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

Total No. of Pages : 03

Total No. of Questions : 17

MBA (Sem.–2)

CORPORATE FINANCE AND POLICY

Subject Code : MBA-206-21

M.Code : 92177

Date of Examination : 18-07-22

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.
4. Student may be allowed to use non-scientific calculator.

SECTION-A

Write short notes on the following :

1. Functions of Financial Management.
2. Annuity
3. Weighted Average Cost of Capital.
4. ROI
5. Trading on Equity
6 Accounting Rate of Return
7. Permanent Working Capital
8. Stock Dividend.

SECTION-B

UNIT-I

9. What is corporate finance? Discuss in detail the interface of financial management with other functional areas of management.

10. What is capital market? Discuss in detail how capital market facilitates mobilizing long-term funds for a company.

UNIT-II

11. Write a detailed note on MM Hypothesis I and II. Discuss in detail the principle of arbitrage between debt and equity for explaining MM Hypothesis 1 and II.

12. What is specific and marginal cost of capital? Discuss in detail the role and importance of cost of capital of a firm in various financial decisions of a company.

UNIT-III

13. What is combined leverage? Write a detailed note on the impact of financial leverage on the risk profile of a firm. Give suitable examples to support your answer.

14. ABC Co. Ltd. is evaluating the financial feasibility of following machine and has sought your opinion whether this machine should be installed if the cost of capital of the firm is 10%

Machine	Initial Investment	Cash Flow (Amount in Rs.)				
		Year 1	Year 2	Year 3	Year 4	Year 5
X	5,00,000	2,00,000	1,30,000	1,50,000	1,90,000	-20,000

UNIT-IV

15. What do you mean by working capital? Discuss in detail various factors determining working capital of a company in India.

16. Write a detailed note on various forms of dividend policies followed by companies in India. Also, briefly discuss Walter's model for determining dividend policy of a company.

SECTION-C

17. Case Study :

Based on the following information, prepare a cash budget for ABC Ltd. :

	1st Quarter (Rs.)	2nd Quarter (Rs.)	3rd Quarter (Rs.)	4th Quarter (Rs.)
Opening ash balance	10,000	—	—	—
Collection from Customers	1,25,000	1,50,000	1,60,000	2,21,000
Purchase of Material	20,000	35,000	35,000	17,000
Other Expenses	25,000	20,000	20,000	17.000
Salary and Wages	90,000	95,000	95,000	1.09.200
Income Tax	5,000	----	----	----
Purchase of Machinery	—	---	—	20.000

The company desires to maintain a cash balance of Rs. 15,000 at the end of each quarter. Cash can be borrowed or repaid in multiples of Rs. 500 at an interest of 10% p.a. Management does not want to borrow cash more than what is necessary and wants to repay as early as possible. In any event, loans cannot be extended beyond four quarters. Interest is computed and paid when the principal is repaid Assume that borrowings take place at the beginning and repayments are made at the end of the quarters.

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

Total No. of Pages : 03

Total No. of Questions : 09

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

(Sem.–2)

MATHEMATICS-II

Subject Code : BTAM204-18

M.Code : 91960

Date of Examination : 18-07-22

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 & 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) The mean of 10 numbers is 7 and the mean of 15 other numbers is 12. Determine the mean of 25 numbers taken together.

b) What is skewness? How does it differ from Kurtosis?

c) Find the expectation of the number on a dice when thrown.

d) If a leap year is selected at random, what is the chance that it will contain 53 Tuesdays?

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

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

f) If $n = 10$ and $\sum D^2 = 280$, what is the coefficient of Rank Correlation?

g) Calculate the regression equation Y on X from the following data :

$\sum X = 30, \sum Y = 23, \sum XY = 168, \sum X^2 = 224, \sum Y^2 = 175, N = 7.$

h) Fit a linear curve to the data $\Sigma X = 15$, $\Sigma Y = 204$, $\Sigma XY = 748$, $\Sigma X^2 = 55$, $N = 5$.

i) Is the following function a probability density function?

$$f(x) \quad \begin{array}{ll} 0 & ,x \quad 2 \\ \frac{1}{8}(3 \quad 2x) & ,2 \quad x \quad 4 \\ 0 & ,x \quad 4 \end{array}$$

j) A sample of 400 male students is found to have a mean height of 67.47 inches. Can it be reasonably regarded as sample from a large population with mean height 67.39 inches and S.D. 1.30 inches.

SECTION-B

2. a) Calculate mean, variance and third central moment from the following data :

x :	0	1	2	3	4	5	6	7	8
y :	1	9	26	59	72	52	29	7	1

b) A coin is tossed until a head appears. What is the expectation of the number of tosses required?

3. a) Find the coefficient of skewness from the data given below:

Size :	3	4	5	6	7	8	9	10
Frequency :	7	10	14	35	102	136	43	8

b) Three bad eggs got mixed up with 7 good eggs. If three eggs are drawn (without replacement) from 10 eggs, find the mean and variance for the number of bad eggs among them.

4. a) n person are seated on n chairs at a round table. Find the probability that three are sitting next to each other.

b) Find the binomial distribution whose mean is 3 and variance 2.

5. a) If a random variable x has a Poisson distribution such that

$P(x = 2) = 9\ P(x = 4) + 90\ P(x = 6)$. Then find mean and standard deviation,

b) Calculate correlation coefficient from the following data :

$n = 10$, $\Sigma X = 140$, $\Sigma V = 150$, $\Sigma (X - 10)^2 = 180$, $\Sigma (Y - 15)^2 = 215$, $\Sigma (X - 10)(Y - 15) = 60$.

SECTION-C

6. In the accounting department of bank, 100 accounts are selected at random and estimated for errors. The following results were obtained :

No. of errors :	0	1	2	3	4	5	6
No. of accounts :	35	40	19	2	0	2	2

Does this information verify that the errors are distributed according to the Poisson probability law?

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

x :	10	20	30	40	50
y :	8	10	15	21	30

8. Given below are the figures of production (in thousand tonnes) of coal :

Year :	1980	1981	1982	1983	1984	1985	1986
Production : (in thousand tones)	70	85	94	83	90	100	98

Fit a straight line by the method of least squares.

9. Can vaccination be regarded as preventive measure of small pox as evidenced by the following data of 1482 persons exposed to small pox in a locality. 368 in all were attacked of these 1482 persons and 343 were vaccinated and of these only 35 were attacked.

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

Total No. of Questions :18

B.Tech.(Agriculture Engg./Automation & Robotics/Automation Engg./Civil Engg./Computer Science & Engg./Electrical & Electronics Engg./Electrical Engg./Electronics & Communication Engg./Electronics & Electrical Engg./Information Technology/Mechanical Engg.)/ B.Tech. (CSE/ECE) (PIT)(Sem.–1)

MATHEMATICS-I

Subject Code : BTAM-101-18

M.Code : 75353

Date of Examination : 01-07-22

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 &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

Solve the following :

1) What is maximum value of function $f(x) = -x^2$.

2) Find the equation of normal line to the surface $xyz = 6$ at (1, 2, 3).

3) Show that the function $f(x,y) = \begin{cases} \dfrac{xy}{2y^2+x^2}; & (x,y) \neq (0,0) \\ 0; & (x,y) = (0,0) \end{cases}$ is discontinuous at (0, 0).

4) Evaluate $\lim_{x \to \frac{\pi}{2}} \dfrac{\log\left(x - \frac{\pi}{2}\right)}{\tan x}$.

5) Calculate approximate value of $\sqrt{10}$ to two decimal places by Taylor's theorem.

6) Evaluate $\int_0^1 \int_1^a \frac{1}{xy} dy dx$.

7) Examine the nature of the series $1+\frac{1}{2}+\frac{1}{4}=\frac{1}{8}--------\infty$.

8) Define orthogonal matrices with example.

9) Show that (1, 1, 2) is an eigen vector of the matrix $A=\begin{bmatrix} 3 & 1 & -1 \\ 2 & 2 & -1 \\ 2 & 2 & 0 \end{bmatrix}$ corresponding to the eigen value 2.

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

SECTION-B

11) a) Verify Cauchy's mean value theorem for $f(x) = \log x, g(x) = \frac{1}{x}$ in $[1, e]$.

b) Apply Maclaurin's theorem with Lagrange's remainder to function $f(x) = \cos x$.

12) Discuss the convergence of the following improper integral

a) $\int_0^\infty \frac{1}{b^2x^2+a^2} dx$ b) $\int_1^2 \frac{x+1}{\sqrt{x-1}} dx$.

13) Show that the rectangular solid of maximum volume that can be inscribed in a given sphere is a cube.

14) a) Evaluate by changing the order of integration of $\int_0^1 \int_x^{\sqrt{2-x^2}} \frac{x}{\sqrt{x^2-y^2}} dy\, dx$.

b) Find the volume enclosed between the cylinders $x^2 + y^2 = 2ax$ and $z^2 = 2ax$.

SECTION-C

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

b) Test the convergence of $\sum_{n=2}^{\infty} \frac{1}{[\log(\log n)]^n}$.

16) a) Test the convergence of $1+\frac{(1+\alpha)}{(1+\beta)}+\frac{(1+\alpha)(1+2\alpha)}{(1+\beta)(1+2\beta)}+\frac{(1+\alpha)(1+2\alpha)(1+3\alpha)}{(1+\beta)(1+2\beta)(1+3\beta)}+\ldots\ldots$

b) Discuss the convergence or divergence of the series $\sum_{n=2}^{\infty} \frac{n+\sqrt{n}}{n^2-n}$.

17) a) Use Gauss Jordan method to find the inverse of a matrix $\begin{bmatrix} 2 & 4 & 3 & 2 \\ 3 & 6 & 5 & 2 \\ 2 & 5 & 2 & -3 \\ 4 & 5 & 14 & 14 \end{bmatrix}$.

b) Find a matrix B which transforms $A=\begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$ into a diagonal form.

18) Determine the values of a and b for which the system $\begin{bmatrix} 3 & -2 & 1 \\ 5 & -8 & 9 \\ 2 & 1 & a \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix}=\begin{bmatrix} b \\ 3 \\ -1 \end{bmatrix}$ has

a) a unique solution,

b) no solution,

c) infinitely many solutions.

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00 JUL 2022

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

Total No. of Pages :03

Total No. of Questions :18

B.Tech.(Artificial Intelligence & Machine Learning/Artificial Intelligence/ Artificial Intelligence & Data Science/ Computer Engg./Computer Science & Engg./Artificial Intelligence & Machine Learning/Computer Science & Engg.) (Cyber Security)/Computer Science & Engg.) (Data Science)/Computer Science & Engg.) (IOT)/Data Science/Electronics & Communication Engg./Information Technology/Mechanical Engg./CSE (Internet of Things and Cyber Security including Block Chain Technology)/B.Tech. (Computer Engg./CSE) (PIT) (Sem.–1)

MATHEMATICS-I

Subject Code : BTAM-104-18

M.Code : 75362

Date of Examination : 01-07-22

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

SECTION-A

Solve the following :

1. Solve $\int_0^2 \sqrt{x}(4-x^2)^{-\frac{1}{4}}dx$

2. Write recurrence relation of Gamma function.

3. Find the area of the region enclosed by the curve $x^2 = 4y, y^2 = 4x$.

4. Evaluate $\lim_{x\to\infty} \frac{\sin h^{-1}x}{\cos h^{-1}x}$.

5. Calculate approximate value of $\sqrt{24}$ to two decimal places by Taylor's theorem.

6. Find the value of K so that the set of vectors (K,1,1), (0,1,1), (*K*,0,K) is linearly dependent?

7. Find a linear transformation T: $R^2 \to R^2$ such that T(1,0) = (1,1) and T(0,1)=(–1,2).

8. Show that two similar matrices A and B have same eigen values.

9. If A is an orthogonal matrix, then prove that $|A| = \pm 1$.

10. Define Vector space.

SECTION-B

11. a) State and prove relation between Beta and Gamma functions.

    b) Expand $f(x) = e^{\sin x}$ by Maclaurin's theorem.

12. a) Prove that the area of the region bounded by the curve $a^4y^2 = x^5(2a - x)$ is to that of the circle whose radius is 'a' is 5:4.

    b) Find absolute maximum and minimum value of $f(x) = x - \log x$ on $\left[\frac{1}{2}, 2\right]$.

13. a) Find rank of $A = \begin{bmatrix} 2 & -6 & -2 & -3 \\ -5 & -13 & -4 & -7 \\ -1 & 4 & 1 & 2 \\ 0 & 1 & 0 & 1 \end{bmatrix}$

    b) Solve by Gauss Jordan method the system of equations

    $x + 2y + z = 2,\ 3x + y - 2z = 1,\ 4x - 3y - z = 3,\ 2x + 4y + 2z = 4.$

14. a) Find the inverse of a matrix $\begin{bmatrix} 2 & 1 & -1 & 2 \\ 1 & 3 & 2 & -3 \\ -1 & 2 & 1 & -1 \\ 2 & -3 & -1 & 4 \end{bmatrix}$.

    b) Using properties of determinants, evaluate $\begin{vmatrix} (b+c)^2 & a^2 & a^2 \\ b^2 & (a+c)^2 & b^2 \\ c^2 & c^2 & (a+b)^2 \end{vmatrix}$

SECTION-C

15. a) Diagonalize $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$.

b) Find Eigen Values & Eigen Vectors of $A = \begin{bmatrix} 8 & -8 & -2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$

16. a) Express the matrix A as sum of symmetric and skew symmetric matrix where $A = \begin{bmatrix} 4 & 2 & -3 \\ 1 & 3 & -6 \\ -5 & 0 & -7 \end{bmatrix}$

b) Prove that $A = \frac{1}{3}\begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ is orthogonal.

17. a) Let $T: R^3 \to R^3$ defined by

$T(x,y,z) = (x + y + z,\ 2x + 2y + 2z,\ 3x + 3y + 3z)$

Find the associated matrix corresponding to standardbasis.

b) Find the rank and nullity of the matrix $\begin{bmatrix} 1 & -2 & 2 & 3 & 6 \\ 0 & -1 & -3 & 1 & 1 \\ -2 & 4 & -3 & -6 & 11 \end{bmatrix}$.

18. Determine the coordinate vectors of $p = 4 - 2x + 3x^2$ relative to the following bases.

a) The standard basis for P_2, $S = \{1, x, x^2\}$.

b) The basis for P_2, $A = \{p_1, p_2, p_3\}$, where $p_1 = 2, p_2 = -4x, p_3 = 5x^2 - 1$.

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engineering) (Sem.–4)

ANALOG CIRCUITS

Subject Code : BTEC-401-18

M.Code : 77565

Date of Examination : 02-07-22

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 static and dynamic resistance of a PN junction diode.

b. What is the use of coupling capacitor and bypass capacitor in an amplifier?

c. What is DC load line?

d. What is current shunt feedback?

e. Explain transconductance amplifier.

f. What is current gain and voltage gain of amplifier?

g. What is thermal runaway?

h. Explain the gain of cascaded configuration.

i. What do you mean by harmonic distortions in power amplifiers?

j. What is the difference between Class-B and Class-AB operations?

SECTION-B

2. Draw the circuit of various transistor configurations. List their important features. Why CE configuration is mainly used?

3. Can a negative feedback amplifier operate as an oscillator? If not, why?

4. Derive the expression for following parameters for a class B push-pull amplifier :

   a. Q-point

   b. DC input power

   c. AC output power

   d. Maximum Efficiency.

5. Explain the working of RC coupled amplifier with diagram.

6. Explain how will you determine the voltage gain of CE amplifier by plotting the DC load line on the output characteristics of the transistor.

SECTION-C

7. Explain the working, frequency response and applications of transformer coupled transistor amplifier.

8. Drive the power and efficiency calculations of class B power amplifier.

9. Write short note on the following :

   a) RC phase shift oscillator.

   b) Emitter Follower.

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

Total No. of Pages : 03

Total No. of Questions : 18

B.Tech. (Artificial Intelligence & Machine Learning/ Computer Engineering / Computer Science & Engineering / Information Technology/ CSE (Internet of Things and Cyber Security including Block Chain Technology/Artificial Intelligence & Machine Learning)) (Sem.–4)

DISCRETE MATHEMATICS

Subject Code : BTCS-401-18

M.Code : 77626

Date of Examination : 02-07-22

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. Give an example of a relation which is reflexive but neither symmetric nor transitive.
2. Determine the domain and range of the relation R = $\{(x, y) : x \in N.\ y \in N$ and $x+y= 10\}$
3. How many 8- letter words can be made using the letters of the words "TRIANGLE", if each word is to begin with T and end with E?
4. Define permutation groups.
5. Write down the truth table of $(p \leftrightarrow q) \leftrightarrow r$.
6. Is there a simple graph G with six vertices of degree 1, 3, 4, 6, 7?
7. Define a complete binary tree.
8. Give an example of a connected graph that has an Euler circuit but no Hamiltonian circuit.
9. What will be the chromatic number of complete graph with n - vertices?

10. Define equivalent sets.

SECTION-B

11. Show that intersection of two partial order relations is a partial order relation. But union of two partial order relations need not be a partial order relation. Give suitable example.

12. The set C* of all non-zero complex numbers form an infinite abelian group under the operation of multiplication of complex numbers.

13. a) How many people must you have to guarantee that at least 5 of them will have birthday on the same month.

    b) Find the number of positive integers from 1 to 500 which are divisible by at least one of 3, 5 and 7.

14. a) Prove that $(p \wedge q) \vee r = (p \vee r) \wedge (q \vee r)$

    b) Prove the validity of the following argument:

    If a man is bachelor, he is happy.

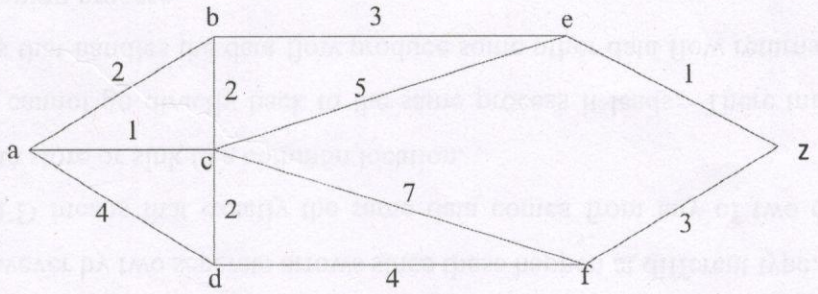
    If a man is happy, he dies young.

    Therefore bachelors die young.

15. Show that a graph G with n vertices and $(n - 1)$ edges and no circuit is connected.

SECTION C

16. Find the shortest path between a and z using Dijkstra's algorithm for the following graph:



17. a) Prove that every finite integral domain is a field.

    b) Simplify the Boolean expression $f(x, y, z) = (x \wedge y \wedge z) \vee (x \wedge y \wedge z)$. And find its conjunctive normal forms.

18. A function f is defined on the set of integers as follows:

$$f(x)=\begin{cases} 1+x & 1\le x<2 \\ 2x-1 & 2\le x<4 \\ 3x-10 & 4\le x<6 \end{cases}$$

a) Find the domain of the function.

b) Find the range of the function.

c) Find the value of $f(4)$.

d) State whether f is one - one or many one function.

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00 JUL 2022

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

Total No. of Questions : 18

B.Tech. (Automation & Robotics/Bio Technology/Civil Engineering/Computer Science & Engineering/Electrical & Electronics Engineering/Electrical Engineering/Electronics & Communication Engineering/Information Technology/Mechanical Engineering) (Sem.–1,2)

ENGINEERING CHEMISTRY

Subject Code : BTCH-101
M.Code : 54093
Date of Examination : 08-07-22

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 &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 Each.**

SECTION-A

Answer briefly :

1) What is the importance of *'finger print region'* in infrared spectroscopy?

2) What is Lambert-Beer's Law?

3) Distinguish between hard water and soft water.

4) Write down the properties of water to be used as green solvent.

5) The observed chemical shift of a proton is 350 Hz from TMS and the operative frequency of NMR spectrometer is 100 MHz. Calculate the chemical shift in δ ppm.

6) What is calgon conditioning of boiler feed water?

7) What is meant by polymer reinforced composite?

8) Why does the small anodic area result in intense corrosion?

9) What are natural gas liquids?

10) What are nonmaterial's?

SECTION-B

11) a) Why molecules absorb in UY-Visible region? What are the types of electronic transitions that can occur in a molecule? Explain giving examples.

b) What is the principle of IR spectroscopy? Calculate the fundamental modes of vibrations in C_6H_6 and CH_4 molecules.

12) a) What is meant by quantum yield of a photochemical-reaction? How would you explain very high and very low quantum yields of some photochemical reactions?

b) Differentiate between fluorescence and phosphorescence.

13) a) Explain the desalination of water by reverse osmosis method.

b) Differentiate between scale and sludge. How are scales formed? What are their disadvantages?

14) a) Name the twelve principles of green chemistry. Explain the use of innocuous reagents in green synthesis.

b) How can the ultrasonic radiations be used to carry out the green chemical synthesis? Explain by taking a suitable example.

SECTION-C

15) a) What is differential aeration corrosion? Illustrate the reactions involved in differential aeration corrosion with reference to iron materials.

b) What are the different methods of controlling corrosion? Explain sacrificial anodic protection method.

16) a) Differentiate between addition polymerisation and condensation polymerization with suitable examples.

b) *'Weight average molecular weight is higher than number-average molecular weight of a polymer'*. Explain.

17) a) What are the characteristics of self assembly? Explain the formation of self assembled monolayers.

b) What are coercing colloids? Give its applications.

18) a) What is the composition of crude oil? Also, classify the crude oil in different categories.

b) Describe the catalytic cracking of crude petroleum oil.

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

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (Agriculture Engg./AI & ML/ AI & DS / Automation & Robotics. / Automobile Engg. / Bio Technology / Civil Engg. / Computer Engg. / CSE / Cyber Security / Data Science / IOT / EEE / EE / ECE / Food Tech / IT / ME) B.Tech. CSE (IOT & Cyber Security including Block Chain Technology) / PIT B.Tech Computer Engg. / PIT B.Tech ECE

(Sem.–1,2)

PROGRAMMING FOR PROBLEM SOLVING

Subject Code : BTPS-101-18

M.Code : 75346

Date of Examination : 13-07-22

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

SECTION-A

Write breifly :

1) What is a pointer and why it is used?
2) What is a link list and how it is different from an array?
3) What is the difference between a variable and a constant?
4) What is an array of structures? Define it.
5) What is the difference between declaration and definition?
6) What is the complexity of Selection sort and why?
7) What is the difference between logical and syntax errors.
8) What is an operating system?
9) What are object and executable code?
10) What is the difference between strings and arrays?

SECTION-B

11) Write a program for Selection sort.

12) Write a program using loops to find the sum of the numbers from 1 to 10.

13) Write a program to find the factorial of a number. The user will enter a number, and you have to calculate its factorial and display it.

14) Write a program using pointers to Swap two numbers entered by the user.

SECTION-C

15) What is the difference between call by value and call by reference? Explain with an example.

16) Why recursion is used in programming? Can we write any program written with recursion without using recursion as well?

17) What is the difference between user-defined and system-defined functions? Write any user- defined function to add two numbers.

18) Explain how we can use if-else statements and how they differ from switch statements?

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

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (Bio Technology/Civil Engineering/Computer Science & Engineering/Electrical & Electronics Engineering/Electrical Engineering/Electronics & Communication Engineering/Information Technology/Mechanical Engineering) (Sem.–1,2)

FUNDAMENTALS OF COMPUTER PROGRAMMING AND IT

Subject Code : BTCS-101

M.Code : 54095

Date of Examination : 11-07-22

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

SECTION-A

Write briefly :

1. What are Local and Global variables?
2. What is a conditional operator in C++?
3. What is a scope of any variable?
4. What is pointers arithmetic?
5. How the CPU's processing power is measured?
6. Explain the difference between source code and object code.
7. What is the meaning of a Bit, byte, KB, MB & GB?
8. What is Recursion?
9. What is a Class?
10. What is Object?

SECTION-B

11. What are the various features of Word Processor?

12. What are the various output devices of computers? Explain the working principle of each of them.

13. How primary memory is different from secondary memory?

14. Write an algorithm/flowchart to find the sum of even numbers.

SECTION-C

15. Describe about the various basic data types in C++.

16. Write a program to determine and print the sum of series for a given value of n :

    $1 + 1/2 + 1/3 + 1/4 + ... + 1/n$

17. Explain about the various control structures in C++ language.

18. Explain how Input / Output operations on files is handled in C.

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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/Computer Science & Engineering/Computer Science & Engineering) (Artificial Intelligence & Machine Learning/Computer Science & Engineering (Cyber Security)/ Computer Science & Engineering (Data Science)/Computer Science & Engineering) (IOT)/ (Data Science)/Information Technology/Mechanical Engineering/CSE (Internet of Things and Cyber Security including Block Chain Technology)/ B.Tech. (Computer Engg./CSE) (PIT) (Sem.–1,2)

SEMI-CONDUCTOR PHYSICS

Subject Code : BTPH-104-18

M.Code : 75360

Date of Examination : 08-07-22

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

SECTION-A

Write briefly :

1) Explain the difference between quantum mechanics and classical mechanics.

2) Give the physical significance of wave function. What does the square of wave function signify?

3) Define Weidemann-Franz law.

4) What is E-K diagram and what do you infer from them?

5) Name three semiconductors along with the value of band gaps.

6) Write short notes on intrinsic and extrinsic semiconductors.

7) State some Column II impurities.

8) Explain the process of formation of electron-hole pairs.

9) What are the three distinct processes by which a transition can take place?

10) What are the necessary conditions for the lasing action to take place?

SECTION-B

11) Explain the quantum theory of free electrons in metals. Derive an expression for the Fermi-energy at absolute zero.

12) Discuss Kronig-Penney model. Using the model show the energy spectrum of electron consisting of a number of allowed energy bands separated by forbidden bands.

13) a) Write a short note on Zener diode. Explain how the Zener diode maintains a constant voltage across the load.

b) For a Si semiconductor with a band gap of 1.12 eV, determine the, position of the Fermi level at 300 K if $m_n^* = 0.12$me and $m_p^* = 0.28$me.

14) a) Derive an expression for the carrier concentration in an extrinsic semiconductor. What would be the position of the Fermi level? Explain.

b) Consider the Fermi 0.3 eV below the conduction band at room temperature (= 27°C) in an n-type semiconductor. If the temperature is raised to *57°C*, what would be the new position of the Fermi level?

SECTION-C

15) Explain the characteristics of laser beams. What are the necessary conditions for Lasing action?

16) What do you mean by spontaneous emission? Discuss Einstein's coefficients. Derive the relation between them.

17) Explain the concept of directionality and monochromaticity as applied to lasers.

18) a) What is the divergence of Laser? Write the principle and procedure of calculating the divergence of the laser.

b) Calculate the divergence of a laser beam at distances of 1 and 10 m from the laser spot and whose diameters are 2 and 4 mm, respectively.

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Agriculture Engineering/Artificial Intelligence & Machine Learning/Artificial Intelligence (AI) and Data Science/Artificial Intelligence/Automation & Robotics/Automobile Engineering/Bio Technology/Civil Engineering/Computer Engineering/Computer Science & Engineering/Computer Science & Engineering (Artificial Intelligence & Machine Learning)/ Computer Science & Engineering (Cyber Security)/ Computer Science & Engineering/Computer Science & Engineering (IOT) (Data Science)/Data Science/Electrical & Electronics Engineering/Electrical Engineering/Electronics & Communication Engineering/Electronics & Electrical Engineering/Food Technology/Information Technology/Mechanical EngineeringCSE (Internet of Things and Cyber Security including Block Chain Technology)/Computer Engg./CSE/ECE (PIT) (Sem.–1,2)

CHEMISTRY-I

Subject Code : BTCH-101-18

M.Code : 75343

Date of Examination : 06-07-22

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 & 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) Discuss the types of the hardness of water and suggest a method for its removal.

b) Define Isobestic Point and give its significance

c) Distinguish between Meso and Racemic mixtures.

d) How does entropy of a solid vary on fusion.

e) Write a note on vander-Waal forces.

f) Discuss HSAB principle and give its one application.

g) Give Fazan's rules for polarizability.

h) What are electrophilic reagents?

i) Compare bond order and stability of oxide and superoxide ion.

j) Discuss the role of dopant in semi-conductor chemistry.

SECTION-B

2. a) Give the physical significance of wave function. Discuss the origin of quantum numbers from Schrodinger wave equation. (6)

   b) Differentiate between extrinsic and intrinsic semi-conductors. (2)

3. a) Draw the energy level diagram for NO molecule also determine their bond order and magnetic behaviour. (5)

   b) Give factors affecting CFSE in transition metal complexes. (3)

4. a) Draw a well labelled Jablonski diagram and explain : (6)

   (i) Intersystem Crossing.

   (ii) Phosphorescence

   b) Explain the importance of finger print region in IR spectroscopy. (2)

5. a) Derive van der Waal's equation for real gases. Give units and significance of van der Waal's constants. (6)

   b) What are Potential Energy Surfaces. Give their application. (2)

SECTION-C

6. a) Derive Nernst Equation for the calculation of cell E.M.F. (4)

   b) Using Ellingham diagram to explain carbon monoxide is a suitable reducing agent for oxide ore. (4)

7. a) Why Electron affinity of halogens is very high. (2)

   b) Which is smaller and Why (CI or CI^-)? (2)

   c) Apply VSEPR theory to explain the shape of molecules : (4)

   i) PCl_3

   ii) Ammonium ion.

8. a) Discuss in detail conformational analysis of n-Butane. (5)

   b) Write a note on optical isomerism. (3)

9. a) Discuss the Friedel Craft Alkylation reaction of Benzene with mechanism. (4)

   b) How the nature of solvent affects rate of nucleophilic substitution reactions. (4)

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

Total No. of Pages : 02

Total No. of Questions : 05

B.Tech. (Agriculture Engineering /Artificial Intelligence & Machine Learning/Artificial Intelligence (AI) and Data Science/Artificial Intelligence (AI) and Data Science/Artificial Intelligence/Automation & Robotics/Automobile Engineering/Automobile Engineering/Bio Technology/Civil Engineering/Computer Science & Engineering/Computer Science & Engineering (Artificial Intelligence & Machine Learning)/Computer Science & Engineering (Cyber Security)/Computer Science & Engineering (Data Science)/Computer Science & Engineering (IOT)/Data Science/Electrical & Electronics Engineering/Electrical & Electronics Engineering/Electrical Engineering/Electronics & Communication Engineering/Electronics & Electrical Engineering/ (Food Technology/Information Technology/Mechanical Engineering/CSE (Internet of Things and Cyber Security including Block Chain Technology)/CSE (Internet of Things and Cyber Security including Block Chain Technology)/ PIT B.Tech Computer Engg./PIT B.Tech CSE/PIT B.Tech ECE (Sem.–1,2)

ENGLISH

Subject Code : BTHU-101-18

M.Code : 75349

Date of Examination : 04-07-22

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :

1. **All Questions Are COMPULSORY.**
2. **Question no. 1, 2 & 3 carry TEN marks each.**
3. **Question no. 4 and 5 carry FIFTEEN Marks each.**

1. a) Use the following phrases in sentences :

   An axe to grind, Blow away, Hear it on grapevine, Opt out, Phase in

   b) State whether the following sentences are simple, compound or complex :

   i) Unless the culprit accepts his fault, he will not be spared.

   ii) I am confident that he is innocent in this matter.

   iii) Let me reach my office and then I shall talk to him.

   iv) The old man is a miser though he is very rich.

   v) But for his faults he would have progressed immensely.

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

Charity is a universal duty, which it is in every man's powers sometimes to practice, since every degree of assistance given to another on proper motives, is an act of charity; and there is scarcely any man in such a state of weakness that he may not on some occasion benefit his neighbour. He who cannot relieve the poor may instruct the ignorant, and he that cannot attend the sick may reclaim the vicious. He who can give little assistance himself may yet perform the duty of charity by inflaming the ardor of others and recommending the petitions which he cannot grant, to those who have more power to bestow. The widow that shall give her mite to the treasury, and the poor man who shall bring to the thirsty a cup of cold water, shall not lose their reward.

b) Use the following transitional/ connecting devices in sentences of your own :

To sum up, Although, Nevertheless, In spite of, As a result

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

The study of history provides many benefits. First, we learn from the past. We may repeat mistakes, but, at least, we have the opportunity to avoid them. Second, history teaches us what questions to ask about the present. Contrary to some people's view, the study of history is not the memorization of names, dates, and places. It is a thoughtful examination of the forces that have shaped the courses of human life. We can examine events 'from the past and then draw inferences about current events. History teaches us about likely outcomes.

Another benefit of the study of history is the broad range of human experience which is covered. War and peace are certainly covered as are national and international affairs. However, matters of culture (art, literature and music) are also included in historical study. Human nature is an important part of history: emotions like passion, greed, and insecurity have influenced the shaping of world affairs. Anyone who thinks that the study of history is boring has not really studied history.

a) Discuss the main idea of this passage.

b) Which method of teaching history would the author of this passage support?

c) What are the benefits of studying history.

d) Give the meaning of the following words and use these in the sentences of your own: Inferences, Outcomes, Contrary, Memorization.

4. Write an essay in about 500 words on "*Information Technology and Its Impact on Future Work Culture*".

5. Assuming yourself to be the Purchase Officer of Sigma Eye Centre, 24, Vasant Vihar, Patna, write a complaint to Clear Vision Store 124, Mayur Vihar, New Delhi, reporting that the four of the eight consignments containing glasses have been received in a damaged condition. Write a letter asking for the replacement of the damaged goods and seek compensation for the additional postage cost incurred. Invent the details necessary.

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Agriculture Engineering/Artificial Intelligence & Machine Learning/Artificial Intelligence (AI) and Data Science/Artificial Intelligence/Automation & Robotics/Automobile Engineering/Civil Engineering/Computer Science Engg./Data Science/ Electrical & Electronics Engineering/ Electrical Engineering/ Electronics & Communication Engineering/ Electronics & Electrical Engineering/ Food Technology/ Information Technology/ Mechanical Engineering/ CSE (Internet of Things and Cyber Security including Block Chain Technology)/B.Tech. (Computer Science & Engineering/Artificial Intelligence & Machine Learning/Cyber Security Data Science/IOT) (Sem.–1,2)

ENGINEERING GRAPHICS & DESIGN

Subject Code : BTME-101-21

M.Code : 91335

Date of Examination : 19-07-22

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

b) Draw a regular Pentagonal Lamina of side 55mm.

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

d) What do you mean by Representative Fraction (RF)?

e) Explain any Two Lines used in Engineering Drawing.

f) How will you represent Metals and Liquid on a drawing sheet?

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

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

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

j) Differentiate Isometric Projections and Isometric Drawing.

SECTION-B

2) Construct a Diagonal Scale of R.F = 1:50 to read meters, decimeters and centimeters and long enough to measure up to 6m. Indicate 3.46m on the scale.

3) A point "G" is 22mm in front of VP and 42mm above HP. Draw its projections and find out its shortest distance from the reference line.

4) A line AB has its end "A" 15 mm above HP and 20 mm in front of VP. End "B" 40 mm above HP and 50 mm in front of VP. The distance between the end projectors is 45 mm. Draw the projections of the line and find out its true length, true inclinations with principal planes, HT and VT.

5) Line "AB" 65mm long; has its end "A" both in HP and VP. It is inclined at 45° to the "HP" and 30° to the "VP". Draw its projections when the line is lying in third quadrant.

SECTION-C

6) A right regular triangular prism of base edge 40 mm, axis 65 mm long is resting on its rectangular face on HP, with axis parallel to both HP and VP. Draw its projections.

7) A regular hexagonal thin plate of 45 mm side is resting on one of its corners in HP. Draw its projections when the plate surface is vertical and inclined to VP at 30°.

8) Draw the projections of a cone of base diameter 42 mm and axis 62 mm; lying on HP on its generator such that the axis is parallel to VP. Assume the cone lying in first quadrant.

9) A right regular hexagonal prism, edge of base 20 mm, and height 50 mm has a central circular hole of diameter 20 mm drilled centrally through it along its axis. Draw its isometric view.

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Aerospace Engineering/Bio Technology/ Civil Engineering/Computer Science & Engineering/Electrical & Electronics Engineering/Electrical Engineering/Electronics & Communication Engineering/Electronics & Electrical Engineering/Information Technology/Mechanical Engineering) (Sem.–1,2)

ENGINEERING DRAWING

Subject Code : BTME-102

M.Code. : 54102

Date of Examination : 19-07-22

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

SECTION–A

1) Answer briefly :

a) What is a sectional view? Why they are important in engineering drawing?

b) Draw a regular Pentagonal Lamina of side 55mm.

c) What is the purpose of the development of surfaces? Explain.

d) What do you mean by Representative Fraction (RF)?

e) Draw symbols used to represent first angle and third angle orthographic projections.

f) Explain with the help of a suitable drawing, the Aligned and Unidirectional system of placement of dimensions.

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

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

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

j) Differentiate Isometric Projection and Isometric Drawing.

SECTION-B

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

3) Plan and elevation of a line "AB" 60 mm long, measures 54 mm and 45 mm respectively. End "A" is 15 mm from HP and 10 mm from VP. Draw the projections of the line and determines its inclination to the reference planes when line lies in first quadrant.

4) A regular pentagonal plate of side 40 mm is resting on HP on one of its sides such that its surface makes an angle of 40° with HP and is perpendicular to VP. Draw the orthographic projections.

5) A right regular hexagonal prism of base edge 38 mm, axis 62 mm long is resting on its rectangular face on HP, with axis parallel to both HP and VP. Draw its projections.

SECTION-C

6) A right regular hexagonal prism of base edge 20 mm and height 50 mm rests on HP on its base with one of its base edges perpendicular to VP. An Auxiliary Inclined Plane (AIP) inclined to HP at 30° cuts its axis at 30 mm from the base. Develop the lateral surface of the truncated prism.

7) A right circular cone, diameter of base rim 40 mm and height 70 mm rests on its base on HP. A section plane perpendicular to VP and inclined to HP at 45° cuts the cone meeting its axis at a distance of 40 mm from its apex. Draw its front view and sectional top view.

8) A cylinder 50 mm diameter and 70 mm long axis resting on HP on its base is completely penetrated by another cylinder of 40 mm diameter and 70 mm long axis horizontally. Both axes intersect & bisect each other. Draw projections showing curves of intersections.

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

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Agriculture Engineering/Artificial Intelligence & Machine Learning/Artificial Intelligence (AI) and Data Science/Artificial Intelligence/Automation & Robotics/Automobile Engineering/Bio Technology/Civil Engineering/Computer Science & Engineering/Computer Science & Engineering (Artificial Intelligence & Machine Learning)/ Computer Science & Engineering (Cyber Security)/ Computer Science & Engineering (Data Science)/ Computer Science & Engineering (IOT)/ Data Science/Electrical & Electronics Engineering/Electrical Engineering/Electronics & Communication Engineering/Electronics & Electrical Engineering/Food Technology/Information Technology/Mechanical Engineering/CSE (Internet of Things and Cyber Security including Block Chain Technology)/B.Tech Computer Engg./CSE/ECE (PIT))

(Sem-1,2)

BASIC ELECTRICAL ENGINEERING

Subject Code : BTEE-101-18

M.Code : 75339

Date of Examination : 15-07-22

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 & 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

Answer the following questions in brief :

1. a) Define apparent power and reactive power of an AC circuit.

   b) What is the effect of frequency on capacitive reactance?

   c) A resistance of 15Ω is connected in series with an inductance of 0.02H. This combination is connected across 200V, 50hz supply. Calculate (i) current flowing in the circuit, (ii) power factor.

   d) Differentiate between star and delta connections.

   e) What is series resonance?

f) What material are used in these parts of a DC motor (i) commutator segments (ii) brushes?

g) Define the voltage regulation for a transformer.

h) What is admittance? Give its units.

i) "*For electric traction DC series motors are best suited*". Why?

j) List the properties of an ideal fuse wire.

SECTION-B

2. Derive the relationship between voltage and current for a purely inductive circuit. Also show that the average power consumed by the circuit is zero.

3. An alternating voltage is given as v = 220sin 314t, determine its (i) maximum value (ii) effective value (iii) form factor (iv) value of voltage after 0.002 sec taking reckoning time from the instant when voltage is zero and becoming positive; (v) time after which voltage attains 110 V for the first time.

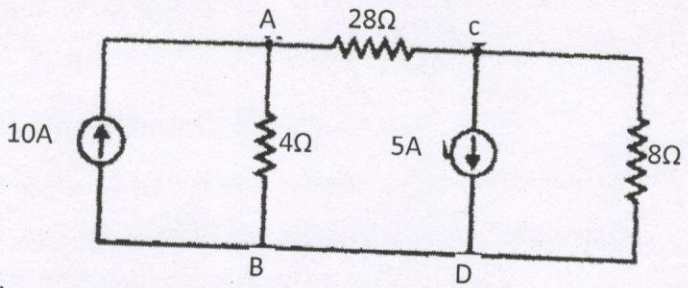
4. Discuss the principle of operation of a DC motor. Also, derive the emf equation.

5. Using a diagram explain the construction of an underground cable. Also write regarding is the function of each part.

SECTION-C

6. Distinguish between a three-phase squirrel cage induction motor and phase wound induction wound.

7. Find the current in 28Ω resister using source conversion method.



8. For the "one time use" type of fuse what do the following convey?

   a) Fuse Current Carrying Capacity
   b) Breaking capacity
   c) I^2t value of fuse
   d) Rated voltage of fuse.

9. Discuss the construction of an auto-transformer and derive the expression for the copper savings in it.

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Artificial Intelligence & Machine Learning/Computer Engineering/Computer Science & Engineering/Computer Science & Engineering (Artificial Intelligence & Machine Learning)/ Information Technology/CSE (Internet of Things and Cyber Security including Block Chain Technology)/ CSE (PIT)) (Sem.–4)

COMPUTER ORGANIZATION AND ARCHITECTURE

Subject Code : BTES-401-18

M.Code : 77627

Date of Examination : 05-07-22

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) What is Control Unit?

   b) Discusss carry look-ahead adder.

   c) Write functioning of USB.

   d) Define concept of Memory Organization.

   e) What is meant by division restoration?

   f) Write use of software interrupts?

   g) What are CPU registers?

   h) Discuss floating point arithmetic.

   i) Briefly explain cache size?

   j) List advantages of pipelining?

SECTION-B

2. Explain different addressing modes used in central processing unit.

3. What are the advantages and disadvantages of hardwired and microprogrammed design approaches?

4. What is DMA? Give an example, where DMA mode of data transfer is useful.

5. Discuss the role of cache coherency in parallel processors?

6. How the data is represented in computer architecture? Explain with example

SECTION-C

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

8. What is the need of replacement algorithms in memory organization? Explain with example.

9. Discuss the role of pipelining for data processing in computer organization. How it increases the throughput?

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engineering)/(ECE) (PIT)
(Sem.–4)

MICROPROCESSORS AND MICROCONTROLLERS

Subject Code : BTEC-402-18
M.Code : 77566
Date of Examination : 05-07-22

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) What is the function of ALE signal?

b) How many ways an 8051 microcontroller can be interrupted?

c) What are special functions registers?

d) List the interrupt sources of 89C51 with their vector address.

e) What is the use of directives? List them.

f) Differentiate between SJMP and LJMP instructions.

g) Differentiate microprocessor and microcontroller.

h) What are the functions of an accumulator?

i) What is an operand? Explain with an example.

j) What is baud rate? What is its significance and how can it be increased?

SECTION-B

2. Explain the architecture of 8051 microcontroller with a neat block diagram.

3. Draw the interrupt vector table of 8085 microprocessor and explain its operation.

4. Show and explain the ADC interfacing with 8051 microcontroller.

5. Discuss about the organisation of Internal RAM and Special function registers of 8051 microcontroller in detail.

6. Draw the TMOD register format and explain the different operating modes of timer in 8051 microcontroller.

SECTION-C

7. a) Draw and explain the timing diagram for IN and OUT instructions of 8085.

   b) Explain the program memory and data memory structure of 8051 microcontroller.

8. Draw the pin diagram of 8051 microcontroller and explain its port structure.

9. Show and explain the interface of LCD or 7 segment display using 8051 microcontroller.

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electronics and Commiunication Engg.) (Sem.–4)

DATA STRUCTURES AND ALGORITHMS

Subject Code : BTCS-301-18

M.Code : 77567

Date of Examination : 07-07-22

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. What is a Queue? Write applications of queue.

   b. Define link list. How it is represented in memory?

   c. What is a data structure? Give example.

   d. Compare single and doubly linked list.

   e. What do you mean by algorithmic complexity?

   f. Discuss the sequential representation of a tree.

   g. How you can delete a node from an existing binary tree.

   h. Distinguish between linear and binary search techniques.

   i. Compare array and linked list data structures.

   j. What is a priority queue? How it is created?

SECTION- B

2. What do you mean by stack? Explain the various operations of stack.

3. Write an algorithm for linear search and discuss with suitable example.

4. Write an algorithm for Selection sort and discuss the same with the help of an example.

5. What is a binary tree? Explain binary tree traversals with the help of an example.

6. Define Graph. Explain BFS and DFS graph traversals with examples.

SECTION-C

7. a) Compare sequential and linked memory representation of binary tree.

   b) What is the concept of Hashing? Explain the various techniques used for hashing. How collisions are handled while addressing?

8. Write an algorithm to insert a new node in a sorted one-way link list and illustrate with the help of an example.

9. What is a circular queue? Write algorithm how you can insert and delete an element from circular queue. Write its applications also.

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00 JUL 2022

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

Total No. of Pages : 02

Total No. of Questions : 18

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

OPERATING SYSTEM

Subject Code : BTCS-402-18

M.Code : 77628

Date of Examination : 07-07-22

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

Write briefly :

1. PCB
2. Protection
3. Threshold
4. System Calls
5. Soft RTS
6. Multi-programming OS
7. Waiting Time
8. Logical Address
9. Preemptive
10. Frame.

SECTION-B

11. What is an Operating System and its services?

12. Explain the FIRST fit, and Worst fit allocation algorithms with the help of example.

13. Explain Belady's Anomaly.

14. Write a detailed note on paging and segmentation.

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

SECTION-C

16. A block manager for a variable size region strategy has a free list of blocks of size 600, 1400, 1000, 2200, 1600 and 1050 bytes. What block size will be selected to honor a request for 1605 bytes using best fit policy?

17. What is thrashing? How it is eliminated?

18. What is Page Fault? Explain the process with the help of diagram. Also, define swapping.

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

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (AI & ML / CE / CSE) / B.Tech CSE (Internet of Things & Cyber Security Including Block Chain Technology) / PIT B.Tech CSE (Sem.–4)

DESIGN & ANALYSIS OF ALGORITHMS

Subject Code : BTCS-403-18

M.Code : 77629

Date of Examination : 09-07-22

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. Give an example of dynamic programming approach.
2. What do you understand by algorithm evaluation?
3. What is NP-complete problem?
4. What is asymptotic time complexity?
5. What is the basic principal of divide-and-conquer?
6. List the various applications of DFS and BFS.
7. How the Prim's algorithm is better in finding the Minimal spanning tree in comparison to the Kruskal's method?
8. What are heuristics? What are their characteristics?
9. What are the various steps in the design of an algorithm?
10. Are the sub solutions overlapping in dynamic programming approach?

SECTION-B

11. Explain the Big-Oh computation for each of the following control structures:

    (i) Sequencing

    (ii) If-then-else

    (iii) "for" loop

    (iv) "While" loop

    (v) Recursion

12. Solve the following instance of the knapsack problem using branch and bound technique (assume W = 3)

Items	w	v
11	1	2
12	2	3
13	3	4

13. Apply Prim's Algorithm and Kruskal algorithm to the graph to obtain minimum spanning tree. Do these algorithms generate same output-Justify.

14. Explain the concepts of P, NP and NP completeness.

15. What are NP hard problems? Write short notes on the procedures of the following approximation algorithms to solve TSP using suitable examples.

    a) Nearest Neighbor algorithm.

    b) Twice-around-the-tree algorithm.

SECTION-C

16. Write an algorithm for merging two sorted arrays into one array. Explain with suitable examples.

17. Modify the Dijkastra's algorithm to solve All-Pairs-Shortest-Path problem.

18. Find the Big-Oh notations for the following functions :

    (i) $f(n) = 78889$

    (ii) $f(n) = 6n^2 + 135$

    (iii) $f(n) = 7n^2 + 8n + 56$

    (iv) $f(n) = n^4 + 35n^2 + 84$

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engineering)(PIT)(Sem.–4)

SIGNALS AND SYSTEMS

Subject Code :BTEC-403-18

M.Code :77568

Date of Examination : 09-07-22

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) Give the difference between periodic and aperiodic signal.

b) Define continuous time unit step and unit impulse.

c) What is meant by signal? Contrast the differences between energy and power signal.

d) Find the Fourier transform of unit impulse $\delta(t)$.

e) Differentiate between joint and conditional probabilities.

f) Define probability density function.

g) Distinguish between a continuous random variable and a discrete random variable.

h) Define Fourier Transform. Write short notes on dirichlets conditions.

i) Define probability of random events?

j) Define sampling theorem

SECTION-B

2. When does aliasing occur? Explain the effects of aliasing.

3. Discuss properties of power spectral density function.

4. Find the input $x(n)$ of the system, if the impulse response $h(n)$ and the output $y(n)$ asshown below.

   $h(n) = \{1,2,3,2\}$ $y(n) = \{1,3, 7,10)\}$

5. Find continuous time Fourier transform of the signal $s(t)=t \cos At$

6. Explain the reconstruction of the signal from its samples.

SECTION-C

7. a) State and prove time shifting and time scaling properties of Fourier Transform.

   b) Find the Laplace transform of the signal $x(t) = e^{-at}u(t) + e^{-bt}u(-t)$

8. The input and output of a causal LTI system are related by the differential equation,

$$\frac{d^2y(t)}{dt^2} + 6\frac{dy(t)}{dt} + 8y(t) = 2x(t)$$

   i) Find the impulse response of the system.

   ii) What is the response of this system if $x(t) = te^{-2t}u(t)$

9. Write a note on:

   a) Parseval's Theorem

   b) Fourier Series.

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

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (CSE/IT) (Sem.–4)

SYSTEM PROGRAMMING

Subject Code : BTCS-405

M.Code. : 56608

Date of Examination : 09-07-22

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

Answer briefly :

1. What are macro processors?
2. Differentiate between Assembler and Interpreter?
3. What is code generation?
4. Write a short note on dynamic binding?
5. What are the advantages of relocating loaders?
6. Write need of DOS editor?
7. What are the contents of literal table?
8. Write any one use of compiler.
9. Briefly explain LEX.
10. Write about vi editor.

SECTION-B

11. Write a short note on recursive macro expansion.

12. Discuss how Linkers are used in System Programming.

13. Give the example of concept of code optimization in System programming.

14. Write the concept of lexical analysis in compiler design.

15. Discuss about editors. What are its types?

SECTION-C

16. Write the design procedure of a two pass assembler with the help of a suitable block diagram.

17. Discuss how loaders are used in System Programming. Write about various loading schemes.

18. What is debugger? Discuss various debugging techniques used in system Programming.

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

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (CSE/IT) (Sem.–4)

DISCRETE STRUCTURES

Subject Code : BTCS-402

M.Code : 71106

Date of Examination : 12-07-22

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) In degree

2) Ring

3) Directed Graph

4) Euler circuit

5) Ordered set

6) Chromatic number

7) Equivalence relation

8) Postfix notation

9) Surjection

10) Semi group.

SECTION-B

11) Show that the intersection of the two left ideals of a ring is again a left ideal of a ring.

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

13) Explain the following with example Homomorphism and Isomorphism.

14) Consider G = {1, 5, 7, 11} under multiplication modulo 12 is G cyclic? Also, find all subgroups of G.

15) Prove that a graph G with e = v -1 that has no circuit is a tree.

SECTION-C

16) Write detailed note on :

Cut Points, Simple Graphs, Multigraphs.

17) Define minimum spanning tree. Explain Prim's algorithm to find minimum spanning tree.

18) Prove that the sum of all degree of all the vertices in a graph is equal to twice the number of edges in a graph.

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0 0 JUL 2022

Roll No. | | | | | | | | | | | | Total No. of Pages : 04

Total No. of Questions : 11

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

UNIVERSAL HUMAN VALUES

Subject Code : HSMC-122-18

M.Code : 77630

Date of Examination : 12-07-22

Time : 2 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A contains objective type questions.
2. SECTION-B contains short answer type questions.
3. SECTION-C contains descriptive answer type questions.
4. Attempt ALL questions.

SECTION-A

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

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

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

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

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

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

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

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

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

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

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

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

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

e) Right understanding + ... = Mutual prosperity.

सही समझ + ... = पारस्परिक समृद्धि

ਠੀਕ ਸਮਝ +..... = ਆਪਸੀ ਖੁਸ਼ਹਾਲੀ

f) Human values are universal.

मानवीय मूल्य सार्वभौमिक है।

ਮਾਨਵੀ ਮੁੱਲ ਸਾਵਰਭੌਮਿਕ ਹਨ।

g) Prosperity and wealth are equivalent.

समृद्धि और धनवनता बराबर है।

ਖੁਸ਼ਹਾਲੀ ਅਤੇ ਅਮੀਰੀ ਬਰਾਬਰ ਹਨ।

h) Imaging is an activity of the body.

इमेजिंग शरीर की एक गतिविधि है।

ਚਿਤਰਣ ਸਰੀਰ ਦੀ ਇੱਕ ਗਤੀਵਿਧੀ ਹੈ।

i) The innateness of material order is existence.

सामग्री आदेश की प्रकृति अस्तित्व है।

ਵਸਤੂ ਆਦੇਸ਼ ਦੀ ਕੁਦਰਤ ਅਸਤੀਤਵ ਹੈ।

j) Right understanding forms the basis for definitiveness of human conduct.

सही समझ मानव आचरण की निश्चितता के लिए आधार बनाता है।

ਠੀਕ ਸਮਝ ਮਨੁੱਖ ਚਾਲ ਚਲਣ ਦੀ ਨਿਸ਼ਚਿਤਤਾ ਲਈ ਆਧਾਰ ਬਣਾਉਂਦੀ ਹੈ।

SECTION-B

(5 × 4 = 20)

2. What are the basic guidelines of value education?

मूल्य शिक्षा की बुनियादी दिशा-निर्देश क्या हैं?

ਮੁੱਲ ਸਿੱਖਿਆ ਦੀ ਬੁਨਿਆਦੀ ਦਿਸ਼ਾ-ਨਿਰਦੇਸ਼ ਕੀ ਹਨ?

3. Explain Natural Acceptance.

सहज स्वीकृति समझाओ।

ਕੁਦਰਤੀ ਮੰਜੂਰੀ ਸਮਝਾਓ।

4. What do you mean by SVDD, SSDD and SSSS? How is the transformation possible from SSDD to SSSS?

आपका SVDD, SSDD और SSSS से क्या मतलब है? SSDD से SSSS के लिए परिवर्तन कैसे संभव है?

ਤੁਹਾਡਾ SVDD, SSDD ਅਤੇ SSSS ਤੋਂ ਕੀ ਮਤਲਬ ਹੈ? SSDD ਤੋਂ SSSS ਤੱਕ ਦੀ ਤਬਦੀਲੀ ਕਿਸ ਤਰ੍ਹਾਂ ਸੰਭਵ ਹੈ?

5. 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 के लिए 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?

6. Explain the process of self-exploration with the help of a suitable diagram.

एक उपयुक्त आरेख की मदद से आत्म-अन्वेषण की प्रक्रिया को समझाईये।

ਇੱਕ ਢੁਕਵੇਂ ਚਿੱਤਰ ਦੀ ਮਦਦ ਨਾਲ ਆਤਮ-ਅਧਿਐਨ ਦੀ ਪ੍ਰਕਿਰਿਆ ਨੂੰ ਸਮਝਾਓ।

SECTION-C

(5 × 6 = 30)

7. What is happiness and prosperity? What are the wrong notions about attaining happiness and prosperity? What are the problems faced due to these wrong notions about happiness and prosperity?

सुख और समृद्धि क्या है? खुशी और समृद्धि को प्राप्त करने के बारे में गलत धारणा क्या है? सुख और समृद्धि के बारे में गलत धारणाओं के कारण पेश आ रही समस्याएं क्या हैं?

ਖੁਸ਼ੀ ਅਤੇ ਖੁਸ਼ਹਾਲੀ ਕੀ ਹੈ? ਖੁਸ਼ੀ ਅਤੇ ਖੁਸ਼ਹਾਲੀ ਨੂੰ ਪ੍ਰਾਪਤ ਕਰਨ ਦੇ ਬਾਰੇ ਗਲਤ ਧਾਰਨਾ ਕੀ ਹੈ? ਖੁਸ਼ੀ ਅਤੇ ਖੁਸ਼ਹਾਲੀ ਦੇ ਬਾਰੇ ਗਲਤ ਧਾਰਣਾਵਾਂ ਦੇ ਕਾਰਨ ਕੀ ਸਮਸਿਆਵਾਂ ਪੇਸ਼ ਆ ਰਹੀਆਂ ਹਨ?

OR

What is the need of Value-Education?

मूल्य शिक्षा की क्या जरूरत है?

ਮੁੱਲ ਸਿੱਖਿਆ ਦੀ ਕੀ ਜ਼ਰੂਰਤ ਹੈ?

8. Human being is co-existence of Self and body, explain.

इंसान स्वयं और शरीर का सह-अस्तित्व कैसे है? समझाओ।

ਇਨਸਾਨ ਮੈਂ ਅਤੇ ਸਰੀਰ ਦਾ ਸਹਿ-ਅਸਤੀਤਵ ਹੈ, ਸਮਝਾਓ।

OR

Explain Pre-conditioning, Sensation and Natural-Acceptance.

पूर्व-मान्यता, संवेदना और प्राकृतिक-स्वीकृति समझाओ।

ਪੂਰਵ-ਮਾਨਤਾ, ਸੰਵੇਦਨਾ ਅਤੇ ਸਹਿਜ-ਸਵਿਕਰਿਤੀ ਸਮਝਾਓ।

9. Explain self-organisation and health.

आत्म संगठन और स्वास्थ्य के बारे में बताएं।

ਆਤਮ ਸੰਗਠਨ ਅਤੇ ਸਿਹਤ ਦੇ ਬਾਰੇ ਵਿੱਚ ਦੱਸੋ।

09 JUN 2023

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

Total No. of Pages : 02

Total No. of Questions : 09

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

CLOUD COMPUTING

Subject Code : BTCS-612-18

M.Code : 79254

Date of Examination : 23-06-2023

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) Applications of cloud computing

   b) VPN

   c) API

   d) Community Cloud

   e) Cloud Security Risks

   f) Load Balancing in Cloud

   g) Service Level Agreement

   h) Vendor Lock-In

   i) Grid Computing

   j) Multitenancy.

SECTION-B

2. Write a note on Historical developments and challenges of cloud computing.

3. What do you understand by virtualization in cloud computing? Explain various technologies available under virtualization.

4. How scalability and elasticity is achieved in the cloud? Explain in detail.

5. Explain in detail user account and service hijacking.

6. Discuss and compare AWS, AZURE and Google Cloud services.

SECTION-C

7. An existing Bicycle Manufacturing unit wants to migrate existing stand alone IT Infrastructure to the cloud; explain the steps involved in migrating towards the cloud.

8. An existing IT Company A.Ltd spans multiple states; suggest the Cloud deployment model for A.Ltd. Explain the Pros and Cons of the suggested Deployment Model over other available models.

9. Writer note on the issues and measures for improving Cloud security.

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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 : 20-06-2023

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) Discuss various issues in machine learning.

b) Write a short note on Data Cleaning

c) What is data reduction?

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

e) Describe briefly how is the performance of regression models evaluated?

f) Discuss various applications of clustering.

g) Differentiate between mutation and elitism in genetic algorithms.

h) What is the role of selection in the process of genetic algorithm optimization?

i) Differentiate between precision and recall.

j) How does the acceptable error impact the accuracy of a correlation analysis using R-square?

SECTION-B

2. Compare and contrast the advantages and disadvantages of decision trees and random forests in machine learning.

3. Explain the concept of Support Vector Machine (SVM) and its application in binary classification problems. Discuss the advantages and limitations of SVM compared to other classification algorithms.

4. Explain the basic concepts of genetic algorithms, including gene representation and fitness function. Discuss the importance of genetic operators such as selection, crossover, and mutation in the optimization process.

5. Describe the Naive algorithm for finding association rules and explain the importance of support and confidence in this algorithm.

6. Explain the concepts of Multiple Linear Regression and Polynomial Regression, including the assumptions and limitations of these regression models.

SECTION-C

7. Explain the importance of splitting a dataset into training and testing sets in machine learning. Describe the process of randomly splitting a dataset into training and testing sets and explain the potential issues with this approach.

8. Explain the concept of Reinforcement Learning (RL) and its application in machine learning. Discuss the difference between model-based and model-free RL approaches and explain when each approach is appropriate to use.

9. Explain the concept of Neural Networks and their applications in machine learning. Discuss common activation functions and explain the advantages and limitations of each function.

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

Total No. of Pages : 02

Total No. of Questions : 09

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

OPERATING SYSTEM

Subject Code : BTCS 402-18

M.Code : 79262

Date of Examination :20-06-2023

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) Discuss structure of a disk.

b) What is a process? Discuss states of a process.

c) Discuss layered architecture of an operating system.

d) Write main features of UNIX.

e) What is a deadlock? Write necessary conditions for deadlock occurrence.

f) What do you mean by a Scheduler? Discuss its types.

g) What is a Process Control Block (PCB). What information is stored in this?

h) What do you mean by process synchronization?

i) What is swapping? Explain.

j) What do you understand by locality of reference?

SECTION-B

2. What do you mean by an operating system? Explain functionality of Batch and Multiprogramming operating Systems.

3. Explain various page replacement algorithms.

4. What are semaphores? How can they be used to implement mutual exclusion?

5. **Explain real time scheduling algorithms :**

   RM and EDF.

6. Discuss FIFO, SSTF and C-SCAN methods of disk scheduling with example.

SECTION-C

7. What do you mean by CPU scheduling? Explain various scheduling algorithms.

8. Explain various memory management schemes in detail.

9. What is a file? Discuss various file access methods. Explain the directory structure in detail.

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

Total No. of Questions : 09

B.Tech. (CSE) (Sem–6)

MOBILE APPLICATION DEVELOPMENT

Subject Code : BTCS-620-18

M.Code : 79258

Date of Examination : 19-06-2023

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) Android SDK

b) System permissions

c) Mobile platforms

d) Intents

e) Text-to-Speech techniques

f) Sync Task

g) SQLite

h) Android user

i) Multithreading

j) Mobile apps Testing.

SECTION-B

2. Describe about the Android development environment with suitable examples.

3. Describe different types of Android user interface controls.

4. Explain briefly about the mobile software engineering with framework and tools.

5. Discuss important characteristics of mobile applications.

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

SECTION-C

7. Describe Service in mobile apps giving its states and lifecycle.

8. **Define the following terms :**

   a) Shared preferences

   b) VUI

   c) Peer-To-Peer Architecture

   d) Mobile Agents.

9. a) Explain myths of security and hacking of Android application with a suitable example.

   b) Explain about active transactions in Android series. How data will be secured while transacting data?

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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 : 06-06-23

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 state space representation?

b. What do you mean by policy iteration?

c. What is decision tree?

d. What is heuristic search?

e. What is rule based learning?

f. What do you mean by open list?

g. Define temporal difference learning.

h. Define random search?

i. Role of AI in today's era.

j. What is an expert system?

SECTION-B

2. Explain Depth First Search, in detail.

3. What do you mean by AI? Explain contribution of AI in various fields.

4. Explain hidden Markov model in detail.

5. What do you mean by MDP? Explain.

6. Explain Knowledge based system in detail with suitable example.

SECTION-C

7. What are the characteristics of AI problem? Explain with the help of example.

8. What do you mean by Reinforcement Learning? Explain practical applications of RL.

9. Explain Beat First Search and Game Search, in detail with suitable examples.

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00 JUL 2022

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Mechanical Engg.) (Sem.–6)

REFRIGERATION AND AIR CONDITIONING

Subject Code : BTME601-18

M.Code : 79650

Date of Examination : 02-07-22

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) Explain how a refrigerant produces a cooling effect.

b) What are the advantages of using a flash chamber in parallel with evaporator?

c) Suggest some measures to improve the working of a vapor compression refrigeration system.

d) What are various methods of leak detection in refrigeration system?

e) What do you understand by the performance characteristics of refrigerant compressor?

f) What is the basic principle of vapor absorption refrigeration system?

g) What are human requirements of comforts?

h) Atmospheric air temperature is 20°C and specific humidity is 9.5 gm/kg of dry air. Find the partial pressure of water vapour and specific humidity.

i) Why wet compression is avoided?

[illegible] proper refrigerant?

SECTION - B

2. A vapor compression refrigeration machine with R – 12 as refrigerant has a capacity of 20 T of refrigeration operating between -28°C and 26°C. The refrigerant is subcooled by 4°C before the throttle value and superheated by 5°C before leaving the evaporator. Calculate the theoretical COP and power required.

3. "*Compound compression with intercooling is effective method of operation*". Discuss.

4. Explain with a neat sketch, the working principle of thermostatic expansion valve. Discuss the factors that affect the capacity of the valve.

5. What are secondary refrigerants? Where these are used? Explain its importance in the context of big ice manufacturing plants.

6. Draw a neat diagram of the Lithium Bromide Water Absorption refrigeration system and explain its working.

SECTION – C

7. Air flowing at the rate of $90m^3$/min at 45°C DBT and 60% RH is mixed with another stream flowing at the rate of $20m^3$/min at 25°C DBT and 40% RH. The mixture flows over a cooling coil whose ADP temperature is 12°C and bypass factor is 0.22. Find DBT and RH of air leaving the coil. If this air is supplied to an air conditioned room where DBT of 25°C and RH of 40% are maintained, estimate Room Sensible Heat Factor (SHR) and Cooling coil capacity in tons of refrigeration.

8. What are the thermodynamic advantages of sub-cooling the liquid refrigerant in the condenser? State different methods of sub-cooling and explain their relative merits and demerits.

9. Explain the following :

   a) Two phased Carnot cycle and its limitations

   b) Eco-friendly refrigerants

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

Total No. of Questions : 18

B.Tech. (CSE) PIT(Sem.–6)

COMPILER DESIGN

Subject Code : BTCS-601-18

M.Code : 79249

Date of Examination : 02-07-22

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

Write briefly :

1. Lexeme
2. Error
3. Three address code
4. Impact of empty entry in parsing table.
5. Type checking
6. NFA
7. Regular expression
8. Syntax tree
9. Context free grammar
10. Phase of a compiler.

SECTION-B

11. Write a note on input buffering.

12. How shift reduce parsing is performed on given below grammar, explain in detail.

    $S \rightarrow S + S$

    $S \rightarrow S*S$

    $S \rightarrow id$

13. Differentiate between Parse tree and Syntax tree with the use of suitable example.

14. Explain the role of symbol table, symbol table management in compiler design.

15. Explain various issues of code generation in compiler design.

SECTION-C

16. Write a note on basic blocks and its optimization techniques.

17. Explain in detail the role of various phases of compiler with suitable example.

18. Explain in detail error handling mid recovery techniques available in compiler.

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

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (CSE) (Sem.–6)

SIMULATION AND MODELING

Subject Code : BTCS-601

M.Code : 71107

Date of Examination : 02-07-22

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

Answer briefly :

1) Mention two advantages and two disadvantages of simulation.

2) Write the major operations of list processing.

3) List the statistical tools used for data analysis.

4) Differentiate activity and attribute with respect to system simulation.

5) What is an unbiased estimator? Give example.

6) What is sampling with equal and unequal variances?

7) Name any two techniques to generate Pseudo-Random numbers.

8) Compare process orientation and event orientation in simulation of computer systems.

9) What is meant by stochastic nature of output data?

10) State the equivalence property of queuing networks.

SECTION-B

11) What is meant by event scheduling and time-advance mechanism in discrete event simulation? Give appropriate examples for both.

12) Describe the inverse transformation technique for Weibull and for Empirical Continuous Distribution.

13) What is preemptive and non-preemptive priority discipline queuing model? Give example.

14) Do you think the test of significance is important in the comparison and evaluation of simulation models? Give proper reasons.

15) Discuss the concept of both, confidence interval with specified precision and multiple linear regressions.

SECTION-C

16) What is the use of network queues? Briefly discuss the steady state behavior of infinite (M/G/l) and finite (M/M/c/K/K) calling population models.

17) Explain the basic structure of queuing models by taking any suitable queuing model and highlight the role of exponential and non-exponential distributions in statistical modeling.

18) Describe the following with respect to input modeling :

    a. Chi-Square and Chi-Square with equal probabilities.

    b. Calibration and Validation.

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) PIT (Sem.–6)

ARTIFICIAL INTELLIGENCE

Subject Code : BTCS-602-18

M.Code : 79250

Date of Examination : 05-07-22

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) Multi-agent environment

   b) Search graph

   c) Heuristic search

   d) Depth first search

   e) Probabilistic reasoning

   f) Bayesian networks

   g) Markov decision process

   h) Policy iteration in Markov decision process

   i) Q-learning algorithm in reinforcement learning

   j) Temporal difference learning.

SECTION-B

2. Discuss the various issues and challenges in Artificial Intelligence.

3. Explain any one game search technique in Artificial Intelligence.

4. Describe the concept of conditional probability in detail.

5. How does utility functions work in Markov decision process?

6. Explain how the Bayesian networks are represented and constructed?

SECTION-C

7. Discuss the searching algorithm with closed and open list. Give suitable example.

8. Differentiate between tree and graph structures.

9. With the help of suitable illustrations, describe the importance of Q-learning algorithm in reinforcement learning.

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

Total No. of Pages : 02

Total No. of Questions : 09

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

CLOUD COMPUTING

Subject Code : BTCS-612-18

M.Code : 79254

Date of Examination : 03-07-22

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 short notes on :

   a) Hypervisor

   b) Scalability

   c) API

   d) IaaS

   e) Private Cloud

   f) Cloud Migration

   g) Access Control

   h) Security Breach

   i) AWS

   j) Multitenancy

SECTION-B

2. Explain in detail the characteristics, vision and applications of cloud computing.

3. Write a note on virtualization techniques.

4. Explain in detail the various cloud service models and their examples.

5. What do you understand by Platform as a service? Explain its purpose.

6. Explain in detail various web services provided by AWS cloud provider.

SECTION-C

7. Explain in detail the various steps involved in cloud migration.

8. Write a note on security risks and the measures involved in cloud computing.

9. Explain different types of Hypervisors, their limitations available in cloud computing.

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Civil Engineering / Electrical & Electronics Engineering / Electrical Engineering / Electronics & Communication Engineering)

(Sem.–6)

OPERATING SYSTEM

Subject Code : BTCS 402-18

M.Code : 79262

Date of Examination : 03-07-22

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) Differentiate between UNIX and WINDOWS Operating System.

b) Write at least two advantages of Microkernel based structure of an Operating System.

c) Differentiate between Pre-emptive and Non-preemptive scheduling algorithms.

d) List at least two benefits of threads.

e) What is critical section problem?

f) List the necessary conditions for a deadlock to occur.

g) Why page size is always power of 2?

h) Explain the term compaction in brief.

i) Define the term Disk Bandwidth.

j) What do you mean by device drivers?

SECTION-B

2. Write a detailed note on following Operating Systems

   a) Time sharing operating systems

   b) Real Time operating systems

3. Write a detailed note on the concept of multithreads.

4. Explain in detail about Dinning Philosopher problem.

5. What is deadlock? Explain deadlock prevention in detail.

6. Write a detailed note on Principles of I/O Software.

SECTION-C

7. Write a detailed note on Operating System Services.

8. Write a detailed note on the following

   a) Disk formatting

   b) Boot-block

   c) Bad blocks

9. What is the need of Page replacement? Consider the following reference string

   7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1

   Find the number of Page Faults with FIFO, Optimal Page replacement and LRU with three free frames which are empty initially. Which algorithm gives the minimum number of page faults?

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

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (CSE / IT) (Sem.–6)

SOFTWARE ENGINEERING

Subject Code : BTCS-603

M.Code : 71109

Date of Examination : 07-07-22

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

Answer briefly :

1. Differentiate between cohesion and coupling.
2. In which scenario structure chart will be considered a better choice than DFD?
3. What is the significance of software reuse?
4. How risk analysis helps in software development?
5. Why do we need to create SRS document?
6. Prerequisites to draw GANTT chart.
7. List the various software reliability metrics.
8. Define test case.
9. What is the need of technical feasibility study?
10. List various non-functional requirements for software.

SECTION-B

11. Which methodology is used to analyze viability of software to be developed? Discuss its types.

12. How object-oriented software development is better than traditional development methods?

13. Differentiate between DFS and structure chart. Draw a DFD elaborating working of software for event ticket booking.

14. What are different test case design techniques? Discuss.

15. Why do we need formal process for software development? How it helps in standardization of software's across the world.

SECTION-C

16. What are the various steps involved in spiral model? Explain and compare it with water fall model.

17. Why testing is necessary for software's? What are the different methods to test software?

18. Write short note on following :

    a) Cost estimation

    b) Coding standards

    c) Software requirement specification.

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

Total No. of Questions : 09

B.Tech. (CSE) (Sem.–6)

RDBMS-II

Subject Code : BTCS-602

M.Code : 71108

Date of Examination : 05-07-22

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.**
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SECTION-A

Write briefly :

1. a) Differentiate between DDL and DML commands.

   b) What is a view? How it is related with data independence?

   c) Define Schema and Instance.

   d) What is functional dependency? When it is said to be minimal?

   e) What do you mean by atomicity and aggregation?

   f) What is phantom deadlock?

   g) What is checkpoint and when does it occur?

   h) What do you mean by data fragmentation in DDBMS?

   i) Compare OLTP and OLAP systems.

   j) What is buffer management?

SECTION-B

2. Differentiate the recovery techniques deferred update and immediate update.

3. What is meant by multi-valued dependency? How it is related to normalization? .

4. Discuss the two phase locking protocols for concurrency control in databases with the help of an example.

5. Give a comparative study of different features of MySQL, Oracle and Microsoft SQL Server.

6. Briefly explain the data mining process. Also, discuss relationship between data warehousing and data mining.

SECTION-C

7. What is Data Fragmentation? Explain its types with suitable examples.

8. What is Normalization? Discuss all the normal forms in detail with example.

9. Illustrate the statement syntax for following operations on given table.

   a) Create above given table.

   b) Change the marks of Rahul in English subject from 89 to 91.

   c) Display the name of students who got more than 80 marks in any subject.

   d) Calculate total marks of individual student.

   e) Increase marks by adding 5 marks whose marks are less than 75.

Sr.No.	S name	English	Science	Maths	IT
100	Anil	75	85	73	70
101	Sunil	88	75	95	84
102	Rahul	89	77	82	91
103	Pihu	75	72	70	92
104	Monu	86	85	81	71

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

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (CSE) (Sem.–6)

MOBILE APPLICATION DEVELOPMENT

Subject Code : BTCS-620-18

M.Code : 79258

Date of Examination : 09-07-22

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

Write briefly :

1) Define the role of GPS in Android devices.

2) Write the syntax for Intent-Filter tag.

3) Enlist the steps to publish the Android application.

4) What are the layers present in the android architecture?

5) What are the mobile agents?

6) Enlist steps to implement the AddMob in Application.

7) What is use of Gradle in Android?

8) Define Touch Gesture.

9) Enlist the two limitations AsyncTask.

10) Define Shared Preferences? Differentiate between Shared Preferences and Saved Instance State.

SECTION-B

11) What is SQLite? Explain the steps required to create, open and close the database cursors.

12) Define Loader. Explain the different call back method of Loader Manager class.

13) Define Content Provider. Explain with an example sharing the data between application using Content Provider.

14) Explain best practices to keep the user data secure.

15) Define Input Control. Explain different types of Button and its states.

SECTION-B

16) Explain the Android architecture with the help of a neat diagram.

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

18) What are the most important factors in developing mobile application development? Explain in detail.

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

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (CSE) (Sem.–6)

MACHINE LEARNING

Subject Code : BTCS-618-18

M.Code : 79257

Date of Examination : 09-07-22

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. Machine Learning
2. Well-Posed Learning Problems
3. Data integration
4. Data reduction
5. Rsquare
6. Linear Regression
7. K-NN
8. Clustering
9. Recombination
10. Mutation.

SECTION-B

11. What is the need of data Pre-processing? Explain any 2 methods.
12. Explain the various types of Machine Learning.

13. Explain how Naive-Bayes algorithm is useful for learning and classifying text.

14. What are the applications of Neural Network?

15. Explain :

    a) Naive Algorithm

    b) Apriori Algorithm.

SECTION-C

16. Explain the concept of classification in detail.

17. Write need and application of Association Rules Learning.

18. Describe the various types of clustering Methods.

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00 JUL 2022

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

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Mechanical Engg.) (Sem.–6)

AUTOMOBILE ENGINEERING

Subject Code : BTME603-18

M.Code : 79652

Date of Examination : 07-07-22

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) Which vehicle is better monocoque or ladder on frame? Justify your answer.

b) Where and why, we use multiplate clutch?

c) What do you mean by multi-point fuel injection system for a petrol engine?

d) Why the differential is needed in automobile?

e) Why a rich mixture is required for idling?

f) *'Is differential compulsory part of transmission system'*. Explain in brief.

g) What are the different sources of automobile pollution?

h) Make a list of important quantities to be measured during the testing of an engine.

i) How Exhaust Gas Recirculation (EGR) helps in reducing pollution?

j) What is knocking phenomenon of I.C. engines.

SECTION-B

2. Why we use multi-cylinder engines instead of the big single-cylinder with the same volume? Justify your answer by suitable engine parameter's discussion.

3. What are the main factors which affect the tendency to detonate? Describe them with suitable diagram.

4. What are the functions of exhaust system? Draw a neat sketch of exhaust system.

5. Explain the terms (a) Brake Power (b) Indicated Power (c) Specific Fuel consumption.

6. Discuss the weight transfer phenomenon indicating the force acting when brakes are applied to a moving vehicle.

SECTION-C

7. a) What do you understand from the 'breathing' of the fuel tank? How does it cause pollution?

   b) What are the advantage and drawbacks of the catalytic converter method compared to blowing of air only into the exhaust manifold?

8. Explain the multi-point fuel injection system for a petrol engine.

9. Explain the following :

   a) Camber

   b) Caster

   c) Toe-in and Toe-out

   d) King-pin inclination.

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.–6)

COMPUTER NETWORKS

Subject Code : BTCS-504-18

M.Code : 79374

Date of Examination : 16-07-22

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. What is the need of presentation layer?

b. List few applications layer protocols.

c. What is Checksum?

d. What is message switching? ,

e. Why do we need RARP?

f. Define BOOTP.

g. What is meaning of reliability in TCP?

h. What is MAC address?

i. Define DDNS.

j. What is IDS?

SECTION-B

2. Why do we need multiplexing? Discuss Frequency Division multiplexing.

3. Explain the CSMA/CD protocol used at MAC layer. Does it reduce the number of collisions?

4. Discuss the functionality of network layer. How logical addressing is done at this layer?

5. Define Congestion. How Stream control Transmission protocol works?

6. Discuss the working of DNS protocol with the help of a suitable example.

SECTION-C

7. Explain the different guided and unguided media used at physical layer for data transmission.

8. What is sliding window protocol? Discuss the advantages and disadvantages of using piggybacking.

9. Write a short note on :

   a. TCP *vs* UDP

   b. FTP.

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

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (CE/CSE/ME) (Sem.–6)

COMPUTER AIDED DESIGN

Subject Code : BTME-613-18

M.Code : 79658

Date of Examination : 12-07-22

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

Write briefly :

1) Define CAD.

2) What are the different curve primitives?

3) Differentiate between implicit and explicit functions. Give examples.

4) Define parametric representation of circle.

5) What is sweep representation?

6) Define shape function.

7) Define the concept of constructive solid geometry in brief.

8) Why 2D transformations can be performed by using 3D matrix only?

9) What is raster scan graphics system?

10) Explain the details of polygon clipping.

SECTION-B

11) Find the equation of a Bezier curve which is defined by four control points as (80,30,0), (100,100,0),(200,100,0) and (250,30,0).

12) A square having end points A (1,1), B (5,1), C (5,5), D (1,5) is rotated 45° in clockwise direction keeping the point B fixed. Find its final co-ordinate.

13) Explain in detail the various analytical properties associated with assembly design.

14) Explain in detail the representation of synthetic surfaces in CAD?

15) a) Describe how the data base in organized when building a solid model from the graphic primitives.

b) What is geometric modelling? What are its advantages?

SECTION-C

16) What are the ruled surfaces? Explain it with diagram.

17) Write a short note on the following :

a) Difference between translation and panning.

b) Euler-Poincare formula used in solid modelling.

18) a) Differentiate between wire frame modeling and surface frame modeling.

b) Define NURBS curve and various properties of NURBS curve in details.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Mechanical Engineering) (Sem.–6)

INTRODUCTION TO INDUSTRIAL MANAGEMENT

Subject Code : BTME-604-18

M.Code : 79653

Date of Examination : 09-07-22

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) Discuss the relevance of Total Quality Management in today's competitive world.

b) What is the Input-output model in the production system?

c) Explain the effect of product design on manufacturing cost.

d) What do you understand by the term-Breakeven analysis?

e) Name different buying techniques used in the organization.

f) Enumerate the importance of predictive maintenance.

g) Enlist the different types of waste in manufacturing organizations?

h) What is the JIT cause and effect chain?

i) Define benchmarking and elaborate its concept.

j) Name the different methods of data collection from of customers.

SECTION-B

2. In today's highly competitive and fast-changing environment, how industrial engineering helps to increase industrial productivity? Justify your answer with suitable examples.

3. Can there be a product design for disassembling? Where could this concept be useful? Justify your answer for such a design.

4. Would purchasing in the service industry differ from purchasing in the manufacturing industry? Discuss with suitable examples.

5. Does benchmarking help a firm to be proactive? Explain your answer. Give one example of each of the different types of benchmarking.

6. Can total customer satisfaction be achieved while a company is also aiming for key business results? Is there a conflict between these two goals? Discuss.

SECTION-C

7. a) *'Poor maintenance of plant and machinery leads to various losses in the industry'.* What are these losses? Discuss briefly.

   b) Discuss in detail the objectives and responsibilities of the plant maintenance department.

8. a) What is the function of safety stock or buffer stock? What are all the different uncertainties against which you would like to protect the inventory?

   b) What is the role of set-up times in-JIT? How should they be reduced? Discuss in detail.

9. Write a short note on **any two** of the following :

   a) Concept of Production and Production function

   b) Salient features of Total Quality Management

   c) ABC Analysis.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CE / CSE / EE / ECE / EEE / IT / SE) / BTech. (CE) (PIT)

(Sem.–6)

WIRELESS COMMUNICATION

Subject Code : BTEC-601-18

M.Code : 79373

Date of Examination : 20-07-22

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) What is LTE?

b) Define cluster.

c) Write full form of UMTS.

d) What are the advantages of RAKE receiver?

e) What is signal to noise ratio?

f) What is frequency hopped multiple access?

g) What is IS-136 standard?

h) Write about forward and reverse channel.

i) Write full form of VLR.

j) Briefly explain ZigBee.

SECTION-B

2. Explain the various parameters involved in multipath propagation.

3. Explain in detail how to improve coverage and channel capacity.

4. Explain fourth generation in detail.

5. Explain why large scale fading and small scale fading occur in wireless channel.

6. What are ALOHA protocols? Explain in detail.

SECTION-C

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

8. Explain with diagram the different techniques available for signal combining.

9. Discuss the major differences between TDMA/FDMA and CDMA. Explain each in detail.

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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 : 18-07-22

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) How BER is related to the quality of the signal?

b) What do mean by wavelength converter? Explain FWM wavelength converter.

c) Calculate the quantum efficiency at 1300 nm if the change in power of 2mW produces a current change of 6mA.

d) Define the receiver sensitivity.

e) List the advantages of optical communication.

f) Suppose you use an LED whose energy gap equals 2.5 eV. What wavelength signal will it radiate?

g) Differentiate between Splices and Connectors.

h) Calculate chromatic dispersion in single mode fibre at the 1550 nm operating wavelength with $\Delta\lambda$=1 and L=1 km.

i) 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.

j) What is Chromatic dispersion?

SECTION-B

2. What is linear scattering? Briefly explain the Rayleigh scattering and Mie scattering with relation to intrinsic and extrinsic absorption mechanism.

3. When the mean optical power launched into an 10 Km length of fiber is 180 μW, the mean power at the other end of the fibre is 10 μW. Determine the overall signed attenuation in dB through the fiber assuming there are no connectors or splices and also, the overall signal attenuation for 10 Km optical link using same fibre with splices at 1Km interval, each giving an attenuation of 1 dB.

4. A silica optical fiber with a core diameter large enough to be considered by ray theory analysis has a core refractive index of 1.50 and cladding refractive index of 1.47. Determine: (i) the critical angle at core cladding interface, (ii) the numerical aperture for the fiber, and (iii) the acceptance angle in air for the fiber.

   Why is stimulated emission used in laser? Give the fundamental structure of optical confining?

5. Derive the expression for calculating the power budget.

6. Starting from Maxwell's equation, derive the expression for wave equation, derive the expression for wave propagating through optical fiber.

SECTION-C

7. Discuss the sources of errors in optical receivers with mathematical expressions.

8. (a) Describe the add/drop techniques in WDM optical networks.

   (b) Compare the quantum efficiency of PIN & APD photo-detectors.

9. A 6 Km optical link consists of multimode step index fiber with a core refractive index of 1.5 and a relative refractive 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).

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ECE) (Sem.–6)

C# AND .NET PROGRAMMING

Subject Code : BTEC-906D-18

M.Code : 79380

Date of Examination : 17-07-22

Time : 3 Hrs.

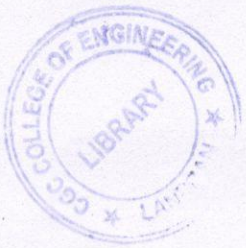
Max. Marks : 60

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) Dynamic data type in C#

b) Exception

c) CLR

d) Operator Overloading

e) Abstract Class

f) MDI

g) Synchronization

h) ADO.NET

i) Localization

j) Data Stores

SECTION-B

2. Discuss the various data types in C#

3. Define Indexers. Can they be overloaded? Justify.

4. Write a note on windows presentations foundation.

5. Differentiate between abstract and interface. Explain the concept of polymorphism.

6. Explain how testing and debugging is done in .Net.

SECTION-C

7. Describe in detail the process of packaging and deployment in .Net.

8. Write a detailed note on memory management, pointers and regular expressions.

9. Define transactions. Explain P2P networking. How P2P applications are created in .Net.

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