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Total No. of Questions : 13] **[Total No. of Pages : 04**

J-3855[S-8032]

[2037]
BCA/B.Sc. IT
MATH - II (Computer Oriented Methods)
(BCA - 301) /B.Sc. (IT - 404)

Time : 03 Hours **Maximum Marks : 75**

Instruction to Candidates:

1) Section - A is **compulsory.**

2) Attempt any **Nine** questions from Section - B.

Section - A

Q1) ***(15 x 2 = 30)***

a) Define symmetric and skew symmetric matrix.

b) Define Inverse of a matrix and give necessary conditions for its existence.

c) Explain matrix multiplication and give its one important property.

d) Explain Gauss Jordon method.

e) Given $A = \begin{pmatrix} 4 & 1 \\ 9 & 0 \end{pmatrix}$, $B = \begin{pmatrix} 2 & 0 \\ 7 & 1 \end{pmatrix}$ and $c = \begin{pmatrix} 2 & 0 \\ 0 & 3 \end{pmatrix}$

Show that $(A + B)' = A' + B'$ and

$(AC)' = C' A'$

f) Find the maximum and minimum for the function $f(x) = x^3 - 3x^2 + 2$.

g) Find first order partial derivative for $u = \dfrac{x + y}{x - y}$.

h) Find $\int x \log x \, dx$.

i) What is measure of control tendency? Name two important measures which you like.

j) What is coefficient of kurtosis?

k) Explain the term statistics and give its two uses.

l) Explain the method Simpson ⅜ rule and give its one application.

m) Solve $\int\left(4e^{x}-x^{-2}+\frac{3}{x}\right)dx$.

n) Explain method of substitution for solving integral of a function with an example.

o) The marginal cost of a firm is $2 + 3e^{x}$, where x is output. Find the total cost function, if fixed cost is Rs. 500.

Section - B

(9 x 5 = 45)

Q2) Find the value of $\begin{vmatrix} 2 & 7 & 2 \\ 3 & 10 & 4 \\ 4 & 13 & 5 \end{vmatrix}$.

Q3) Find the inverse of the matrix $\begin{pmatrix} 1 & -3 & -8 \\ 3 & 1 & -4 \\ 2 & 5 & 6 \end{pmatrix}$, if it exists.

Q4) Given $A=\begin{pmatrix} 2 & 6 \\ 0 & 3 \end{pmatrix}$, $B=\begin{pmatrix} \frac{1}{2} & -1 \\ 0 & 1/3 \end{pmatrix}$,

$C=\begin{pmatrix} 1 & 4 \\ 6 & 8 \end{pmatrix}$ and $D=\begin{pmatrix} -1/2 & 1/4 \\ 3/8 & -1/10 \end{pmatrix}$

Show that B is inverse of A and D is inverse of C.

Q5) Solve the following set of equations simultaneously.

$x - 2y + 3z = 1, 3x - y + 4z = 3$ and $2x + y - 2z = -1$

Q6) Following is record of hours worked per week of 100 workers in textile industry.

Hours/weeks	31-33	34-36	37-39	40-42	43-45	46-48
No. of workers	3	8	25	31	20	13

Calculate coefficient of variation and interpret the results.

Q7) Compare and contrast the following

(i) Mean v/s Median.

(ii) Mode v/s Mean

Q8) If $(x-y)e^{\frac{x}{x-y}} = a$, prove that $y\ \frac{dy}{dx} + x = 2y$.

Q9) Differentiate w.r.t. x

(i) $y = \sqrt{\frac{(x-1)(x+2)}{(2x-1)(x-3)}}$

(ii) $\frac{1+\sqrt{x}}{1-\sqrt{x}}$

Q10) Integrate the following functions w.r.t. x

(i) $\int (3x+5)^6\ dx$

(ii) $\frac{1}{(x^2+1)(x-2)} dx$

Q11) (i) Integrate $\frac{1}{x^2 + x + 1}$ w.r.t. x

(ii) Find $\int_2^3 \frac{6x^2+1}{\sqrt{2x^3+x-2}} dx$

Q12) Compare and contrast Simpsonís ⅓ rule with Simpsonís ⅜ rule with atleast one example for each.

Q13) If I(t) = $3t^{⅓}$ crores of rupees per year, what will be the capital formation in the time period of 5 years and during the last year of the plan. Given k(t) = capital formation $= \int_{o}^{t} I(t)\,dt$.