2023

Full Marks : 70

Time : 3 hours

Answer from **both** the Groups as directed.

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP—A

Answer any *four* questions :   10 × 4

1. Write short notes on development of 'C'. Also explain its features.

2. What are the different types of control statement available in C ? Explain it with suitable example.

3. Define Array. Write a program to perform and find the maximum element in an array.

(*Turn Over*)

4. Define Function. Explain call by value and call by reference with suitable example.

5. What is recursion ? Write a program to print N terms of Fibonacci series by using recursion.

6. Differentiate between Structure and Union. Write a program to store and display the Roll, Name, Address and Marks of 5 students using structure.

7. What do you mean by file handling in C ? Write a program to copy the contents from one file to another file.

8. What is pointer ? Write a C program to accept 'n' numbers from user and sort them in ascending order using pointer.

GROUP–B

All questions are compulsory   3 × 10

9. Describe relational operators used in C language.

10. Differentiate between local variable and global variable.

11. Explain any three string functions.

12. Write a program to find the maximum between two numbers without using any control statement.

13. Differentiate between while and do-while loop.

14. Define continue statement.

15. Write a program to convert the temperature form Fahrenheit to Celsius.

16. Define Keywords.

17. Write a program to print the given format

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18. Define Operator precedence.

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2023

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GROUP—A

(Long Answer Type Questions)

Answer any *four* questions : 10×4

1. State and prove Leibnitz's theorem.

2. If $u = \log\left(x^3 + y^3 + z^3 - 3xyz\right)$, show that

$$\left(\frac{\partial}{\partial x} + \frac{\partial}{\partial y} + \frac{\partial}{\partial z}\right)^2 u = \frac{-9}{(x+y+z)^2}$$

3. Expand $\sin x$ in power of $\left(x - \dfrac{\pi}{2}\right)$ by Taylor's theorem.

4. Evaluate the integral

$$\iiint \left(x^2 + y^2 + z^2\right) dx\, dy\, dz$$

taken over the volume enclosed by the sphere $x^2 + y^2 + z^2 = 1$.

5. Find the area common to the parabola $y^2 = ax$ and the circle $x^2 + y^2 = 4ax$.

6. Change the order of integration in

$$\int\limits_{0}^{\infty}\int\limits_{x}^{\infty} \frac{e^{-y}}{y} dy\, dx.$$

7. Solve : $\dfrac{d^2 y}{dx^2} + 6\dfrac{dy}{dx} + 9y = 2e^{-3x}$

8. Define Lagrange's equation and hence solve the following partial differential equation

$$x^2(y-z)p + y^2(z-x)q = z^2(x-y)$$

GROUP—B

(Short Answer Type Questions)

9. Answer *all* the following questions : 3 × 10

(a) Solve : $\dfrac{dy}{dx} = \dfrac{1+y^2}{1+x^2}$

(b) If $y = \cos(ax + b)$, then find y_n.

(c) Sketch the region of integration for the integral $\displaystyle\int_0^2 \int_{x^2}^{x} f(x,y)\,dy\,dx$.

(d) Solve ; $\dfrac{d^2 y}{dx^2} + \dfrac{dy}{dx} + y = e^{-7x}$

(e) If $y^{1/m} + y^{-1/m} = 2x$, prove that
$$(x^2 - 1)y_2 + xy_1 - m^2 y = 0.$$

(f) Find the extreme value of the function
$$f(x,y) = xy - x^2 - y^2 - 2x - 2y + 4$$

(g) Define definite integral and its application for volume.

(h) Solve : $\dfrac{d^2y}{dx^2} - 4\dfrac{dy}{dx} + 4y = xe^{2x}$

(i) Apply Maclaurin's series to prove the following expansion

$$\sec x = 1 + \dfrac{x^2}{2!} + \dfrac{5x^4}{4!} + ...\infty$$

(j) If $y = \sin^{-1} x$, prove that

$$\left(1 - x^2\right) y_2 - xy_1 = 0.$$

2023

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Time : 3 hours

Answer from both the Sections as directed.

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SECTION—A

Answer any *four* questions :   10 × 4

1. What are different types of computers ? Explain them on the basis of their features and technology.

2. What are peripheral devices ? Name and list the features of any five input and five output devices in detail.

3. Draw the flowchart to find the sum of first 'N' natural numbers.

4. What is memory hierarchy ? Explain track, sector and cylinder with respect to magnetic memory.

5. What is operating system ? Discuss important types of operating system.

6. What is a computer network ? What are its advantages ? Discuss any three network topologies.

7. Perform the following operations :

    (i)   Convert 1010000 into equivalent 1's and 2's complement number.

    (ii)   10101 * 111

    (iii)   101011111 + 110011010

    (iv)   101111 - 010101

    (v)   1001000 ÷ 11

8. Convert :

    (i) $(75)_{10} = ()_2$

(*ii*) $(AB)_{16} = ( )_8$

(*iii*) $(10100110101111)_2 = ( )_{16}$

(*iv*) $(79)_{10} = ( )_8$

(*v*) $(357)_8 = ( )_{10}$

SECTION–B

All questions are compulsory 3×10

9. Differentiate between computer software and hardware.

10. What are computer viruses ?

11. What is ROM ? Name its types.

12. What do you mean by printers ? Name two categories of printers.

13. What are basic logic gates ? Explain.

14. Name any three popular web browsers ?

15. How does cache reduce the memory access time ?

16. What is an e-mail ?

17. List three important characteristics of computers.

18. Compare and contrast low level and high level programming language.

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2023

Full Marks : 70

Time : 3 hours

Answer from **both** the Groups as directed.

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GROUP—A

Answer any *four* questions :   10 × 4

1. Define Communication and its stages.

2. Discuss the difference between listening and hearing.

3. What are the deterrents to the listening process ? Discuss.

4. Discuss the various barriers in the process of communication.

5. What is the difference between a bio-data and a resume ?

6. Define the ten commandments of communication.

7. What is the process of drafting agenda of a meeting ?

8. What is a Group Discussion ? Provide a detailed note.

GROUP—B

Answer *all* questions :   10 × 3

9. Write short notes of the following :

   (i) Synonyms

   (ii) Antonyms

   (iii) Common errors

   (iv) Circulars

   (v) Memo

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(vi) Minutes of a meeting

(vii) Types of listening

(viii) Process of communication

(ix) Formal reports

(x) Process of paragraph writing

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2023

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GROUP—A

Answer any *four* questions :   10 × 4

1. Define Macro and Micro Environment.

2. Define Sole Proprietorship and its features.

3. Define Partnership and its features.

4. Define Organisation and its importance.

5. Define Management and its importance.

6. Define Leadership and the qualities of a good leader.

7. Define Communication and the barriers to effective communication.

8. Define Control and the process of control.

GROUP—B

Answer *all* the questions :   3 × 10

9. Explain three features of Business

10. Define Company.

11. Define Co-operative Organisation.

12. Define Formal Organisation.

13. Define Decision Making.

14. Define Motivation.

15. Define Centralization of Authority.

16. Define Staffing.

17. Define Planning.

18. Define Directing.

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