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Paper ID [A0211]

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BCA (301) (Old / S05) B.Sc. IT (404) (New) (Sem. - 3rd)**MATH -II (Computer Oriented Methods)****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 × 2 = 30)**

- a) State the both Necessary and Sufficient Conditions for maxima or minima of a function.
- b) Define a matrix and its rank.
- c) When two matrices A and B are said to be conformable to multiplication?
- d) Find the maxima or minima for the function
 $f(x) = 2x^3 - 21x^2 + 36x - 20$.
- e) What is Gauss elimination method of solving system of simultaneous equations?
- f) What is a determinant? Give its one important property.
- g) Given $X = \begin{pmatrix} 7 & 0 \\ 2 & 5 \end{pmatrix}$, $Y = \begin{pmatrix} 1 & 3 \\ 1 & -4 \end{pmatrix}$, $Z = \begin{pmatrix} 4 & 7 \\ 2 & 6 \end{pmatrix}$
 Show that $(A + B) + C = A + (B + C)$
- h) What is measures of Dispersion? Name two important measures which you like.
- i) What is a frequency distribution Table? Give its one use.
- j) What is coefficient of skewness?

- k) Compare and contrast Integral of a function and definite integral.
- l) Explain Trapezoidal method of Numerical Analysis.
- m) What is Simpson 1/3 rule? Give its one application.
- n) Find the cost function for a product whose marginal cost function is $MC = 5 + 8X$, given that fixed cost is 250.
- o) What is Integration by partial fractions? Give its one application.

Section - B

(9 × 5 = 45)

Q2) Find the value of $\begin{vmatrix} 4 & 3 & 1 \\ 1 & 3 & 2 \\ 2 & 1 & 5 \end{vmatrix}$

Q3) Find the inverse of $A = \begin{pmatrix} 3 & 0 & 2 \\ 1 & 5 & 9 \\ 6 & 4 & 7 \end{pmatrix}$ if it exist.

Q4) Solve the following system of Equations using matrix inverse method, if the solution exist.

$$5x + 7y = -2$$

$$4x + 6y = -3$$

Q5) Explain Gauss Jordan method of solving simultaneous Equations with an example. Also give its advantages over other methods.

Q6) Following is record of percentage of dividend declared by selected listed companies during the year.

% age of Dividend: 5-10 10-15 15-20 20-25 25-30 30-35 35-40 40-45

No of Companies: 5 6 15 10 5 4 2 2

Calculate coefficient of variation for the data and interpret the results.

Q7) Compare and contrast the following as measures of central tendency.

- (a) Mean v/s Median.
- (b) Median v/s Mode.
- (c) Percentile v/s Quartiles.

Q8) Differentiate the following w.r.t. x .

(a) $\sqrt{\frac{1-x^2}{1-x}}$

(b) $\frac{\sqrt{a+x} - \sqrt{a-x}}{\sqrt{a+x} + \sqrt{a-x}}$

Q9) Find maxima and minima for the following function

(a) $y = \frac{1}{3}x^3 - 2x^2 + 4x + 1$

(b) $y = 4x + \frac{1}{x}$

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

(a) $y = x(x-2)^{1/3}$

(b) $y = \frac{1 + \cos x}{x + \sin x}$

Q11) Integrate the following w.r.t. x

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

(b) $\int_0^1 \frac{xdx}{\sqrt{1-x^2}}$

Q12) If Marginal Cost = $MC = \frac{a}{\sqrt{ax+b}}$, and if cost of zero output (x) is zero,

find the total cost as a function of x .

Q13) Compare and contrast different Numerical Integration techniques and give atleast one application of each.

