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R18

Course Code: A30007



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech IV Semester Supplementary Examinations Feb/March-2023

Course Name: NUMERICAL TECHNIQUES & PROBABILITY DISTRIBUTIONS
(Common for CE, ME, CSE, IT & CSC)

Date: 21.02.2023 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.

10x2=20M

1. Write down the condition for convergence of Newton Raphson Method for $f(x) = 0$. 2 M
2. Find the second degree polynomial through the points (0,2),(2,1),(1,0) using Lagrange's formula. 2 M
3. Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using Trapezoidal's rule. 2 M
4. What is the major drawback of Taylor's series method? 2 M
5. Find $L^{-1} \left[\frac{1}{(s+2)^2} \right]$. 2 M
6. State the first shifting theorem on Laplace transforms. 2 M
7. Test whether $f(x) = \begin{cases} |x|; & -1 \leq x \leq 1 \\ 0; & \text{otherwise} \end{cases}$ can be the probability density function of a continuous random variable. 2 M
8. If X and Y are two independent random variables with variances 2 and 3 find the variance of $3X+4Y$. 2 M
9. Define null hypothesis and alternative hypothesis. 2 M
10. What are the uses of 'F' - test? 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Find the real root of the equation $\cos x = 3x - 1$ correct to four places of decimal using fixed point iteration method. 10M

OR

11. B). From the following table, of half-yearly premium for policies maturing at different ages, estimates the premium for policies maturing at age 46 and 63. 10M

Age	x:	45	50	55	60	65
Premium y:		114.84	96.16	83.32	74.48	68.48

12. A). The velocities of a car running on a straight road at intervals of 2 minutes are given by 10M

Time(min)	0	2	4	6	8	10	12
Velocity(km/hr)	0	22	30	27	18	7	0

Using Simpson's $\frac{1}{3}$ rule find the distance covered by the car.

(P.T.O.)

OR

12. B). Using fourth order R-K method, Solve $\frac{dy}{dx} = \frac{y^2-x^2}{y^2+x^2}$ with $y(0) = 1$ at $x = 0.2$ 10M

13. A). Apply the convolution theorem to find the inverse Laplace transform of the function 10M

$$\frac{s^2}{(s^2+a^2)(s^2+b^2)}$$

OR

13. B). Solve $(D^2 + 3D + 2)y = e^{-t}$, given that $y' = y = 0$, when $t = 0$. 10M

14. A). If the density function of continuous random variables X is given by 10M

$$f(x) = \begin{cases} ax, & 0 \leq x \leq 1 \\ a, & 1 \leq x \leq 2 \\ 3a - ax, & 2 \leq x \leq 3 \\ 0, & \text{elsewhere} \end{cases}$$

(i) Find the value of 'a'

(ii) Find the Cumulative Distribution Function of X

(iii) Compute $P[X \leq 1.5]$

OR

14. B). Six dice are thrown 729 times. How many times do you expect at least three dice to show a five or six? 10M

15. A). In a large city A, 20% of a random sample of 900 school boys had a slight physical defect. In another large city B, 18.5% of a random sample of 1600 school boys had the same defect. Is the difference between the proportions significant? (To calculate at 5% level of significance). 10M

OR

15. B). The theory predicts the proportion of beans in the 4 groups A, B, C and D should be 9:3:3:1. In an experiment among 1600 beans, the numbers in the 4 groups were 882, 313, 287 and 118. Does the experimental result support the theory? (To calculate at 5% level of significance). 10M

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Course Code: A30511



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech IV Semester Supplementary Examinations Feb/March-2023

Course Name: DESIGN & ANALYSIS OF ALGORITHMS
(Common for CSE, IT & CSM)

Date: 23.02.2023 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.

10x2=20M

1. What is an algorithm? Write an algorithm to find the biggest of two numbers. 2 M
2. Define time complexity. 2 M
3. Write the general method of greedy method. 2 M
4. Write the Purging rule of 0/1 knapsack rule. 2 M
5. What is Hamiltonian cycle? 2 M
6. Define the terms e-node, live-node, and dead-node. 2 M
7. What is topological sorting give example? 2 M
8. List the algorithm to find the shortest path of a graph. 2 M
9. Write the types of reduction techniques. 2 M
10. What is intractable problem? 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain various asymptotic Notations with example. 10M
- OR**
11. B). i) Solve $T(n)=2T(n/2)+n$ using substitution method 5M
ii) Analyze the time complexity of factorial of a given number. 5M
12. A). i) Derive the time complexity for strassen's matrix multiplication. 5M
ii) Find the optimal solution of the Knapsack instance $n=3$, $M=20$, $(P_1,P_2,P_3)=(25,24,15)$ and $(W_1,W_2,W_3)=(18,15,10)$ using greedy method. 5M
- OR**
12. B). Construct OBST for the given identifier set $(a_1,a_2,a_3,a_4) = (\text{cout,float,if,while})$ with $p(1,2,3,4)=(1/20,1/5,1/10,1/20)$ and $q(0,1,2,3,4)=(1/5,1/10,1/5,1/20,1/20)$. 10M
13. A). i) Explain graph coloring with an example? 5M
ii) Find the sum of subsets for the following set of integers $s = \{5, 10, 12, 13, 15, 18\}$ for $W=30$. 5M
- OR**
13. B). Solve Travelling Sales person problem using LC branch and bound method for the given adjacency matrix of undirected graph 10M
- | | | | | |
|----------|----------|----------|----------|----------|
| ∞ | 20 | 30 | 10 | 11 |
| 15 | ∞ | 16 | 4 | 2 |
| 3 | 5 | ∞ | 2 | 4 |
| 19 | 6 | 18 | ∞ | 3 |
| 16 | 4 | 7 | 16 | ∞ |

(P.T.O..)

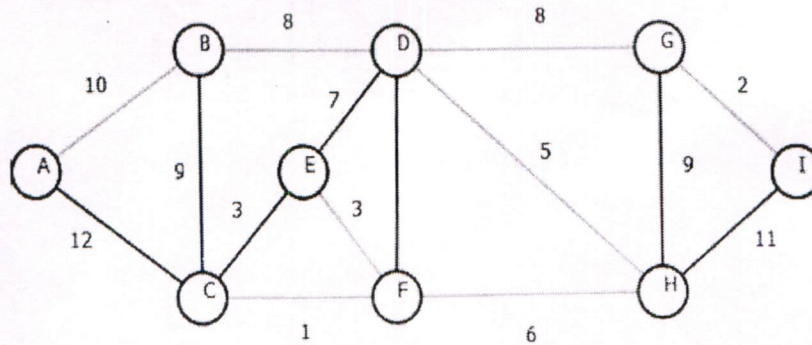
14. A). i) Explain the BFS algorithm with an example.
 ii) Discuss about network flow algorithm with example.

5M
 5M

OR

14. B). i) Find Minimum Spanning tree using Kruskal algorithm for the given graph

5M



- ii) Describe about transitivity closure of a graph with example.

5M

15. A). i) Write non deterministic algorithm for 0/1 knapsack problem.
 ii) Explain Game tree with an example.

5M
 5M

OR

15. B). i) State whether Node cover decision problem is NP complete or hard. Justify your answer.
 ii) Explain the classes of NP hard and NP complete problems.

5M
 5M

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Course Code: A30525



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech IV Semester Supplementary Examinations Feb/March-2023

Course Name: SOFTWARE ENGINEERING

(Common for CSE & IT)

Date: 25.02.2023 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.

10x2=20M

1. Define Software Engineering, Software process model. 2 M
2. Infer the need for software engineering. 2 M
3. Summarize the Context models 2 M
4. List the characteristics of good SRS. 2 M
5. Explain DRD and EFD. 2 M
6. Outline few elements of data design. 2 M
7. Determine the steps followed in testing 2 M
8. Distinguish between verification and validation. 2 M
9. Predict the Risk information sheet of any software. 2 M
10. Build the size measure of any organization. 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain the steps in a waterfall model with a neat diagram. Discuss its advantages and disadvantages. 10M

OR

11. B). Construct agile process for any software development project. 10M

12. A). Interpret the feasibility studies. What are the outcomes? Does it have implicit or explicit effects on software requirement. 10M

OR

12. B). Compare the functional and non-functional requirements of any application. 10M

13. A). Develop the golden rules for interface design. 10M

OR

13. B). Demonstrate in detail about software architecture and different types of software architectural styles with illustrations. 10M

14. A). List and explain distinct object oriented metrics. 10M

OR

14. B). Recall black box testing. Explain the different types of black box testing strategies with example. 10M

15. A). Build the steps for the risk management and explain the need for it. 10M

OR

15. B). Elaborate on the various software cost estimation techniques with the examples. 10M

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Course Code: A30228



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech IV Semester Supplementary Examinations Feb/March-2023

Course Name: **BASIC ELECTRICAL ENGINEERING**

(Common for CSE, IT & CSC)

Date: 28.02.2023 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.

10x2=20M

1. Define Resistance. 2 M
2. State super position theorem. 2 M
3. What is power? 2 M
4. What is the relation between phase and line voltage in star connection? 2 M
5. What is commutator? 2 M
6. What are the losses in DC Machine? 2 M
7. List the applications of Transformer. 2 M
8. What is ideal and practical transformers? 2 M
9. What is slip of an induction motor? 2 M
10. Why is the stator core of Alternator laminated? 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Draw and explain the V-I Relations for passive elements 10M
OR
11. B). State and prove the super position theorem. 10M
12. A). Define Average value, RMS value, Peak value and Form factor. 10M
OR
12. B). Derive voltage and current response for series RL circuit. 10M
13. A). Classify the losses in DC Generator and explain them. 10M
OR
13. B). Write the applications of DC Motor. 10M
14. A). Explain the construction and working principle of single phase Transformer. 10M
OR
14. B). In a 25-kVA, 2000/200 V, single-phase transformer, the iron and full-load cop per losses are 350W and 400 W respectively. Calculate the efficiency at unity power factor on full load. 10M
15. A). Describe the constructional details of three phase slip ring induction motor. 10M
OR
15. B). Explain the Torque slip characteristics of induction motor. 10M

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Course Code: A30473



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech IV Semester Supplementary Examinations Feb/March-2023

Course Name: **IMAGE PROCESSING**

(Common for CSE, IT, CSC & CSM)

Date: 04.03.2023 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.

10x2=20M

1. List the basic steps involved in image processing. 2 M
2. Mention the properties of 2D DFT. 2 M
3. List the uses histogram for the image enhancement. 2 M
4. What is the difference between spatial and frequency domains in filtering. 2 M
5. What is an order statistics filter? List the different statistics filters. 2 M
6. Mention the Possible classification of restoration methods. 2 M
7. Define opening and closing operation. 2 M
8. Explain Region oriented segmentation. 2 M
9. List and define different redundancies. 2 M
10. Compare Lossless and Lossy compression. 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). With a neat block diagram, explain the components of image processing system. 10M
- OR**
11. B). Determine Hadamard matrix for N=4. 10M

12. A). Perform histogram equalization of the 5x5 image whose data is shown in Table shown below. 10M

Gray level	0	1	2	3	4	5	6	7
Number of pixels	0	0	0	6	14	5	0	0

OR

12. B). Explain the smoothing of images in frequency domain using:
i) Ideal high pass filter and ii) Butterworth high pass filter. 10M

13. A). Explain in brief, the inverse filtering approach and its limitations. 10M

OR

13. B). Write a short note on Weiner filtering and inverse filtering. 10M

(P.T.O..)

14. A). Discuss in detail the hit or miss Transformation method. 10M

OR

14. B). What are the derivative operators useful in image segmentation? Explain their role in segmentation? 10M

15. A). With neat diagram, explain transform based compression method. 10M

OR

15. B). Derive the code for string "went." Comprising characters with probability of $e = 0.3$, $n = 0.3$, $t = 0.2$, $w = 0.1$, $\bullet = 0.1$ using Arithmetic coding. 10M

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Course Code: A30531



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech IV Semester Supplementary Examinations Feb/March-2023

Course Name: PYTHON PROGRAMMING

(Common for CE, ME, ECE, CSE & IT)

Date: 04.03.2023 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.

10x2=20M

1. How to read input and print output in python? 2 M
2. How Type conversion is done in python? 2 M
3. Define File. 2 M
4. Differentiate between local and global variables. 2 M
5. What is the purpose of string slicing? 2 M
6. Why recursion is used give example? 2 M
7. Define polymorphism. 2 M
8. What is object? 2 M
9. Give the syntax for button and dialog box. 2 M
10. What is image processing? 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain various control structures supported in Python each with respective example program. 10M

OR

11. B). List and explain operators supported by Python. Demonstrate python code to print all prime numbers less than 256. 10M

12. A). Define a Function and explain default, keyword and variable length arguments in functions. 10M

OR

12. B). Explain the class design techniques with example. And write a python program to print the area of circle. 10M

13. A). What is a string and explain different string manipulations techniques? 10M

OR

13. B). Discuss about Lists, Dictionaries, sets and Tuple each with and executable code. 10M

14. A). List and explain the features of object-oriented programming. 10M

OR

14. B). What is inheritance list different types of inheritance with code snippets? 10M

15. A). Why GUI is powerful explain using tkinter module? 10M

OR

15. B). Discuss about turtle Graphics with an example. 10M
