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Total No. of Questions : 07]

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Paper ID [BB102]
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BBA (Sem. - 1st)

BUSINESS MATHEMATICS (BB-102)

Time : 03 Hours

Maximum Marks : 60

Instruction to Candidates:

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

Section - A

Q1)

$(10 \times 2 = 20)$

a) If A = {1, 2, 3, 5}, B = {4, 5, 7} and C = {1, 6, 7} then prove that A − (B ∩ C) = (A − B) ∪ (A − C).

b) Construct the truth table for $[p \wedge (p \rightarrow q)] \rightarrow q$.

c) In how many ways a committee of 3 students can be formed from 4 boys and 3 girls so that committee contains at least one boy and one girl.

d) State Binomial Theorem and using it expand $(1 - x)^4$.

e) Find the derivative of $2^x \log x$ with respect to x.

f) Evaluate $\lim\limits_{x \to 0} \dfrac{\sqrt{1+x} - 1}{x}$

g) If $A = \begin{bmatrix} \cos\theta & 0 & \sin\theta \\ 0 & 1 & 0 \\ -\sin\theta & 0 & \cos\theta \end{bmatrix}$ then find A^2 & A^3.

h) Using Matrix Inversion Method, solve the following system of linear equations:

$3x + 2y = 1$

$x - y = 2$

i) Define Logarithm. List few properties of logarithm.

j) How much money is needed today so that we will have Rs. 2500 after 2 years if interest is 8% compounded quarterly.

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P.T.O.

Section - B

(4 × 10 = 40)

Q2) (a) In a class of 35 students, 17 have taken mathematics, 10 have taken mathematics but not economics. Find the number of students who have taken both mathematics and economics and the number of students who have taken economics but not mathematics, if it is given that each student has taken either mathematics or economics or both.

(b) Solve the equation:
$12x^4 - 56x^3 + 89x^2 - 56x + 12 = 0$

Q3) (a) State the converse and contrapositive of the following statements:
  (i) If today is Holi then tomorrow is Tuesday.
  (ii) If John is a poet then he is poor.
  (iii) If triangle ABC is right angled then $AB^2 + BC^2 = AC^2$.
  (iv) If P is a square then P is a rectangle.
  (v) If a triangle is not isosceles then it is not equilateral

(b) A bit is either 0 or 1: a byte is a sequence of 8 bits. Find
  (i) the number of bytes that can be formed,
  (ii) the number of bytes that begin with 11 and end with 11,
  (iii) the number of bytes that begin with 11 and do not end with 11,
  (iv) the number of bytes that begin with 11 or end with 11,

Q4) (a) Find the sum of first 20 terms of an A.P. in which 3rd term is 7 and the 7th term is two more than thrice of its 3rd term.

(b) Find the extreme values of the function given by $f(x) = (x - 1)^2 (x + 1)^3$.

Q5) (a) Express the matrix A as sum of a symmetric and skew symmetric matrix where

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

(b) Using Cramer's rule, solve the following system of linear equations:
$x - y + z = 4$
$2x + y - 3z = 0$
$x + y + z = 2$

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Q6) Using Gauss elimination method, solve the following system of linear equations:

$$2x + z = 3$$
$$x - y + z = 1$$
$$4x - 2y + 3z = 3$$

Q7) Define Depreciation. Explain Straight-Line Method of depreciation. A dishwasher was purchased by the Check-Inn Restaurant on october 1. The purchase price was Rs. 1200 and installation cost was Rs. 300. The estimate useful life of the dishwasher is 6 years and its salvage value is Rs. 300. What is the amount of depreciation to the nearest paisa at the end of 4th year?

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