

19 (a) Find the mean and standard deviation of the following data :

$x :$	2.0	2.5	3.0	3.5	4.0	4.5	5.0
$f :$	5	38	65	92	70	40	10

(b) Five coins are tossed 3200 times. Find the expected frequencies of distribution of heads and tails. Calculate the mean number of heads and standard deviation.

BCA I year
II rd
III rd year

7204/A11

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MATHEMATICS

Time : Three hours

Maximum : 100 marks

PART A — (6 × 5 = 30 marks)

Answer any SIX questions.

1. Find $\frac{dy}{dx}$ if $x = a \cos^3 t$, $y = a \sin^3 t$.
2. Find the n th derivative of $\cos x \cos 2x \cos 3x$.
3. Evaluate $\int \frac{3x+1}{2x^2+x+1} dx$.
4. Evaluate $\int \frac{\sin x}{\sin x + \cos x} dx$.
5. Show that the diagonals of a rhombus are at right angles.
6. Find the value of
 - (a) $2A + B$
 - (b) $B - 3C$ where
 $A = \begin{pmatrix} 1 & 0 \\ -1 & 2 \end{pmatrix}$ $B = \begin{pmatrix} 3 & 1 \\ 0 & -1 \end{pmatrix}$.

7. State the condition for a straight line $y = mx + c$ touches the circle $x^2 + y^2 = a^2$.

8. Solve $(x^2 - y^2) dx = 2xy dy$.

9. Calculate the median for the following data :

CI: 1-10 11-20 21-30 31-40 41-50 51-60 61-70

f : 8 15 25 20 16 10 6

10. A card is drawn from each of two well shuffled packs of cards. Find the probability that at least one of them is an ace.

PART B — ($4 \times 10 = 40$ marks)

Answer any FOUR questions.

11. If $y = a \cos(\log x) + b \sin(\log x)$ show that $x^2 y_{n+2} + (2n+1)xy_{n+1} + (n^2+1)y_n = 0$.

12. Evaluate find $I = \int \frac{(2+3 \cos x)}{(\sin x + 2 \cos x + 3)} dx$.

13. Solve the following system of equations by matrix method.

$$x + 2y + 3z = 1$$

$$2x + 3y + 2z = 2$$

$$3x + 3y + 4z = 1.$$

14. Find the equation of the circle which touches the straight line $3x + y - 4 = 0$ at the point $\left(\frac{1}{2}, \frac{5}{2}\right)$ and has its centre on the line $x + y - 5 = 0$.

15. Solve $(mz - ny)p + (nx - lz)q = ly - mx$.

16. Fit a straight line for the following data :

X : 100 200 300 400 500 600

Y : 40.2 92.3 94.2 96.3 98.2 100.3

PART C — ($2 \times 15 = 30$ marks)

Answer any TWO questions.

17. (a) If $y = \sin(m \sin^{-1} x)$, prove that $(1-x^2)y_2 - xy_1 + m^2y = 0$.

(b) Show that $\int \log(\tan x + \cot x) dx = \pi \log 2$.

18. (a) Find the inverse of the matrix

$$A = \begin{pmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{pmatrix}.$$

(b) Solve $x^2(y-z)p + y^2(z-x) = z^2(x-y)$.

PROGRAMMING IN C

Time : Three hours

Maximum : 100 marks

PART A — (6 × 5 = 30 marks)

Answer any SIX questions.

1. Discuss about the striking features of C.
2. Explain with example, Nested IF construct in C.
3. Distinguish between actual and formal arguments.
4. Discuss the various bitwise operators in C.
5. How are one-dimensional arrays initialized in a C program?
6. Describe the operators used for getting the address of a variable and the value of a pointer variable.
7. Compare a structure and a union.
8. Explain how you represent nested structures.
9. Describe the uses of the functions fprintf and fscanf.
10. List out the file handling functions in C.



