OLE-57502

BBA 1st Semester (N. S.) 2014-17 Examination – April, 2021

BUSINESS MATHEMATICS

Paper :BBAN-102

Time : Three Hours]   *[Maximum Marks : 80*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Section **– A** is *compulsory*. Attempt *one* Question from each Unit in Section **– B**. All questions carry equal marks.

SECTION – A

1. (a) A market research team intervied 100 people, asking each whether he smoks any or all the items :

A : Cigarettes

B : Cigars

C : Pipe tobaco

Following data was returned :

Category	Number	Category	Number
ABC	3	A	`42
AB	7	B	17
BC	13	C	27
AC	18	Total	100

Are the returns consistent ?

(b) If $A = \{1, 4\}$; $B = \{4, 5\}$; $C = \{5, 7\}$, verify that $A \times (B \cap C) = (A \times B) \cap (A \times C)$

(c) If $2^x = 3^y = 12^z$, prove that $xy = z(x + 2y)$

(d) Which term of the series $12 + 9 + 6 +$ ………………
is equal to (i) –30 (ii) – 100 ?

(e) In an examination on Advanced Accounts, 10 questions are set. In how many ways can an examinee choose 7 questions ?

(f) The demand and supply equations are $2p^2 + q^2 = 11$ and $p + 2q = 7$.

Find the equilibrium price and quantity, where p stands for price and q for quantity.

(g) Let $y = (3x^2 + 1)(x^3 + 2x)$ find $\dfrac{dy}{dx}$.

(h) Find the adjoint of the matrix $A = \begin{pmatrix} 1 & 2 \\ 3 & -5 \end{pmatrix}$.

SECTION – B

UNIT – I

2. (a) A class of 60 students appeared for an examination of Mercantile Law, Statistics & Accountancy. 25 students failed in Mercantile Law, 24 failed in Statistics, 32 failed in Accountancy, 9 failed in Mercantile Law alone, 6 failed in Statistics alone, & 5 failed in Accountancy & Statistics only. Further, 3 failed in Mercantile Law and Statistics only. Find :

(i) how many failed in all the three subjects.

(ii) how many passed in all the three subjects. Use set theory only.

(b) Given $A = \{2, 3, 4\}$ and $B = \{4, 5\}$, which statements are not correct & why ?

(i) $5 \in A$

(ii) $\{5\} \subset A$

(iii) $4 \in A$

3. (a) Out of 880 boys in a school, 224 played cricket, 240 played hockey & 336 played basketball. Of the total 64 played both basketball & hockey; 80 played cricket & basket ball & 40 played cricket & hockey. 24 boys played all the three games. How many boys did not play any game, & how many played only one game ?

(b) If $A = \{1, 2, 3\}$ & $B = \{2, 3\}$, prove that :

$A \times B \neq B \times A.$

UNIT – II

4. (a) Evaluate :

$$\frac{24.395 \times (3.16)^3}{8.79}$$

(Given antilog $(1.9425) = 87.60$)

(b) Mr. Mehta borrowed Rs. 20,000 from a money lender but he could not repay any amount in a period of 4 years. Accordingly, money lender now demands Rs. 26,500 from him. At what rate percent per annum compounded interest did the latter lend his money ?

5. (a) Find the sum of natural numbers from 1 to 200 excluding those divisible by 5.

(b) Show that the sum of all odd numbers between 2 and 1,000 which are divisible by 3 is 83667, and of those not divisible by 3 is 1,66,332.

(c) The rate of monthly salary of a person is increased annually in A. P. It is known that he was drawing Rs. 400 a month during the 11th year of his service, and Rs. 760 during the 29th year. Find his starting salary and the rate of annual increment. What should be his salary at the time of retirement just on the completion of 36 years of service ?

UNIT – III

6. (a) A party of 3 ladies & 4 gentlemen is to be formed from 8 ladies & 7 gentlemen. In how many different way can the party be formed if Mrs. X & Mr. Y refuse to join the same party ?

(b) In how many ways can the letters of the word :

ARRANGE

be arranged ? How many of these arrangements are that in which :

(i) Two Rs come together,

(ii) Two Rs do not come together,.

(iii) Two Rs & two As come together ?

7. Solve the following quadratic equation :

(i) $4x^2 = 25$

(ii) $3x^2 - 14x + 8 = 0$

(iii) $\dfrac{x}{b} + \dfrac{b}{x} = \dfrac{a}{b} + \dfrac{b}{a}$

(iv) $x^2 - (a+b)x + ab = 0$

UNIT – IV

8. (a) The matrix $A = \begin{pmatrix} 2 & 1 \\ 4 & 3 \end{pmatrix}$ represents the number of instruments P & Q, two factories X and Y can produces in a day, according to the table shown below :

Instrument		X	Y
	P	2	1
	Q	4	3

Let $B = \begin{pmatrix} 5 \\ 6 \end{pmatrix}$ represent the number of days two factories operate per week. Find AB and state what does it represent.

(b) Solve simultaneous linear equation using determinants :

$$2x - y = 5$$

$$3x + 2y = -3$$

(c) Compute the determinant of the given matrix :

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

9. (a) Compute the inverse of the matrix :

$$\begin{pmatrix} 1 & 0 & -4 \\ -2 & 2 & 5 \\ 3 & -1 & 2 \end{pmatrix}$$

(b) Solve following equation using determinants :

$$2x - 3y = 3$$

$$4x - y = 11$$

(c) Calculate $PQ \& QP$ where :

$$P = \begin{bmatrix} 3 & 1 \\ 0 & 2 \end{bmatrix} \& \ Q = \begin{bmatrix} 1/3 & -1/6 \\ 0 & 1/2 \end{bmatrix}$$

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