. Create a BST of 15 nodes. Write all 3 traversals.

8. What is a heap tree? Write an algorithm for heap sort.

9. What do you mean by infix, prefix and postfix expressions? How to evaluate postfix?

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

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

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (Artificial Intelligence & Machine Learning / Artificial Intelligence (AI) and Data Science / Artificial Intelligence / CSE / Data Science / IT / CSE (Internet of Things and Cyber Security including Block Chain Technology) / Computer Engg.)

B.Tech. (CSE) (Artificial Intelligence & Machine Learning) / (CSE) (Cyber Security) / (CSE) (Data Science) / (CSE) (IOT) (Sem.–3)

DIGITAL ELECTRONICS

Subject Code : BTES-301-18

M.Code : 76435

Date of Examination : 12-01-23

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

Write briefly :

a) Convert binary number 11010101 into octal and hexadecimal numbers.

b) Explain ASCII codes.

c) Give the applications of Gray codes.

d) State De-Morgan's Theorem.

e) Describe Minterms and Maxterms.

f) Draw half adder circuit diagram.

g) What do you mean by Ripple counters?

h) Draw SIPO, SISO, PISO and PIPO shift registers.

i) Enlist various memories.

j) Classify D/A conversion techniques.

SECTION-B

2. Design all other logic gates using 2 inputs NOR gates.

3. Minimize the function $F = \sum m (1,2,3,5,6,8,9)$ using K-Map.

4. Design Full subtracter with truth table, circuit diagrams.

5. Design mod-6 up counter.

6. Draw and explain complex programmable logic devices.

SECTION-C

7. Design BCD to 7 segment decoder.

8. Explain counter type analog to digital converters.

9. Encode Decimal number 56 into binary, octal, hexadecimal, BCD, Gray and Excess 3 codes.

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

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

Total No. of Questions : 09

B.Tech. (AI&ML / AI / DS / CE / CSE) (Sem.–4)

OPERATING SYSTEMS

Subject Code : BTCS-402-18

M.Code : 77628

Date of Examination : 22-11-2023

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

SECTION-A

1. **Explain the following :**

   a) Security

   b) Semaphores

   c) Non-Preemptive

   d) Booting Process

   e) Virtual Memory

   f) Hard RTS

   g) Multi-processing OS

   h) Turnaround Time

   i) Physical Address

   j) Shell.

SECTION-B

2. What is a process control block? Explain with help of a diagram.

3. Write a note on deadlocks. How they occur and how they are prevented?

4. Differentiate between internal fragmentation and external fragmentation.

5. Explain the concept of Synchronization.

6. What is arrival time of a process? Suppose a new process in a system arrives at an average of six processes per minute and each such process requires an average of 8 seconds of service time. Estimate the fraction of time the CPU is busy in a system with a single processor.

SECTION-C

7. What are various CPU scheduling criterias? Explain with the help of example.

8. List down various protection problems that an operating system might have to deal.

9. A timesharing system is to be designed to support a large number of users. List all the considerations which choices of times slice. Justify each consideration.

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

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

Total No. of Questions : 09

Total No. of Pages : 03

B.Tech (AI &ML / AI & DS / CSE / ECE) (Sem.–4)

UNIVERSAL HUMAN VALUES

Subject Code : HSMC-122-18

M.Code : 77630

Date of Examination : 11-12-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A** is compulsory contains objective type questions carry TWO marks each.
2. SECTION-B contains FIVE short answer type questions carry FIVE marks each attempt any FOUR.
3. SECTION-C contains THREE descriptive answer type questions carry TEN marks each attempt any TWO.

SECTION-A

(10 × 2 = 20)

1. Answer briefly :

a) What is the difference between prosperity and wealth?

समृद्धि और धन के बीच क्या अंतर है?

ਖੁਸ਼ਹਾਲੀ ਅਤੇ ਅਮੀਰੀ ਦੇ ਵਿੱਚ ਕੀ ਅੰਤਰ ਹੈ?

b) Explain Natural Acceptance.

सहज स्वीकृति समझाओ।

ਕੁਦਰਤੀ ਮੰਜੂਰੀ ਸਮਝਾਓ।

c) How the value "care" is related with body.

मूल्य ''ध्यान'' शरीर के साथ कैसे संबंधित है?

ਮੁੱਲ ਧਿਆਨ ਸਰੀਰ ਦੇ ਨਾਲ ਕਿਵੇਂ ਸਬੰਧਤ ਹੈ?

d) What are the different patterns of differentiation?

भेदभाव के विभिन्न पैटर्न क्या हैं?

ਫਰਕ ਦੇ ਵੱਖ ਵੱਖ ਪੈਟਰਨ ਕੀ ਹਨ?

e) What is Gratitude?

कृतज्ञता क्या है?

ਕ੍ਰਿਤਗਿਅਤਾ ਕੀ ਹੈ?

f) What is innateness?

स्वाभाविकता क्या है?

ਸਵਾਭਾਵਿਕਤਾ ਕੀ ਹੈ?

g) What is Existence?

अस्तित्व क्या है?

ਅਸਤੀਤਵ ਕੀ ਹੈ?

h) What is Utility-Value ?

उपयोगिता-मूल्य क्या हैं?

ਉਪਯੋਗਿਤਾ-ਮੁੱਲ ਕੀ ਹੈ?

i) What is cyclic production?

चक्रीय उत्पादन क्या है?

ਚੱਕਰੀ ਉਤਪਾਦਨ ਕੀ ਹੈ?

j) What do you mean by values or human values?

मूल्यों या मानवीय मूल्यों से आप क्या समझते हैं?

ਕਦਰਾਂ-ਕੀਮਤਾਂ ਜਾਂ ਮਨੁੱਖੀ ਕਦਰਾਂ-ਕੀਮਤਾਂ ਤੋਂ ਤੁਹਾਡਾ ਕੀ ਭਾਵ ਹੈ?

SECTION-B

(4 × 5 = 20)

2. What do you mean by Animal Consciousness and Human Consciousness? How is the transformation possible form Animal consciousness to human Consciousness?

आपका पशु चेतना और मानव चेतना से क्या मतलब है? पशु चेतना से मानव चेतना परिवर्तन कैसे संभव है?

ਤੁਹਾਡਾ ਪਸ਼ੂ ਚੇਤਨਾ ਅਤੇ ਮਨੁੱਖੀ ਚੇਤਨਾ ਤੋਂ ਕੀ ਮਤਲਬ ਹੈ? ਪਸ਼ੂ ਚੇਤਨਾ ਤੋਂ ਮਨੁੱਖੀ ਚੇਤਨਾ ਤੱਕ ਦੀ ਤਬਦੀਲੀ ਕਿਸ ਤਰ੍ਹਾਂ ਸੰਭਵ ਹੈ?

3. What is the difference between belief and understanding?

विश्वास और समझ में क्या अंतर है?

ਵਿਸ਼ਵਾਸ ਅਤੇ ਸਮਝ ਵਿੱਚ ਕੀ ਅੰਤਰ ਹੈ?

4. What is the need for value education in technical and other professional Institutions?

तकनीकी एवं अन्य व्यावसायिक संस्थानों में मूल्यपरक शिक्षा की क्या आवश्यकता है?

ਤਕਨੀਕੀ ਅਤੇ ਹੋਰ ਪੇਸ਼ੇਵਰ ਸੰਸਥਾਵਾਂ ਵਿੱਚ ਮੁੱਲ ਦੀ ਸਿੱਖਿਆ ਦੀ ਕੀ ਲੋੜ ਹੈ?

5. What are the basic guidelines of value education?

मूल्य शिक्षा की बुनियादी दिशानिर्देश क्या हैं?

ਮੁੱਲ ਸਿੱਖਿਆ ਦੀ ਬੁਨਿਆਦੀ ਦਿਸ਼ਾਨਿਰਦੇਸ਼ ਕੀ ਹਨ?

6. What are the basic requirements to fulfill human aspirations? Indicate their correct priority.

मानवयी आकांक्षाओं की पूर्ति के लिए मूलभूत आवश्यकताएं क्या हैं? उनकी सही प्राथमिकता बताएं।

ਮਨੁੱਖੀ ਇੱਛਾਵਾਂ ਨੂੰ ਪੂਰਾ ਕਰਨ ਲਈ ਬੁਨਿਆਦੀ ਲੋੜਾਂ ਕੀ ਹਨ? ਉਹਨਾਂ ਦੀ ਸਹੀ ਤਰਜੀਹ ਦਰਸਾਓ।

SECTION-B

(2 × 10 = 20)

7. What do you understand by competgence in professional ethics? Elaborate.

आप व्यावसायिक नैतिकता में दक्षता से क्या समझते हैं? समझाओ।

ਤੁਸੀਂ ਪੇਸ਼ੇਵਰ ਨੈਤਿਕਤਾ ਵਿੱਚ ਯੋਗਤਾ ਵਲੋਂ ਕੀ ਸੱਮਝਦੇ ਹੋ? ਸਮਝਾਓ।

8. How do realization and understanding lead to the definiteness of human conduct?

बोध और समझ मानव आचरण की निश्चितता की ओर कैसे ले जाते हैं?

ਬੋਧ ਅਤੇ ਸਮਝ ਮਨੁੱਖੀ ਆਚਰਣ ਦੀ ਨਿਸ਼ਚਿਤਤਾ ਵੱਲ ਕਿਵੇਂ ਅਗਵਾਈ ਕਰਦੀ ਹੈ?

9. List some of the specific criteria for holistic evaluation of technologies. Elaborate on any two of them.

प्रौद्योगिकियों के समग्र मूल्यांकन के लिए कुछ विशिष्ट मानदंडों की सूची बनाएं। उनमें से किन्हीं दो पर विस्तार से प्रकाश डालिए।

ਤਕਨਾਲੋਜੀਆਂ ਦੇ ਸੰਪੂਰਨ ਮੁਲਾਂਕਣ ਲਈ ਕੁਝ ਖਾਸ ਮਾਪਦੰਡਾਂ ਦੀ ਸੂਚੀ ਬਣਾਓ। ਇਹਨਾਂ ਵਿੱਚੋਂ ਕਿਸੇ ਦੋ ਬਾਰੇ ਵਿਸਤਾਰ ਵਿੱਚ ਦੱਸੋ।

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

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

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

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (AI&ML/AI & Data Science/CE/CSE) (Sem.–4)

COMPUTER ORGANIZATION AND ARCHITECTURE

Subject Code : BTES-401-18

M.Code : 77627

Date of Examination : 05-12-2023

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 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 I/O subsystem?

b) Discuss ripple carry adder.

c) What is hardwired design?

d) Write functioning of SCII.

e) What is meant by non restoration?

f) Write use of DMA.

g) What are privileged instructions?

h) Discuss mapping function.

i) Briefly explain block size.

j) What are pipeline hazards?

SECTION-B

2. Briefly explain computer instructions formats and sets.

3. What do you understand by interrupt? Explain the steps through which the processor handles the interrupts.

4. What are the benefits of hardwired and microprogrammed design approaches?

5. Discuss the use of cache coherency in parallel processors.

6. How floating point representation and character representation is done in computer organization?

SECTION-C

7. Briefly explain the block diagram and instruction set of 8085 processor? How 8085 is different from 8086?

8. What is the concept of hierarchical memory organization? Discuss its benefits in computer organization.

9. Discuss the basic concept of Pipelining in data processing. How it is used in speedup?

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

00 DEC 2023

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

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

B.Tech. (CSE / AI&ML / DS / CE / IOT / CE / CSE / 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 : 24-11-2023

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

SECTION-A

1. **Answer briefly :**

a) What is a minimal spanning tree?

b) How do you compare the performance of various algorithms?

c) What is travelling salesperson problem?

d) Distinguish between deterministic and non-deterministic algorithms.

e) Give an example of dynamic programming approach.

f) What are the graph traversal techniques?

g) Do the greedy algorithms give an optimized solution?

h) What is the difference between DFS and BFS in terms of traversal of a graph?

i) What is meant by NP hard and NP-complete problems?

j) What is the time complexity of the algorithm for finding all-pairs-shortest-path problem?

(3 -705

SECTION-B

2. **Compare :**

   a) Time *vs.* Space Complexity

   b) Polynomial *vs.* exponential running Time

   c) Upper *vs.* Lower Bound

   d) Shortest path *vs.* Minimal Spanning tree

3. What are greedy algorithms? What are their characteristics? Explain any greedy algorithm with example.

4. Define depth-first search. With an algorithm for DFS, discuss its time complexity. Also illustrate with some example.

5. What is the relationship among P, NP and NP complete problems? Show with the help of a diagram.

6. What are randomized algorithms? What are their types? What are their advantages? Where these are used? Give an example of randomized algorithm.

SECTION-C

7. Order the following functions by growth rate : N, N^{15}, N^2 , N log log N , N $\log^2$ N, N log (N^2), 2/N, 2 N, $2^{N/2}$, 37, N^2 log N, N^3. Indicate which functions grow at the same rate.

8. Define spanning tree. Write Kruskal's algorithm for finding minimum cost spanning tree. Describe how Kruskal's algorithm is different from Prim's algorithm for finding minimum cost spanning tree?

9. Compare the various programming paradigms such as divide-and-conquer, dynamic programming and greedy approach.

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

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.–4)

DISCRETE STRUCTURES

Subject Code : BTCS-402

M.Code : 71106

Date of Examination : 09-01-2023

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 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

Answer briefly :

1. a) Out degree

   b) Tree

   c) Undirected Graph

   d) Hamiltonian Circuit

   e) Disjoint set

   f) Transitive relation

   g) Infix notation

   h) Injection

   i) Monoid

   j) POSETS.

SECTION-B

2. Explain the following with an example :

   Isomorphism and Automorphism

3. Prove that the intersection of two equivalence relations is an equivalence relation.

4. Show that $Z_7 = \{0, 1, 2, 3, 4, 5, 6\}$ is a group under addition modulo 7.

5. State Euler formula for connected planer graphs with help of example.

6. Solve the recurrence relation, $a_n + 5a_{n-1} + 6a_{n-2} = 3n^2 - 2n + 1$

SECTION-C

7. Explain the concept of Dijkstra's algorithm with help of example.

8. Show that the edge chromatic number of a graph must be at least as large as the maximum degree of a vertex of a graph.

9. **Write detailed note on:**

   a) Connected components in disconnected Graph

   b) Eulerian Chain

   c) Bridge.

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

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.–5)

DATABASE MANAGEMENT SYSTEMS

Subject Code : BTCS501-18

M.Code : 78320

Date of Examination : 19-12-2023

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

SECTION-A

1. **Explain briefly :**

   a) What do you mean by Data abstraction and Data independence?

   b) Differentiate between DDL and DML.

   c) Name few popular open source and commercial DBMS.

   d) What do you mean by query optimization?

   e) What is the role of indices in DBMS?

   f) What are the problems arising out of concurrency?

   g) What are the various types of database failures?

   h) What is intrusion detection in database systems?

   i) What are the features of logical database?

   j) What are web databases?

SECTION-B

2. What are integrity constraints? Why they are important?

3. Between Hashing and B-trees, which method is preferable for storing indexes in a database?

4. Explain the concept of authorization and authentication.

5. **Write short notes on :**

   a) Access control models

   b) Distributed databases

6. What is difference between Object oriented *vs.* Object relation databases?

SECTION-C

7. What is data model? State and explain various data models with suitable examples.

8. **Write notes on the following :**

   a) Relational algebra

   b) Normal forms

   c) Query processing

   d) Join strategies.

9. a) What are the ACID properties of transactions?

   b) Discuss the Lock-based and Timestamp-based protocol for concurrency control.

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

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

Total No. of Pages : 02

Total No. of Questions : 09

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

DATABASE MANAGEMENT SYSTEM

Subject Code : BTCS 501-18

M.Code : 93937

Date of Examination : 06-12-2023

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

SECTION-A

1. Write briefly :

   a. List responsibilities of DBA.

   b. Difference between a centralized and a distributed database system.

   c. What is the difference between a SELECT operation and a PROJECT operation?

   d. Define dynamic hashing.

   e. List four ACID properties of transitions.

   f. Difference between authentication and authorization.

   g. Define self-join.

   h. Define IDS.

   i. What is web database?

   j. Define referential integrity constraint.

SECTION-B

2. Explain about the Network model used in database management systems.

3. Why do we need normalization of database? Explain 3NF.

4. How does a B-tree maintain balance during insertions and deletions? Explain the process.

5. What is Mandatory Access Control (MAC) in the context of database security, and what sets it apart from DAC?

6. What is a "race condition" in database concurrency control and how can it be problematic?

SECTION-C

7. What is query optimization? Describe the difference between logical and physical query optimization and how does the query optimizer determine the best execution plan for a given SQL query?

8. What is concurrency control? Explain the term "serializability" and how it relates to ensure a high level of data consistency in concurrent database transactions?

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

   a. Object oriented databases

   b. Difference between logical and physical database recovery.

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

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

Total No. of Questions : 09

Total No. of Pages : 02

B.Tech. (CSE) (Sem.–5)

WEB TECHNOLOGIES

Subject Code : BTCS520-18

M.Code : 78326

Date of Examination : 14-12-2023

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 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) Meta Tags

b) SSL

c) MySQL

d) GET method

e) XMLHttpRequest

f) Sessions

g) Operators

h) DNS

i) HTTPS

j) Cookies.

SECTION-B

2. Explain the Structure of HTML Program.

3. Explain various types of control statements available in PHP.

4. Write short note on style sheets.

5. Write steps to connect MySql database in a PHP Program? Explain with the help of an example.

6. What is DOM explain in detail?

SECTION-C

7. What is the role of Client/Server programming in the web designing

8. Explain structure of HTML program and also design a web page by adding audios, videos, tables, images and lists.

9. Write advantages and disadvantages of AJAX and also explain how we can read and write JSON on client and server?

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

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

Total No. of Pages : 02

Total No. of Questions : 09

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

JAVA PROGRAMMING

Subject Code : BTAIML 509-20

M.Code : 93951

Date of Examination: 09-12-2023

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

SECTION-A

1. Write briefly :

   a) Differentiate between Java and C.

   b) What is Inheritance?

   c) Briefly explain constructors.

   d) Discuss some special operators used in Java.

   e) What are Abstract methods?

   f) Discuss the Package.

   g) Write the need of Multithreading in Java.

   h) Discuss Interface.

   i) Give use of Web Applications.

   j) Discuss Java utilities.

SECTION-B

2. What do you understand by Java virtual machine?
3. Discuss various nested methods and statements available in Java.
4. By taking an example show the use of Arrays in Java.
5. What are the Swing components in Java? How they are used in GUI Programming?
6. Give the introduction of JDBC and its architecture.

SECTION-C

7. What is GUI Programming? Discuss its various components with example.
8. What are exceptions in Java? How Try and Catch are used to handle the exception?
9. Explain the concept of servlets. Discuss its lifecycle.

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

10 DEC 2023

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

Total No. of Questions : 09

B.Tech. (AI / Data Science) (Sem.–5)

ARTIFICIAL INTELLIGENCE

Subject Code : BTAIML502-20

M.Code : 93940

Date of Examination : 28-11-2023

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

SECTION-A

1. **Write briefly :**

a) Describe the term 'constraint satisfaction'.

b) What is heuristic search?

c) What is nonmonotonic reasoning?

d) Write a short note on minmax search.

e) How is first-order logic and propositional logic used in knowledge representation?

f) Discuss key challenges in knowledge representation.

g) How can the learning from examples be made more effective?

h) Discuss the disadvantages of rote learning.

i) What do you mean by knowledge acquisition?

j) How can expert systems be used to reason about uncertain knowledge?

SECTION-B

2. Differentiate between breadth-first search and depth-first search with the help of an example.

3. Differentiate between forward chaining and backward chaining discussing advantages and disadvantages of each method.

4. What is knowledge representation? Discuss various knowledge representation issues along with how these issues are addressed?

5. Differentiate between learning by taking advice and learning from examples.

6. Describe the various approaches used to represent domain knowledge in expert systems. Discuss advantages and disadvantages of each approach.

SECTION-C

7. Explain the relationship between agents and the environment. Discuss the basic structure of agents and describe the various types of agents available in artificial intelligence.

8. Explain in detail the A* search algorithm's heuristic evaluation and its significance in solving pathfinding problems.

9. What is a Bayesian network? Discuss the key components and structure of a Bayesian network along with the advantages and limitations of Bayesian networks in uncertain domains.

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

00 DEC 2023

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.–5)

SOFTWARE ENGINEERING

Subject Code : BTCS503-18

M.Code : 78322

Date of Examination : 25-11-2023

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 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 at least two advantages of Evolutionary model.

b) Explain in brief about impact of software engineering.

c) What is cohesion? Differentiate Cohesion and Coupling.

d) Explain in brief about object-oriented software development.

e) Differentiate between static and dynamic analysis.

f) Explain the concept of test case.

g) Explain the purpose of Gantt charts.

h) Explain in brief about quality management.

i) What is the purpose of software maintenance?

j) What is component based software development approach?

SECTION-B

2. Differentiate functional and non-functional requirements.

3. Explain in detail about user interface design.

4. Write a detailed note on Software reliability metrics.

5. Write a detailed note on Project Scheduling using PERT.

6. Explain in brief about Software reuse.

SECTION-C

7. Write a detailed note on Waterfall Model.

8. Write a detailed note on DFD. How DFDs are significant for Software Engineering? Explain.

9. Write a detailed note on ISO and SEI CMMI.

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

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Computer Science & Engineering)(Sem.–5)

FORMAL LANGUAGE & AUTOMATA THEORY

Subject Code : BTCS-502-18

M.Code : 78321

Date of Examination: 23-11-2023

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 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 a formal language and how is it different from a natural language?

b) Define the term "alphabet" in the context of formal languages.

c) How do we represent Grammar?

d) Define NDFA.

e) The regular expression ab*c will give_____?

f) What is context sensitive grammar?

g) Define LBA.

h) What is NP Complete problem?

i) Define Intractability.

j) Define NFA.

SECTION-B

2. Describe the acceptance criteria for both NFAs and DFAs. How does each type of automaton determine whether a given input string is accepted or rejected?

3. What is PDA? How does a PDA handle the recognition of context-free languages and what role does its stack play in this process?

4. Explain the concept of a Linear Bounded Automaton (LBA) and how it relates to the recognition of context-sensitive languages?

5. Describe the operation of a Turing Machine in terms of reading and writing symbols on the tape, state transitions and halting conditions.

6. Explain the concept of Hamiltonian Cycle in Graphs.

SECTION-C

7. Discuss the different applications of Formal Language and Automata Theory.

8. Explain the three key components of the Pumping Lemma: the pumping length, the string decomposition and the pumping condition. How does the Pumping Lemma help in proving that a language is not regular?

9. Write a short note on :

   a) Difference between Decidability and undecidability.

   b) Cook Levin Theorem for satisfiability.

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

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

Total No. of Questions : 09

B.Tech. (CSE) (Sem.–5)

ENTERPRISE RESOURCE PLANNING

Subject Code : BTES 501-18

M.Code : 78319

Date of Examination: 17-11-2023

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

SECTION-A

1. **Write briefly :**

(a) What do you mean by Enterprise Resource Planning (ERP)?

(b) List the benefits of ERP.

(c) What is Data warehousing?

(d) What is Reengineering?

(e) What is Data Mining?

(f) What do you mean by SCM?

(g) What is the importance of Project Monitoring?

(h) What is Peoplesoft?

(i) What is Oracle?

(j) What is an Enterprise? Give an overview.

SECTION-B

2. Explain the term Hidden costs.

3. Explain an On-line Analytical Processing (OLAP) in detail.

4. What is ERP package?

5. What is the relation between ERP and internet?

6. Explain the term JD Edwards.

SECTION-C

7. Explain the important activities in Plant Maintenance.

8. Explain the business models in an ERP package.

9. Explain the term ERP and E-commerce.

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

00 DEC 2023

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

Total No. of Questions : 09

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

STATISTICAL COMPUTING TECHNIQUES USING R

Subject Code : BTES 501-20

M.Code : 93936

Date of Examination: 20-11-2023

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 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) Words

   b) Vectors

   c) Objects

   d) Workspace

   e) Matrices

   f) Iteration

   g) Mean

   h) Standard Deviation

   i) Simulation

   j) Box plot.

SECTION-B

2. Differentiate between data in and data outside the system.

3. Describe subsetting system defined functions.

4. Write a note on coherence of the workspace.

5. Discuss exploratory data analysis and standard deviation.

6. Explain chi-square goodness of fit.

SECTION-C

7. Describe in detail the programming using R as a calculator.

8. Explain in detail random number generation distribution.

9. Discuss regression and generalized linear models.

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

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.–5)

FORMAL LANGUAGE AND AUTOMATA THEORY

Subject Code : BTCS 502-18

M.Code : 78321

Date of Examination: 17-12-2022

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) If A={a,b} and B={b,c}, find A* U B*

b) Which are the two finite automata that produce output? Define any one.

c) Design a DFA that accepts set of all strings over (a, b) that does not contain the string 'aabb' in it.

d) Convert the regular expression (a+b) c to its equivalent Finite Automata.

e) State Ambiguous Grammar. Also give example.

f) What is right Derivation tree? Give example.

g) State Kleene's theorem.

h) What is Cellular automata and what it is used for?

i) State Cook-Levin theorem.

j) What is tractable and intractable problem?

SECTION-B

2. Differentiate Mealy and Moore machines.

3. Construct a minimum DFA equivalent to the DFA described by:

State	0	1
$\rightarrow q_0$	q_1	q_5
q_1	q_6	q_2
(q_2)	q_0	q_2
q_3	q_2	q_6
q_4	q_7	q_5
q_5	q_2	q_6
q_6	q_6	q_4
q_7	q_6	q_2

4. Design a NFA for a language that accepts all strings over {0, 1} in which the second last symbol is always '1'. Then convert it to its equivalent DFA.

5. What is Pushdown Automata? Construct a PDA that accepts:

$$L= \{0^n 1^n \mid n >= 0\}$$

6. Construct a Mealy Machine that prints 'a' whenever the sequence '01' is encountered in any input binary string and then convert it to its equivalent Mealy Machine.

SECTION-C

7. What is Turing machine? Design a Turing Machine which recognizes the language

$$L=0^N 1^N$$

8. Describe pumping lemma for regular languages with the help of example.

9. Define Greibach Normal Form. Convert the following Context Free Grammar to Greibach Normal Form:

$$P : S \rightarrow CA \mid BB, B \rightarrow b \mid SB, C \rightarrow b, A \rightarrow a$$

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

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

Total No. of Questions : 09

B.Tech. (CSE) (Sem.–5)

WEB TECHNOLOGIES

Subject Code : BTCS-520-18

M.Code : 78326

Date of Examination : 07-01-2023

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 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 Web Server?

   b) What is the purpose of name space?

   c) What is DHTML?

   d) What is Proxy Server?

   e) What is XML? List two characteristics of XML.

   f) What are Cookies?

   g) Differentiate between 'Get' and 'Post' methods in PHP.

   h) What is the role of CSS in HTML?

   i) Why JavaScript is used in HTML?

   j) What is the use of JSON?

SECTION-B

2. What are the drawbacks of HTML? How are they addressed in XML?

3. Define Array. How can we declare one dimensional and two-dimensional array in PHP?

4. Briefly explain the control flow statements in Java script with example.

5. What is the syntax of declaring an attribute in a DTD?

6. How to create a table in HTML? Explain with relevant example.

SECTION-C

7. a) Explain database connectivity in PHP with reference to MYSQL.

   b) Define Session and Cookies. Explain with an example program.

8. Discuss AJAX architecture and compare it with DOM.

9. Write a short note on the following

   a) Web Browser

   b) Jason Schema

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

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.–5)

COMPUTER NETWORKS

Subject Code : BTCS-504-18

M.Code : 78323

Date of Examination : 04-01-2023

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 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 the advantages of Bus network topology.

   b) Define the term Multiplexing.

   c) What do you mean by Hamming Distance? Explain.

   d) Explain in brief about Pure ALOHA.

   e) Explain the term RARP.

   f) Explain in brief about the term DHCP.

   g) Explain briefly the effects of Congestion.

   h) What are the characteristics of Quality of Service (QoS)?

   i) Explain the term WWW in brief.

   j) What do you mean by Cipher Text in reference to cryptography?

SECTION-B

2. Differentiate between Wired and Wireless Networks in detail.

3. Write a detailed note on CSMA/CD.

4. What is IP addressing? How it is classified? Also briefly explain about subnets.

5. Write a detailed note on Leaky Bucket Algorithm.

6. Explain in detail about Firewalls.

SECTION-C

7. Write a detailed note on Transmission Media.

8. Write a detailed note on Link State Routing Protocol.

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

   (a) DDNS

   (b) HTTP

   (c) Bluetooth

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

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engineering) (Sem.–5)

PROGRAMMING IN JAVA

Subject Code : BTEC-905D-18

M.Code : 78710

Date of Examination : 10-01-2023

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 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) Method overriding

   b) Constructor

   c) Interface

   d) Packages

   e) Thread

   f) JDBC

   g) Synchronization

   h) Exception

   i) Scanner class

   j) I/O Streams

SECTION-B

2. List the features of Java Programming Language.

3. Explain the need of Wrapper classes in Java.

4. Why multiple inheritance is not part of java and how we can achieve multiple inheritance java?

5. Discuss the concept of Exception Handling in detail.

6. Discuss various Stream Classes present in Java to manage I/O.

SECTION-C

7. Write steps how we can create and use Package in Java.

8. Explain CORBA. Java Beans, RM1,

9. What is Java IDL? Explain in detail.

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

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.–5)

SOFTWARE ENGINEERING

Subject Code : BTCS-503-18

M.Code : 78322

Date of Examination : 02-01-23

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

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

SECTION-A

1. Write briefly :

a) What do you mean by software configuration management?

b) Differentiate between verification and validation.

c) What is cyclomatic complexity?

d) How two processes are joined in DFD?

e) What is software reuse?

f) What is test coverage?

g) What is SRS?

h) Define feasibility study.

i) What is data dictionary?

j) Define coding standards.

SECTION-B

2. What is the Difference between Gantt and PERT Chart? Explain with the help of an example.

3. Differentiate between functional and non-functional requirements and explain them.

4. Explain component-based software development.

5. Explain the scheduling of software project.

6. Explain the waterfall model with the help of diagram.

SECTION-C

7. Explain black box testing methods and its advantages and disadvantages.

8. Explain Water fall Model. What are the problems that are sometimes encountered when the waterfall model is applied?

9. What are the characteristics of a good design? Describe different types of coupling and cohesion. How design evaluation is performed?

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

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

Total No. of Questions : 09

B.Tech. (CSE) (Sem.–5)

DATABASE MANAGEMENT SYSTEM

Subject Code : BTCS-501-18

M.Code : 78320

Date of Examination : 15-12-22

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 DBMS

b) What is a view level?

c) State 1 NF.

d) What is meaning of functional dependence?

e) Difference between alter and update?

f) What is entity integrity Constraint?

g) Define view serializability.

h) Define deadlock in transactions.

i) What is access control?

j) What is database recovery?

SECTION-B

2. What is the need of DBMS and discuss in detail the different DBMS Models.

3. Define Normalization. Explain 3NF and BCNF with the help of a suitable example.

4. What is the concept of locking techniques? Discuss the Two-phase locking protocol.

5. Explain the concept of ACID properties with the help of suitable example.

6. Explain the concept of authorization and authentication

SECTION-C

7. What are different data models used in DBMS? Discuss in detail about the ER Model used in the RDBMS.

8. Explain different types of Joins used in RDBMS with the help of example and why do we use self-join?

9. Write a short note on :

   a) Object Relational Databases

   b) Query Optimization

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

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.–5)

ENTERPRISE RESOURCE PLANNING

Subject Code : BTES-501-18

M.Code : 78319

Date of Examionation : 24-01-2023

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 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. SCM

   b. BPR

   c. Vendor

   d. Planning

   e. Disadvantages of ERP

   f. Human Resource Management

   g. SSA

   h. PeopleSoft

   i. QAD

   J. OLAP

SECTION-B

2. What do you understand by Business process Reengineering?

3. Explain in detail the ERP Implementation methodology.

4. How does ERP helps in Human Resource and Finance Management?

5. Explain the role played by Oracle in ERP Market Place.

6. How Internet is helping in the growth of ERP?

SECTION-C

7. Explain in detail the Parameters involved in ERP Implementation.

8. Explain the benefits of the ERP Package achieved at different levels of business modules.

9. Write a note on Data warehousing, Data mining, and OLAP in enhancing the capabilities of ERP.

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

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engg.) (Sem.–5)

CONTROL SYSTEMS

Subject Code : BTEC-504-18

M.Code : 78300

Date of Examination : 20-12-2022

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

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

SECTION-A

1) **Write briefly :**

a) What do you mean by Industrial Control system?

b) What do you mean by Transfer function?

c) Define Closed loop systems with example.

d) What are Techo generators?

e) What is Transient accuracy?

f) Explain the Routh Hurwitz criterion of stability.

g) What do you mean by Lead comensation?

h) What do you mean by Steady state errors?

i) What are Eigen values and Eigen vectors?

j) What is Gain margin?

SECTION-B

2. Using Routh Hurwitz stability criterion, determine whether the following system is stable or not $S^4 + 2S^3 + 3S^2 + 4S + 5 = 0$

3. Draw the polar plot for the following open loop transfer function of a closed loop system control system.

$$G(s)\,H(s) = 5/s(s + 1)\,(s + 2)$$

4. What are Bode plots? Explain Magnitude plot and Phase plot.

5. Derive the expressions for resonant peak and resonant frequency and hence establish the correlation between time response and frequency response.

6. a) Define state and state variable.

   b) What is state equation?

SECTION-C

7. a) The transfer function relating the input x (t) to the output y(t) of a system is given by $G(s) = 1/s + 3$. A unit step input is applied to the system at time $t = 0$. Assuming that $y(0) = 3$, the value of y (t) at time $t = 1$.

   b) List the properties of signal flow graph.

8. Define steady state error? Derive the static error components for Type 0, Type 1 and Type 2 systems.

9. a) What is the characteristic equation? List the significance of characteristic equation.

   b) The system has $G(s) = K/(1+ST)$ with unity feedback where K & T are constant.

   Determine the factor by which gain 'K' should be multiplied to reduce the overshot from 75% to 25%?

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

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ECE) (Sem.–5)

LINEAR INTEGRATED CIRCUITS

Subject Code : BTEC-503-18

M.Code : 78299

Date of Exaination : 17-12-2022

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 Level translator circuit?

b) What is input offset voltage?

c) Define Common Mode Rejection Ratio (CMRR).

d) Define slew rate.

e) What are the characteristics of Ideal Op-Amp?

f) State the difference between Differentiator and Integrator and give one application of each.

g) What does order of filter signifies?

h) List the applications of 555 timer.

i) Why positive feedback is used in oscillators?

j) What is the principle of switching regulator?

SECTION-B

2. Compare Current Mirror Circuit and Constant Current Bias Circuit.

3. Define differential and common mode gain of an Op-Amp. Find the common mode gain of Op-Amp having a differential voltage gain of 2×10^5 and CMRR of 120 dBs.

4. Discuss the application of op-amp as an inverting and non-inverting adder.

5. The input to an op-amp integrator circuit is a sinusoidal voltage of peak value 10μV and frequency of 2KHz. If the values of integrating components are given as R=40 kΩ and C=5 μF, determine the output voltage.

6. What are the advantages of active filters over passive filters? Design a second order Butterworth high-pass filter with lower cut-off frequency of 2.5 KHz.

SECTION-C

7. a) Explain the circuit diagram of a differentiator circuit. Derive an expression for the output voltage.

   b) Explain how 555 timer used as Schmitt trigger?

8. Explain principle and working of PLL. Also, write down its applications.

9. **Write short notes on:**

   a) Fixed and Adjustable Voltage Regulator.

   b) V to F and F to V converters.

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

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

Total No. of Questions : 09

B.Tech. (Sem.–5)

DIGITAL SIGNAL PROCESSING

Subject Code : BTEC-502-18

M.Code : 78298

Date of Examination : 15-12-22

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

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

SECTION-A

1. **Write briefly :**

   a) List three advantages of digital signal processing.

   b) Define sine function.

   c) Where do we use z-transform?

   d) Relate Discrete-Time Fourier Transform and Discrete Fourier Transform

   e) What is the importance of twiddle factor in DFT?

   f) How convolution is helpful in determining system response?

   g) Give suitable example of an LTI system.

   h) State importance of stable-causal-LTI systems in real-world perspectives.

   i) Differentiate correlation and auto-correlation.

   j) State Sampling Theorem for low pass signals.

SECTION-B

2. Determine circular convolution of $x(n) = [1\ 2\ 3\ 1]$ and $h(n) = [1\ 2\ 2\ 1]$.

3. Compare advantages and disadvantages of FIR and IIR Filters?

4. What is twiddle factor? Explain the Radix-2 FFT algorithm with example.

5. State and prove any four properties of z-transform.

6. Relate Fourier Series, Fourier Transform and Discrete Fourier Transforms.

SECTION-C

7. a) Find z-transform of $x(n) = \left(\frac{1}{2}\right)^n u(n)$ signal and discuss its ROCs

   b) Determine inverse z-transform of $X(z) = \frac{1}{(1-z^{-1})(2-z^{-1})}$

8. Discuss various structures for realization of discrete systems with suitable examples.

9. Discuss architecture of ADSP with suitable diagram.

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

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

Total No. of Questions : 09

B.Tech. (ECE) (Sem.–5)

ANALOG AND DIGITAL COMMUNICATION

Subject Code : BTEC-501-18

M.Code : 78297

Date of Examination : 13-12-22

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 ramp signal.

   b) Explain white noise.

   c) Explain sampling process.

   d) What are the advantages of VSB modulation?

   e) Differentiate between delta and adaptive delta modulation.

   f) Explain Nyquist criterion.

   g) What do you mean by ISI?

   h) Define digital modulation.

   i) Enlist various modulation techniques.

   j) Explain pulse transmission.

SECTION-B

2. Draw and explain SSB modulation and demodulation.

3. Derive the expression for probability of error evaluations.

4. Explain digital multiplexers with block diagrams.

5. Draw and explain Quadrature amplitude modulation technique.

6. Describe pre-emphasis and de-emphasis.

SECTION-C

7. Explain pulse code modulation technique block diagram of transmission and reception.

8. Give the representation of noise in amplitude modulation and angle modulation system.

9. With the help of waveforms, explain minimum shift keying modulation technique.

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

00 DEC 2023

T

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

Total No. of Questions : 09

B.Tech. (CSE) (Sem.–6)

MOBILE APPLICATION DEVELOPMENT

Subject Code : BTCS620-18

M.Code : 79258

Date of Examination : 02-12-2023

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 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 Android SDK? Give its main features.

b) What do you mean by device compatibility in Android application?

c) What is JVM?

d) What is JDK?

e) What is a User Interface on a mobile machine?

f) Is Android SDK open-source? Justify.

g) What are mobile agents?

h) What are system permissions in Android?

i) Define activity life cycle.

j) What is the Android stack?

SECTION-B

2. Explain Android architecture in detail.

3. How mobile application is integrated with GPS?

4. Why web services are required in Android application deployment?

5. Discuss the Android SDK GUI elements in application design

6. How graphics and multimedia contents are embedded in Android applications?

SECTION-C

7. What is SQLite? How it is connected with UI? Give an example to establish a connection.

8. What is screen-casting? How you will cast your Android screen with other applications? Give an example to cast a screen with Google Home.

9. What is Kotlin and Jetpack Compose? Describe important features of Kotlin and Compose. Which tool of these provides faster application development?

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

0 0 DEC 2023

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem–6)

MACHINE LEARNING

Subject Code : BTCS618-18

M.Code : 79257

Date of Examination : 29-11-2023

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

SECTION-A

1. **Write briefly :**

a) Differentiate between supervised and unsupervised learning.

b) What are the features in the context of machine learning?

c) What do you mean by Data Transformation? Explain.

d) What is the need of Data pre-processing?

e) Define the term Mean absolute error.

f) Explain the need of polynomial regression.

g) What is logistic regression and how does it differ from linear regression?

h) What is the primary objective of a Support Vector Machine (SVM) in a classification problem?

i) What is Fitness function in reference to Genetic Algorithms?

j) What is a Genetic Algorithm and how is it inspired by natural evolution?

(S-965

SECTION-B

2. Explain the concept of Supervised learning along with its advantages and disadvantages.
3. Write a detailed note on Data Integration.
4. Write a detailed note on Multiple Linear Regression.
5. Explain Naive Bayes Algorithm in detail.
6. Write a detailed note on need and applications of Artificial Neural Network.

SECTION-C

7. **Write a detailed note on following :**
   a) Reinforcement Learning
   b) Well-posed learning problems
8. **Explain in detail about following in reference to Artificial Neural Networks :**
   a) Neural Network representation and working.
   b) Activation functions.
9. **Write a detailed note on following algorithms :**
   a) Decision Tree
   b) K-Nearest Neighbours (K-NN)

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

00 DEC 2023

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

Total No. of Questions : 09

B.Tech. (ECE/IT/CSE/EE/AIML/CE/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 : 03-01-2024

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 forward CDMA and reverse CDMA channel?

b) What is adjacent channel interference?

c) What is the difference between soft and hard handoff?

d) What is the difference between Pure and Slotted ALOHA?

e) Define rms and excess delay spread of a fading channel.

f) Differentiate between CDMA and SDMA.

g) Define selection combining techniques.

h) What is cell splitting?

i) Define frequency selective fast fading channel.

j) What is doppler spread and coherence time?

SECTION-B

2. With the help of a block diagram of basic cellular system, explain the operation and planning of cellular system.

3. With the help of cosine law and hexagon cell geometry, prove that for a hexagonal cell geometry, the co-channel reuse ratio is given by $Q = \sqrt{3N}$, where $N = i^2 + j^2 + i\,j$.

4. Explain IS-54 and IS-136 US digital cellular system along with their key parameters.

5. What are the advantages of spread spectrum multiple access over FDMA and TDMA? Explain direct sequence spread spectrum in detail.

6. Explain the frame structure and different services of the GSM.

SECTION-C

7. With the help of proper mathematical expression, explain how maximal ratio and equal combining improves the performance of communication system?

8. How signal bandwidth, symbol period, channel coherence time and doppler spread is used to determine the nature of fading? Explain different types of fading based on these parameters.

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

   a) CDMA 2000 standards and its specification.

   b) Bluetooth and Zigbee.

   c) 4G & 5G Mobile Techniques.

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

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

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (CSE) (Sem.–6)

MOBILE APPLICATION DEVELOPMEN

Subject Code : BTCS-620-18

M.Code : 79258

Date of Examination : 19-12-2022

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

Write briefly :

1. Mobile agents
2. Android multimedia
3. Broadcast receiver.
4. Emulator.
5. System permission.
6. Activity State
7. SQLite
8. List any two SMS APIs.
9. Shared preferences.
10. Two limitation of Android OS.

SECTION-B

11. Define Activity Life Cycle? Explain with neat diagram Activity Life Cycle.

12. Define APK. Explain the steps involved in preparing App for release.

13. Demonstrate with code snippet of database operation with SQLite database.

14. With a neat diagram explain the life cycle of Services.

15. Define Shared Preferences. Differentiate between Shared Preferences and Saved Instance State.

SECTION-C

16. Develop an application to store student details like roll no, name, branch, marks, percentage and retrieve student information using roll no. in SQLite databases.

17. What are the security issues in the Android? Explain the remedies to resolves security issues in Android.

18. Explain the Android architecture with the help of neat diagram.

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

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.–6)

MACHINE LEARNING

Subject Code : BTCS-618-18

M.Code : 79257

Date of Examination : 19-12-22

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. **Define the following term:**

   a) Big Data

   b) Well-Posed Learning Problems

   c) Data Cleaning

   d) Feature scaling

   e) Mean Absolute Error

   f) Correlation

   g) SVM

   h) Logistic Regression

   i) Mutation

   j) Elistism.

SECTION-B

2. Explain need and applications of Clustering.

3. Compare Simple Linear Regression, Multiple Linear Regression and Polynomial Regression.

4. What is the difference between training set and test set?

5. Compare Supervised, Unsupervised and Reinforcement Learning.

6. How decision trees are used in Machine Learning?

SECTION-C

7. Define Machine Learning. Explain the basic machine learning workflow. Discuss the advantages and challenges of machine learning.

8. Explain the concept of classification in detail.

9. Write need and application of Artificial Neural Network.

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

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

Total No. of Pages : 02

Total No. of Questions : 18

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

CLOUD COMPUTING

Subject Code : BTCS-612-18

M.Code : 79254

Date of Examination : 14-12-22

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

Answer Briefly :

1. Virtualization
2. PaaS
3. Authorization
4. Azure
5. Resource Management
6. Hybrid Cloud
7. Service Hijacking
8. Elasticity
9. Data Leak
10. Data Security.

SECTION-B

11. Differentiate between grid, utility and cloud computing.

12. Explain the role of hypervisors and API in cloud computing.

13. Compare existing cloud deployment models.

14. How migration to cloud happens? Explain its steps.

15. What do you understand by internal security breach? Explain measures involved in reducing it.

SECTION-C

16. Explain in detail driving factors for migrating to a cloud.

17. Write a note on security dangers associated with cloud computing.

18. Explain in detail various cloud service models available, along with their examples.

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

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.–6)

ARTIFICIAL INTELLIGENCE

Subject Code : BTCS-602-18

M.Code : 79250

Date of Examination : 16-12-2022

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) Artificial Intelligence

(b) Intelligent agent

(c) Best, first search

(d) Random search

(e) Conditional probability

(f) Hidden Markov model

(g) Markov decision process

(h) Partially observable Markov decision process

(i) Passive reinforcement learning

(j) Adaptive dynamic programming.

SECTION-B

2. Differentiate between tree and graph structures.

3. "*A* Search algorithm is one of the best and popular technique used in path-finding and graph traversals*". Justify.

4. In a class, there are 70% of the students who like English and 40% of the students who likes English and Mathematics, and then what is the percent of students those who like English also like Mathematics?

5. How does value iteration work in Markov decision process?

6. Discuss the Q-learning algorithm in reinforcement learning.

SECTION-C

7. Differentiate between depth first and breadth first search.

8. Discuss the various application areas of Artificial Intelligence.

9. How Bayesian networks are represented? Explain.

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

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

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 : 12-12-2022

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

Write briefly :

1. a. Token

   b. DFA

   c. Augmented Grammar

   d. Preprocessor

   e. Loop Optimization

   f. DAG

   g. Parse tree

   h. Parsing Table

   i. Symbol Table

   j. Heap

SECTION-B

2. Explain the role of lexical analyzer.

3. Perform predictive paring cm following grammar

$$E \rightarrow TE'$$

$$E1 \rightarrow +TE' \mid \varepsilon$$

$$T \rightarrow FT'$$

$$T' \rightarrow *FT' \mid \varepsilon$$

$$F \rightarrow id \mid (E)$$

* ε denotes epsilon

4. Explain the role of basic blocks with the use of a suitable example.

5. Discuss issues of code generation in compiler design.

6. Write a note on Lex.

SECTION-C

7. Write a note on peephole optimization.

8. What is a directed acyclic graph? Discuss the procedure for construction of a directed acyclic graph with suitable example.

9. How three address code is implemented in compiler? Explain in detail.

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

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engineering) (Sem.–6)

OPTICAL FIBERS & COMMUNICATION

Subject Code : BTEC-602-18

M.Code : 79375

Date of Examination : 07-01-2023

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 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 steps index and graded index fibers?

   b) Calculate the length of DCF having dispersion coefficient of -46 ps/km, if length of SMF is 40 km with dispersion coefficient of 18.75 ps/km.

   c) Explain the phenomenon of material dispersion in optical fiber.

   d) An optical signal has lost 55% of its power after travelling 8.5 km of fiber. What is the loss in dB/km of the fiber?

   e) Give the expression for numerical aperture in graded index fibers.

   f) Describe the two methods of fiber coupling.

   g) Define macroscopic bending.

   h) Differentiate between Splices and Connectors.

   i) What width of depletion region of an *InGaAs* photo detector do we need to make its quantum efficiency 70%?

   j) What are conditions for total internal reflection?

SECTION-B

2. A p-i-n diode has a transit time of 2 nanoseconds and junction capacitance of 3 pF. If the load resistor is 50 ohms, find out whether the bandwidth is limited by transit time or capacitance.

3. Discuss the requirement for population inversion in order that stimulated emission may dominate over spontaneous emission in LED. Also give the working principle of edge emitting-LED with structural diagram. What is meant by Hetero - junction lasers? How this is different from single hetrostructure lasers. Discuss their performance characteristics.

4. What are various types of attenuation factors in optical fibers? Suggest various measures to overcome attenuation.

5. Derive the expression for calculating the power budget.

6. Explain the fiber optic receiver operation using a simple model and equivalent circuit.

SECTION-C

7. Discuss the sources of errors in optical receivers.

8. A multimode optical fiber has the specifications: core refractive index = 1.52, cladding refractive index = 1.48; core diameter = 90μm wavelength of operation = 0.85μm. Calculate :

   i) Relative refractive index difference;

   ii) Critical angle at core-cladding interface;

   iii) Acceptance angle,

   iv) Solid acceptance angle

   v) Numerical aperture of fiber

   vi) Normalized V-number

   vii) Number of guided modes.

9. A 6 Km optical link consists of multimode step index fiber with a core refractive index of 1.5 and a relative refractive index difference of 1 %. Estimate:

   i) the delay difference between the slowest and fastest modes at fiber output.

   ii) the rms pulse broadening due to intermodal dispersion on the link.

   iii) the maximum bit rate that may be obtained without substantial error on the link assuming only intermodal dispersion.

   iv) the bandwidth-length product corresponding to iii.

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

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

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engineering) (Sem.–6)

MICROWAVE AND ANTENNA ENGINEERING

Subject Code : BTEC-603-18

M.Code : 79376

Date of Examination : 21-12-2022

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 primary and secondary radiator?

b) Define reflection coefficient.

c) Write the properties of S- Matrix.

d) Define unconditional stability with regard to microwave transistor amplifier.

e) What do you mean by O type tube?

f) What is the need of loop antenna?

g) Write the applications of Aperture Antenna.

h) Define induction field.

i) Define IMP ATT.

j) What are bends and corners?

SECTION-B

2. Write a detailed note on travelling wave tube amplifier.

3. Discuss the measurement of power at microwave frequency in detail.

4. Design a circular using Magic Tees.

5. Explain the concept of radiation in single wire.

6. Write a short note on Horn antenna.

SECTION-C

7. A helix travelling wave tube operates at 4GHz under a beam voltage 10KV and beam current 500mA. If helix impedance is 25ohm and interaction length is 20cm. find the output power gain in decibels.

8. Explain Hansen-woodyard end fire array in detail.

9. Derive an expression for near field and far field equation of short electric dipole

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

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CE / CSE /EE / ECE / EEE / IT) (Sem.–6)

WIRELESS COMMUNICATION

Subject Code : BTEC-601-18

M.Code : 79373

Date of Examination : 10-01-2023

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 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 indoor propagation models?

   b) Define cell.

   c) Write full form of AMPS.

   d) What are the advantages of RAKE receiver?

   e) What is carrier to interference ratio?

   f) What is frequency hopped multiple access?

   g) Write full form of GPRS.

   h) Write about forward and reverse channel.

   i) Write full form of HLR.

   j) Briefly explain architecture of Bluetooth.

SECTION-B

2. Write about frequency reuse concept.

3. Explain the principle of cellular network and various types of handoff techniques.

4. Explain spread spectrum multiple access technique.

5. State the difference between small scale fading and large scale fading.

6. Write a note on '*wireless cable television*'.

SECTION-C

7. **Write a note on :**

   a) Maximum ration combining

   b) Selective diversity.

8. Write a note on third generation wireless networks and standards.

9. State advantages, disadvantages of various multiple access techniques.

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

00 JUN 2023

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

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engineering) (Sem–6)

MICROWAVE AND ANTENNA ENGINEERING

Subject Code : BTEC-603-18

M.Code : 79376

Date of Examination : 27-06-2023

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 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 Travelling Wave Tube (TWT).

b) What is backward wave oscillator?

c) What is transferred electron device?

d) What is directional coupler?

e) What is the difference between isolator and circulator?

f) Define Standing Wave Ratio (SWR).

g) Define antenna efficiency and temperature.

h) Define End fire antenna array.

i) Define aperture antenna.

j) List the applications of IMPATT diode.

(S2)-2882

SECTION-B

2. With the help of a suitable diagram, explain the working principle of phase shifter.

3. What is cavity resonator? Derive the equation for resonant frequency in rectangular cavity resonator.

4. Explain the operation of a two cavity klystron amplifier. Derive expressions for bunched beam current.

5. What are slow wave structures? Explain how a helical TWT achieve amplification?

6. What is Babinet's principle? Explain slot antenna and its radiation mechanism.

SECTION-C

7. For a broad side antenna array of n elements, derive the expression of direction of pattern maxima, pattern minima and beam width of major lobe. Assume the distance between each element is 'd' and each antenna element carries current of equal amplitude and phase.

8. Derive an expression for the far field component of a half wave dipole of an antenna. With the help of proper mathematical expressions, explain how single wire antenna radiates?

9. Derive the S-matrix for directional coupler. Using the properties of scattering matrix of a lossless reciprocal microwave junction, prove that for a four port network if all the four ports are matched, the device shall be a directional coupler.

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

0 0 JUN 2023

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

Total No. of Questions : 09

B.Tech. (CE / CSE / AI&ML / EE / ECE / EEE / IT/ (SE)/ (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 : 26-06-2023

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

SECTION-A

1. Write briefly :

a) How much is increased in spectrum efficiency offered by 2G compared to 1G?

b) If the cluster size N is reduced while the cell size is kept constant then what is the effect on capacity?

c) Define dwell time.

d) How will you define PN sequences used in CDMA?

e) What is near far problem?

f) Write the services provided by GSM.

g) What is the role of the power control bit in CDMA?

h) List the GSM channels.

i) Define channel modelling.

j) What is the reduction factor?

SECTION-B

2. Consider a cellular system with four cell reuse patterns. The bandwidth allocated is 60 MHz to a FDD cellular telephone system using two 30 KHz simplex channels for providing full duplex control of one channel. Calculate the total number of channels available in one cell.

3. Explain various Parameters of mobile multipath channels.

4. Draw and Explain IS-95 forward link in detail.

5. Compare FDMA, TDMA and CDMA multiple access techniques in detail.

6. Draw and Explain GSM signal processing in detail.

SECTION-C

7. Explain the diversity techniques in detail.

8. Write a short note on pure ALOHA and slotted ALOHA.

9. What is hand-off in cellular communication? Explain different hand-off strategies.

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

00 DEC 2023

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

Total No. of Questions : 09

B.Tech. (ECE) (Sem.–7)

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

Subject Code : BTEC-909D-18

M.Code : 90686

Date of Examination : 30-11-2023

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 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 the foundational goal of Artificial Intelligence (AI)?

   b) Define the term "intelligent agent" in the context of AI.

   c) Define the concept of "good behavior" in intelligent agents.

   d) How does boolean algebra contribute to AI problem-solving?

   e) What are expert systems and how do they mimic human expertise?

   f) Describe briefly the process of color selection in AI applications.

   g) What is problem-solving in AI, and how do algorithms contribute to it?

   h) Discuss briefly the importance of searching in AI algorithms.

   i) What is knowledge representation and why are they essential in AI?

   j) Write the application of AI in the context of an "*internet shopping world.*"

SECTION-B

2. You are building a search algorithm to find the shortest path between two points on a grid. The grid is represented as a 2D array, where each cell can be either empty (0) or blocked (1). Implement a Breadth-First Search (BFS) algorithm to find the shortest path from the top-left corner to the bottom-right corner, considering that you can only move horizontally or vertically.

3. Explain the bias-variance tradeoff in machine learning. How does increasing model complexity affect bias and variance? How does this tradeoff impact a model's generalization performance?

4. Define Explainable AI (XAI) and its significance. Why is it important for AI models to provide explanations for their decisions, especially in critical applications like healthcare and finance?

5. Differentiate between supervised and unsupervised learning. Provide examples of tasks that fall under each category. Explain the challenges associated with unsupervised learning.

6. Describe the concept of semantic networks in knowledge representation. How do nodes and arcs represent entities and relationships? Provide an example of a semantic network for representing relationships in a family tree.

SECTION-C

7. You are using k-means clustering to group data points into two clusters. Given the following data points in a 1D space: [2, 3, 7, 9, 12, 15], initialize the centroids at 4 and 10 and perform two iterations of the k-means algorithm. Show the updated centroids and cluster assignments after each iteration.

8. Define ontologies in the context of knowledge representation. How do ontologies help capture domain-specific knowledge and relationships? Provide an example of an ontology used in a specific field, such as medicine or geography.

9. Explain the concept of a pattern database heuristic in solving combinatorial problems. How are pattern databases precomputed and how do they help accelerate the search process? Provide an example scenario where a pattern database heuristic is applied.

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

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE/ECE) (Sem.–7)

SOFT COMPUTING

Subject Code : BTEC-908D-18

M.Code : 90681

Date of Examination : 19-12-2023

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

SECTION-A

1. **Write briefly :**

   a. What do you mean by the term perceptron?

   b. What do you mean by soft computing?

   c. What is the importance of fitness function?

   d. Differentiate between crisp and fuzzy set theory.

   e. Define Adaline and Madaline.

   f. State various types of GA.

   g. State the Bayes' rule.

   h. What is the difference between classification and regression trees?

   i. What do you mean by mutation?

   j. Mention the criteria for the evaluation of a search strategy.

SECTION-B

2. Differentiate between single and multi-point crossover operations.

3. Explain the string coding of chromosomes.

4. Differentiate between Mamdani and Sugeno fuzzy inference system.

5. Write a note on Swarm Intelligence.

6. Explain different activation functions in NN.

SECTION-C

7. Explain the single layer Neural Network architecture using Perceptron model with suitable activation function.

8. Sketch the 5 layer ANFIS architecture mentioning the task of each layer.

9. Design Hebb Net to implement logical AND function. Use bipolar inputs and targets.

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

00 DEC 2023

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

Total No. of Questions : 09

B.Tech. (CSE / EEE / EE / ECE / ME / IT) (Sem–7,8)

DATABASE MANAGEMENT SYSTEM

Subject Code : BTCS-501-18

M.Code : 90493

Date of Examination : 22-12-2023

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

SECTION-A

1. **Answer briefly :**

a) What is a DBMS and why is it recommended for managing data?

b) Explain the purpose of SQL in a database system.

c) What are ACID properties in DBMS and why are they important?

d) Name two types of relationships in a DBMS.

e) What does BCNF stand for in database normalization?

f) Is NULL the same as blank space or zero in databases?

g) Define a distributed database in simple terms.

h) How are Database Triggers used to automate actions in a DBMS?

i) Explain the terms "specialization" and "generalization" in database design.

j) What is the role of an index in a database and why is it useful?

SECTION-B

2. Explain the purpose of normalization in DBMS. Compare and contrast BCNF (Boyce-Codd Normal Form) with 3NF (Third Normal Form) using an example. Highlight the key differences between these two normal forms and their significance in database design.

3. Describe the different types of keys in a database. Explain which of these keys are used in the normalization process. Choose any two normal forms (e.g., 1NF, 2NF, etc.) and detail how keys contribute to achieve those nomal forms. Provide examples to illustrate your points.

4. Given the Sailors-Boats-Reserves Database schema,

   Sailors (sid, sname, rating, age)

   Boats (bid, bname, color)

   Reserves (sid, bid, date)

   answer the following queries in SQL along with explanations for each :

   a) Find all sailor IDs of sailors who have a rating of at least 8 or have reserved a boat with ID 103.

   b) Find the sailor IDs of sailors over 20 years old who haven't reserved a boat with a name containing "thunder."

   c) Find the sailor IDs of sailors whose rating is better than that of a sailor named Bob.

   d) Find the colors of boats reserved by Albert.

5. Design an Entity-Relationship (E-R) diagram for the Dean Academic Affairs (DAA) office scenario. Include entities, attributes, relationships and cardinalities. Document any assumptions you make about the mapping constraints between entities. Discuss whether a weak entity can exist in the given scenario and explain your reasoning.

6. Define concurrency management in a database system. Provide a detailed explanation of the Two-Phase Locking (2PL) protocol. Discuss how 2PL ensures data consistency and prevents conflicts during concurrent transactions.

SECTION-C

7. Explain the concept of database normalization. Provide a step-by-step example of converting an unnormalized table to Third Normal Form (3NF). Highlight the benefits of normalization and the potential trade-offs in terms of storage and performance.

8. Discuss the CAP theorem (Consistency, Availability, Partition Tolerance) in the context of distributed databases. Explain the meaning of each term and the principle that a distributed database system can achieve at most two out of the three attributes simultaneously. Provide real-world scenarios to illustrate the trade-offs between these attributes.

9. Consider a database schema for an online shopping platform with the following tables :

   Customers (CustomerID, CustomerName, Email)

   Orders (OrderID, CustomerID, OrderDate)

   OrderItems (OrderID, ProductID, Quantity, UnitPrice)

   Products (ProductID, ProductName, Category, StockQuantity)

   Write SQL queries for the following tasks :

   a) Calculate the total revenue generated by each product, considering the quantity sold and unit price.

   b) Find the top 5 customers who have spent the most in total on their orders.

   c) Determine the products that are out of stock and need to be restocked.

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

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ECE)/(EE) (Sem.–7,8)

COMPUTER ORGANIZATION AND ARCHITECTURE

Subject Code : BTES-401-18

M.Code : 90491

Date of Examination : 04-12-2023

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 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 Computer Architecture and what are its functional blocks?

b) Take one example and show the working of carry save multiplier.

c) Differentiate between hardwired and micro-programmed design approaches.

d) Give examples of privileged and non-privileged instructions.

e) Define an interrupt. How they can be helpful for process state transition?

f) Why is pipelining important? Name few of the pipeline hazards.

g) What is memory interleaving? How can we achieve concurrent access to memory?

h) Explain the instruction execution cycle.

i) Mention few mapping functions used for memory organization.

j) What are the advantages of division restoring and non-restoring techniques?

SECTION-B

2) Explain how the computer buses can be used to communicate with memory and I/O. Also, draw a block diagram to show CPU and IO Processor communication.

3) Describe the instruction set architecture of a CPU explaining registers and execution cycle.

4) Explain in detail the principle of Carry Look Ahead (CLA) adder and Design-Bit CLA adder.

5) Discuss the different mapping techniques used in cache memories and their relative merits and demerits.

6) Using Booth Multiplier algorithm, perform the multiplication on the following 6-bit unsigned integer 10110011 * 11010101.

SECTION-C

7) Explain the I/O device interfaces-SCII and USB in detail.

8) Describe all types of the data representation (signed, fixed, floating and character) by taking a suitable example for each.

9) **Write short notes on the following :**

   a) Replacement Algorithms *w.r.t* memory organization

   b) Program Controlled I/O transfers.

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