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Roll No. -----

BBA-102

Business Mathematics (व्यवसायिक गणित)

Bachelor of Business Administration

(BBA-10/12/16/17)

1st Semester, Examination June 2022

Time: 2 Hours

Max. Marks: 80

Note : This paper is of Eighty (80) marks divided into two (02) Sections A and B. Attempt the questions contained in these sections according to the detailed instructions given therein.

Section – A

(Long Answer – type questions)

Note: Section 'A' contains Five (05) long-answer-type questions of Twenty (20) marks each. Learners are required to answer any two (02) questions only.

[2 x 20 = 40]

P.T.O.

Q.1. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 3 & -2 & 1 \\ 4 & 2 & 1 \end{bmatrix}$ show that

$$A^3 - 23A - 40I = 0$$

Q.2. If $(1+x)^n = C_0 + C_1x + C_2x^2 + \dots + C_x x^x$

Prove that $C_1^2 + 2C_2^2 + 3C_3^2 + \dots + nC_n^2 =$

$$\frac{2n-1}{n-1^2}$$

$$\frac{2n-1}{n-1^2}$$

Q.3. If $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$ then prove

that $A^n = \begin{bmatrix} \cos n\theta & \sin n\theta \\ -\sin n\theta & \cos n\theta \end{bmatrix}, n \in N$

Q.4. Let A, B, C, be three sets. then

$$A \times (B - C) = (A \times B) - (A \times C).$$

Q.5. If H_1, H_2, \dots, H_n are n harmonic means between two given numbers, then show that

$$H_1H_2 + H_2H_3 + \dots + H_{n-1}H_n = (n-1)H_1H_n$$

P.T.O.

Section – B

(Short-answer-type questions)

Note: Section 'B' contains Eight (08) short-answer-type questions of Ten (10) marks each. Learners are required to answer any Four (04) questions only.

[4 x 10 = 40]

Q.1. Find the sum of the first 14 terms of a G.P. 3, 9, 27, 81, 243, 729,

Q.2. If $y = x^2 \sin x$ find the role of $\frac{dy}{dx}$,

Q.3. Find rank of the following matrix:

$$A = \begin{bmatrix} 5 & 3 & 14 & 4 \\ 0 & 1 & 2 & 1 \\ 1 & -1 & 2 & 0 \end{bmatrix}$$

Q.4. Expand $(x + y)^5$

Q.5. Evaluate $\frac{x dx}{1 + \cos x}$

P.T.O.

Q.6. Find the value of $\frac{dy}{dx}$ if $y = x^{e^x}$

Q.7. Find the value of $\cot^{-1}\left(\frac{-1}{\sqrt{3}}\right)$

Q.8. If $A = \{1, 4\}$, $B = \{4, 5\}$, $C = \{5, 7\}$

Find (i) $(A \times B) \cup (A \times C)$

(ii) $(A \times B) \cap (A \times C)$
