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R-15

Code: 5G121

I B.Tech. II Semester Supplementary Examinations June 2024

C Programming and Data Structures

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

UNIT-I

- 1. a) What is a pointer? What are the features of pointers? Write a C program to print address of a variable 8M
- b) Write a C program to swap two numbers using pointers. 6M

OR

- 2. Compare array and pointers in terms of memory efficiency and execution time efficiency. 14M

UNIT-II

- 3. a) Define union. List out the differences between unions and structures 7M
- b) Write a program for sorting given numbers using selection sort technique 7M

OR

- 4. a) Define Structures. Explain with an example how structure members are initialized and accessed 8M
- b) Write a C program to find the given element using linear searching. 6M

UNIT-III

- 5. Write a program to implement a linear queue using arrays. Take into account the exceptions like Queue Full and Queue Empty. 14M

OR

- 6. a) What is Data Structure? Explain in detail about different type of data structures. 7M
- b) Write applications of stack 7M

UNIT-IV

- 7. Write advantages of doubly linked list over singly linked list. Write C function that will insert a given integer value into an ordered doubly linked list. 14M

OR

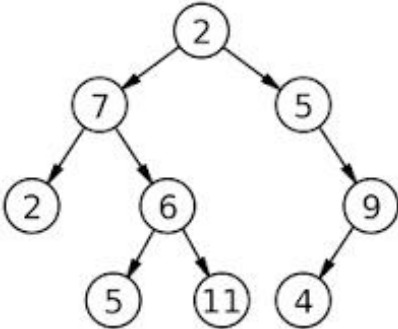
- 8. What is a Singly Linked List.? Explain different operations of a singly linked list with suitable examples. 14M

UNIT-V

- 9. Define binary search tree. Explain with example deletion of an element from a binary search tree. 14M

OR

- 10. Write the recursive algorithms for different binary tree traversal techniques. Find all the tree traversals for the following binary tree:



14M

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R-15

Code: 5GC24

I B.Tech. II Semester Supplementary Examinations June 2024

Engineering Mathematics-II

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

UNIT-I

1. a) Change the order of integration in $\int_0^1 \int_0^{\sqrt{1-x^2}} y^2 dy dx$. 7M

b) changing the order of integration $\int_0^{4a} \int_{\frac{x^2}{4a}}^{2\sqrt{ax}} dy dx$ 7M

OR

2. a) Evaluate $\int_0^a \int_0^x \int_0^{x+y} e^{x+y+z} dz dy dx$ 7M

b) Find the area of the plate in the form of a quadrant (1st quadrant) of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ 7M

UNIT-II

3. a) Find $L^{-1} \left\{ \frac{1}{(s-1)(s+3)} \right\}$ 7M

b) Find the Laplace Transform of $\left(\sqrt{t} - \frac{1}{\sqrt{t}} \right)^3$ 7M

OR

4. a) Using Convolution Theorem, Evaluate $L^{-1} \left\{ \frac{s+2}{s^2-4s+13} \right\}$ 6M

b) Find the Laplace Transform of $\int_0^t \frac{e^{-t} \sin t}{t} dt$ 8M

UNIT-III

5. Solve the differential equation $\frac{d^2x}{dt^2} + 9x = \sin t$ given that $x(0) = 1, x\left(\frac{f}{2}\right) = 1$ using Laplace Transform 14M

OR

6. Solve $y'' + 2y' - 3y = \sin t, y(0) = 0, y'(0) = 0$ Using Laplace Transform 14M

UNIT-IV

7. a) Find the angle between the surface $x^2 + y^2 + z^2 = 9$ and $z = x^2 + y^2 - 3$ at the point $(2, -1, 2)$ 7M
- b) Show the vector $(x^2 - yz)\bar{i} + (y^2 - zx)\bar{j} + (z^2 - xy)\bar{k}$ is irrotational and find its scalar potential. 7M

OR

8. a) Show that $\text{div}(\text{grad } r^n) = n(n+1)r^{n-2}$ 7M
- b) Evaluate divergence of $(2x^2z\bar{i} - xy^2z\bar{j} + 3yz^2\bar{k})$ at the point $(1, 1, 1)$. 7M

UNIT-V

9. Verify Divergence thermo for $\bar{F} = (x^2 - yz)\bar{i} + (y^2 - zx)\bar{j} + (z^2 - xy)\bar{k}$ taken over the rectangular parallelepiped $0 \leq x \leq a$, $0 \leq y \leq b$, $0 \leq z \leq c$ 14M
- OR**
10. Verify by Green's Theorem for $\int_c [(xy + y^2)dx + x^2dy]$ where 'c' is bounded by $y=x$ and $y=x^2$ 14M
