

S.No. : 122

BCACS 1105

No. of Printed Pages : 04

Following Paper ID and Roll No. to be filled in your Answer Book.

PAPER ID : 16405

Roll
No.

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BCA Examination 2021-22

(Special Carry Over Paper)

BASIC MATHEMATICS

Time : Three Hours]

[Maximum Marks : 60

Note :— Attempt all questions.

SECTION – A

1. Attempt all parts of the following : $8 \times 1 = 8$

- Define arithmetic progression with example.
- Write formula to calculate n^{th} term of A. D.
- Define geometric progression with example.
- Define square matrix with example.
- Find n^{th} derivative of e^x .

[P. T. O.]

(f) Evaluate :

$$\int \frac{1}{x} dx$$

(g) Evaluate :

$$\int x^3 dx$$

(h) Evaluate :

$$\frac{d}{dx} (x e^x)$$

SECTION – B

2. Attempt any two parts of the following : $2 \times 6 = 12$

(a) The eighth (8^{th}) term of an A. P. is half of its second term and 11^{th} term exceeds one third of fourth term by 1. Find 15^{th} term.

(b) If

$$A = \begin{bmatrix} 2 & -3 \\ p & q \end{bmatrix}$$

Find p and q so that $A^2 = I$.

(c) Differentiate the following :

(i) $y = e^{ax} \sin bx$

(ii) $y = x^2 \log x$

(d) Evaluate :

$$\int \frac{1}{1 + e^x} dx$$

SECTION - C

Note :- Attempt all questions. Attempt any two parts from each question. $5 \times 8 = 40$

3. (a) The n^{th} term of an A. P. is given by $(-u n + 15)$. Find the sum of first 20 terms of this A. P.

(b) In an A. P., if $S_n = n(4n + 1)$. Find the A. P.

(c) If $x, 2x + 2, 3x + 3$ are first three terms of a geometric progression. Find its fourth term.

4. (a) Find value of x, y, a and b if:

$$\begin{bmatrix} x + y & a + b \\ a - b & 2x - 3y \end{bmatrix} = \begin{bmatrix} 5 & -1 \\ 3 & -5 \end{bmatrix}$$

(b) Find matrix X if:

$$\begin{bmatrix} 2 & 1 \\ 5 & 0 \end{bmatrix} - 3X = \begin{bmatrix} -7 & 4 \\ 2 & 6 \end{bmatrix}$$

[P. T. O.]

(c) If:

$$A = \begin{bmatrix} 2 & -2 \\ 5 & -5 \end{bmatrix} \text{ and } B = \begin{bmatrix} 3 & 4 \\ 3 & 4 \end{bmatrix}$$

Compute AB and BA . What conclusions can you draw.

5. (a) Find

$$\frac{dy}{dx} \text{ when } x^2 + xy + y^2 = 100$$

(b) Differentiate :

$$\frac{e^x}{1 + \sin x}$$

(c) If $y^x = e^{y-x}$, prove that :

$$\frac{dy}{dx} = \frac{(1 + \log y)^2}{\log y}$$

6. (a) Evaluate :

$$\int \frac{e^2 x}{2 + e^x} dx$$

(b) Evaluate :

$$\int_0^1 (2x^3 + 3)^2 dx$$

(c) Evaluate :

$$\int_1^{\sqrt{3}} \frac{dx}{1 + x^2}$$
