Roll No. | | | | | | | | | | | | |

Total No. of Pages: 03
Total No. of Questions: 07

BCA (Sem.-3rd)

MATHEMATICS-II (COMPUTER ORIENTED)

Subject Code: BC-301
Paper ID: [B0227]

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATE:

1. ***Section-A is compulsory.***
2. ***Section-B Attempt any four questions.***

SECTION-A (10x2=20)

Q. 1. (a) If $A=\begin{bmatrix} a & 0 \\ 1 & 1 \end{bmatrix}$, $B=\begin{bmatrix} 160 \\ 51 \end{bmatrix}$, then find b such that $A^2=B$.

(b) Construct 2x3 matrix where elements are given by $a_{ij} = \frac{(i+2j)^2}{3}$

(c) Find the rank of matrix $A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$

(d) If the mean of set of observations $x_1, x_2,...x_{15}$, is 15, then find the mean value of x_1+1, x_2+2, x_3+3, ..., $x_{15}+15$.

(e) Evaluate $\int \frac{x^2}{(x+1)(x+2)} dx$

(f) Evaluate $\int x^2 e^{2x}\, dx$

(g) Find medium of the data

X= 10,11,12,13,13,12,11,10

(h) Differentiate $\sqrt{a+\sqrt{a+x^2}}$ w.r. to x.

(i) State Simpson's $\frac{1}{3}$ and $\frac{3}{8}$ rule to evaluate $\int_a^b f(x)dx$.

(j) Find the maximum and minimum value of $f(x) = x^3 - 3x^2 + 10$

Section-B (4x10=40)

Q. 2. (a) Find two positive numbers whose sum is 20 and sum of whose squares is minimum.

(b) (i) Evaluate $\int_0^{\pi/4} \cos^2 x\,dx$ (ii) $\int \frac{dx}{(x+1)(x-2)}$

Q. 3. (a) Evaluate $\int_0^{\sigma} \frac{dx}{1+x^2}$ by using Simpson's $\left(\frac{1}{3}\right)^{rd}$ rule.

(b) Differentiate the following functions wr to x

(i) $\sin^{-1}\left(\frac{2x}{1+x^2}\right)$ (ii) $\frac{e^x+\sin 2x}{1+\cos 2x}$

Q. 4. Solve by matrix inversion method the following equations:

2x-y+3z = 8, x-2y-z = -4, 3x+y-4z = 0

Q. 5. **(a)** Calculate the mode of the following distribution:

Class	6-7	7-14	14-21	21-28	28-35	35-42	42-49
Frequency	19	25	36	72	51	43	28

(b) Calculate mean and standard deviation of the following data.

Size of item	6	7	8	9	10	11	12
Frequency	3	6	9	13	8	5	4

Q. 6. (a) Find the solution of the following equations by means of Gauss elimination method.

x- 2y + 3z = 4, 2x+ y- 3z = 5, -x+ y+ 2z = 3.

(b) Find the rank of matrix $A = \begin{bmatrix} 2 & 3 & 4 & 3 \\ 3 & 4 & 6 & 2 \\ 2 & 4 & 5 & 6 \end{bmatrix}$

Q. 7. (a) From the following data find mean deviation from medium and its coefficient.

Marks	5	10	15	20	25	30	35	40
No. of students	16	32	36	44	28	18	12	14

(b) From the following data calculate Bowley's coefficient of skewness:

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

.....END.....