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SARDAR PATEL UNIVERSITY
B.B.A. (ITM) (3 Years) EXAMINATION
SEMESTER - I

Wednesday, 23rd November 2016

BUSINESS MATHEMATICS (UM01EBBI03)

Time: - 10.00 a.m. to 12.00 p.m.

Total Marks: - 60

Note: (1) Figures to the right indicate marks. (2) Log table will be provided on request.

Q.1

05

(a) Define the following terms:

1. Subset
2. Intersection of two sets
3. Power set.
4. Null Matrix
5. Transpose Matrix

(b) State and verify De Morgan laws by Venn diagrams.

05

(c) If $A = \begin{bmatrix} 1 & 2 & 3 \\ -1 & 2 & 0 \\ 1 & 4 & -2 \end{bmatrix}$, $B = \begin{bmatrix} 0 & 1 & 3 \\ 2 & 0 & 3 \\ 5 & 4 & -1 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 1 & 2 \\ 1 & 2 & 0 \end{bmatrix}$

05

Then Find (1) $2A + C$ (2) $A - 2B + 3C$

OR

Q.1

05

(a) If $U = \{x: 1 \leq x \leq 10, x \in N\}$, $A = \{1,2,7,4,5\}$, $B = \{2,3,9,6,7,8\}$ and $C = \{3,4,5,6\}$, then find $A \cup B$, $B \cap C$, $B - C$, $A \Delta C$ and A' .

(b) If $A = \begin{bmatrix} 1 & 2 \\ 3 & -4 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & 0 \\ -6 & 7 \end{bmatrix}$. Then

05

1. Show that $(A + B)^T = A^T + B^T$.

2. Also find AB

(c) Find the product AB and BA , if $A = \begin{bmatrix} 2 & -1 \\ 1 & 0 \\ -3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -2 & -5 \\ 4 & 3 & 0 \end{bmatrix}$

05

Q.2

(a) How many different words can be formed using the following words without repetition?

05

- (1) MATHEMATICS
- (2) MISSISSIPPI

(b) Find the number of committees of 5 members from 7 boys and 4 girls that can be formed so that each committee contains at least one girl.

05

(c) Find n : ${}_n P_4 = 12 \cdot {}_n P_2$

05

Q.2

OR

(a) In how many ways can 5 boys and 5 girls be seated at a round table so that no two Girls may be together?

05

(b) How many arrangements can be made with the letter of the word ALLAHABAD? In how many of them vowels occupy even places?

05

(c) (1) Find: ${}_9 C_4 + {}_5 P_2 + 0!$

05

(2) Find n : ${}_n C_6 = {}_n C_{10}$

Q.3

- (a) State the rules of differentiation. 04
- (b) If the supply function is $x = 5 + 3p^2$, find elasticity of supply. Also find the elasticity of supply when (1) $p = 3$, (2) $p = 4$. 05
- (c) Find $\frac{dy}{dx}$: 06
1. $y = 3x^4 + 4x^3 + x^2 + \log x + e^x + 9$
 2. $y = e^x \cdot 3^x$

Q.3

OR

- (a) Find second order derivative of, $y = \frac{\log x}{x}$ 05
- (b) The demand function of a commodity is $p = 8 - \frac{x}{3}$. Determine demand and price for maximum revenue. 05
- (c) At which point the function $f(x) = x^2 + x + 1$ is minimum? Find the minimum value of $f(x)$. 05

Q.4

- (a) What is an aggregate amount for Rs. 16,000 at 9% rate of compound interest for 8 years if the interest is compounded. 05
1. Annually?
 2. Semi-annually?
- (b) Mr. A borrows Rs. 33,000 at the rate 16% of simple interest and invests it on the same day at 14% of compound interest. At the end of 5 years how much profit or loss will he have? 05
- (c) ABC Ltd. Purchased a machine for Rs. 5, 00,000 on 1-1-2015. Its expected life is 12 years. After that period a new machine will Cost 60% more. In order to provide for this, it was decided to create a sinking fund and to invest it at 14% rate of compound interest. Find out the sum to be transferred to the sinking fund on 31stDecember of every year. 05

Q.4

OR

- (a) Explain: Annuity and Sinking Fund. 05
- (b) The Population of a city is 49949 at present. Before 7 years the population of a city was 35498. Find the rate of growth of the population of the city. 05
- (C) A person has to pay 10 installments each of Rs 18,000 at the end of every year against a loan. If the rate of compound interest is 10% per annum, find the amount of the loan. 05
