

Roll No.

Total No. of Questions : 07]

[Total No. of Pages : 03

BCA (Sem. - 2nd)
MATHEMATICS - II
SUBJECT CODE : BSBC - 202 (2011 & Onward)
Paper ID : [B1114]

Time : 03 Hours

Maximum Marks : 60

Instruction to Candidates:

- 1) Section - A is **Compulsory**.
- 2) Attempt any **Four** questions from section - B.

Section - A

(10 × 2 = 20)

Q1) a) Find the rank of the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 0 & 2 & 2 \end{bmatrix}$

b) If $A = \begin{bmatrix} 0 & 1 & 2 \\ 2 & 3 & 4 \\ 4 & 5 & 6 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$, find $3A - 4B$.

- c) The marks out of 50 of a certain class consisting of 15 students in a class test are given below:

18, 19, 25, 29, 24, 23, 32, 40, 19, 26, 22, 20, 18, 35, 21

find the median score.

d) Evaluate $\int \sin^2 x \cos^3 x \, dx$

e) Evaluate $\int x \log x \, dx$

f) Solve:- $\int_0^1 \frac{2x}{5x^2+1} \, dx$

- g) Find the derivative of the function

$$g(x) = \left(\frac{3}{2}x^2 + 1 \right)^2 (x+2)$$

- h) Differentiate $f(x) = \cos^{-1}(4x^3 - 3x)$
- i) Find the derivative of $f(x) = e^{-3x} \sin^2 3x$
- j) Find the numbers whose arithmetic mean is 12.5 and geometric mean is 10.

Section - B

(4 × 10 = 40)

Q2) a) Using Cramer's Rule, Solve the following system of equations:

$$2x + 3y + 4z = 8$$

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

$$4x - y - 5z = -9$$

- b) Find the inverse of the matrix $A = \begin{bmatrix} 3 & -2 & 3 \\ 2 & 1 & -1 \\ 4 & -3 & 2 \end{bmatrix}$

Q3) a) From the following data, compute arithmetic mean

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of students	5	10	25	30	20	10

- b) The scores of two batsman A and B in ten innings during a certain season are :

A :	32	28	47	63	71	39	10	60	96	14
B :	19	31	48	53	67	90	10	62	40	80

Using coefficient of variation, find which of two batsman, A or B, is more consistent in scoring.

Q4) Solve the following system of equations by matrix method

$$2x - 3y + 3z = 10$$

$$x + y + z = 10$$

$$3x - y + 2z = 13$$

Q5) a) Evaluate $\int \frac{x+1}{x^2+4x-5} dx$

b) Use Trapezoidal Rule to compute approximately $\int_0^1 \frac{dx}{1+x}$ using six intervals.

Q6) a) Find the derivative of the function $y = (\sqrt{x})^{\sqrt{x}}$

b) Differentiate w.r.t x the function.

$$y = \tan^{-1} \left[\frac{\sqrt{1+x^2} + 1}{x} \right]$$

Q7) Find two positive numbers whose sum is 16 and the sum of whose cubes is minimum.

