

Roll No.

Total No. of Pages : 3

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BCA (Sem.-4)

MATHEMATICS-II (COMPUTER ORIENTED)

Subject Code : BC-301 (2007 & 2010 Batch)

Paper ID : [B0227]

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 SIX questions carrying TEN marks each and students has to attempt any FOUR questions.

SECTION-A

1. Solve the following :

(a) If $A = \begin{pmatrix} 2 & -1 \\ 3 & 4 \end{pmatrix}$, $B = \begin{pmatrix} 5 & 2 \\ 7 & 4 \end{pmatrix}$, $C = \begin{pmatrix} 2 & 5 \\ 3 & 8 \end{pmatrix}$, then find a matrix D such that $CD = AB$.

(b) If $A = \begin{pmatrix} \cos \alpha & \sin \alpha \\ -\sin \alpha & \cos \alpha \end{pmatrix}$ then verify that $A^T A = I_2$, where T stands for transpose of a matrix

(c) State Simpson's $\frac{3}{8}$ th rule to evaluate $\int_a^b f(x) dx$.

(d) Find the mode of the following items :

0,1,6,7,2,3,7,6,6,2,6,0,5,6,0 .

(e) If $A = \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$, then show that $A^2 - 5A + 7I_2 = 0$

(f) Evaluate the integral $\int \{\sin(\log x) + \cos(\log x)\} dx$.

(g) Differentiate $\log_x 3$ w.r.t x .

- (h) What do you mean by Kurtosis ? How is it measured ?
- (i) What are different measures of Dispersion?
- (j) Define the following matrices
- (i) Triangular matrix
 - (ii) Symmetric matrix
 - (iii) Diagonal matrix
 - (iv) Column matrix..

SECTION-B

2. (a) $A = \begin{pmatrix} 3 & 2 \\ 7 & 5 \end{pmatrix}$ and $B = \begin{pmatrix} 6 & 7 \\ 8 & 9 \end{pmatrix}$, then verify that $(AB)^{-1} = B^{-1} A^{-1}$ (5)

(b) Apply Gauss Jordan method and solve the system of equations : (5)

$$2x - 3y + z = -1 ; x + 4y + 5z = 25 ; 3x - 4y + z = 2$$

3. (a) For a group of 200 candidates the mean and S.D were found to be 40 and 15 respectively. Later on, it was found that the score 43 was misread as 34. Find the correct S.D of the group. (5)

(b) Find first two moments μ_1, μ_2 about mean for the data (5)

Marks : 0-10 10-20 20-30 30-40 40-50 50-60

No. of students : 1 6 10 15 11 7

4. (a) Find the mean deviation of the following frequency distribution (4)

Class : 0-6 6-12 12-18 18-24 24-30

Frequency : 8 10 12 9 5

- (b) Obtain the Karl-Pearson coefficient of skewness for the following frequency distribution (6)

Wages : 70-80 80-90 90-100 100-110 110-120 120-130 130-140 140-150

No. of workers : 12 18 35 42 50 45 20 8

5. (a) If $y = \sqrt{\frac{1-x}{1+x}}$, then prove that $(1-x^2) \frac{dy}{dx} + y = 0$ (5)

(b) Differentiate the following functions w.r.t. x

$$(i) \log(x + \sqrt{1+x^2}) \quad (ii) 5^{3-x^2} + (3-x^2)^5 \quad (5)$$

6. (a) Evaluate the following Integrals : (6)

$$(i) \int_0^{\pi/2} \frac{\sin x}{(1 + \cos x)(2 + \cos x)} dx \quad (ii) \int e^x \frac{(1-x)}{x^2} dx$$

(b) Show that of all the rectangles with a given perimeter, the square has the largest area. (4)

7. (a) Evaluate $\int_1^2 \frac{1}{x} dx$ by using Simpson's 1/3 rule and hence obtain the value of $\log_e 2$ (5)

(b) If $x^3 + y^3 = 3xy$, then find $\frac{dy}{dx}$ (2.5)

(c) Evaluate the integral $\int \frac{1 - \tan x}{1 + \tan x} dx$ (2.5)