Seat No:_____ **Enrollment No:_____**

PARUL UNIVERSITY

FACULTY OF COMMERCE

B.Com (Hons) Winter 2017 – 18 Examination

Semester: 1 **Date: 19/12/2017**
Subject Code: 16100106 **Time: 10.30 am to 1.00 pm**
Subject Name: Business Mathematics **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figure to the right indicate full marks
3. Make suitable assumptions wherever necessary
4. Start new question on new page.

Q.1 (A) Do as directed (1 mark each. <u>All Compulsory</u>) **(06)**

(i) If $A = [2 \quad 4 \quad 7]$ then order of *A* is ____
(a) 3x1 (b) 1x3 (c) 3x3 (d) cannot be determined

(ii) For the set A = {2, 12, 23, 25}, the cardinal number is ___
(a) 5 (b) 4 (c) 2 (d) 1

(iii) For a sequence, $u_n = 3n + 5, for\ n = 1, 2, 3, \ldots$, what is the fifth term?
(a) 20 (b) 5 (c) 17 (d) none of these

(iv) Which of the following formula represents sum of the first n terms of an **arithmetic progression?**
(a) $S_n = \frac{n}{2}[2a + (n-1)d]$ (b) $S_n = \frac{1}{2}[a + (n-1)d]$
(c) $S_n = n[2a + (n-1)d]$ (d) none of these

(v) Which of the following is true, for any event A?
(a) $0 < P(A) < 1$ (b) $P(A) \neq 0$ (c) $0 \leq P(A) \leq 1$ (d) $P(A) > 1$

(vi) If the annual interest rate is 12% and compounding is done on monthly basis then the rate of interest per compounding period is ___
(a) 4% (b) 3% (c) 2% (d) 1%

(B) Do as directed (1 mark each. <u>All Compulsory</u>) **(06)**

(i) Find the transpose of a matrix $= \begin{bmatrix} -1 & 2 & 4 \\ 5 & 7 & -14 \\ 10 & 9 & 3 \end{bmatrix}$.

(ii) If for a geometric progression, first term $a = 2$ and common ratio $r = 3$ then find sum of first six terms.

(iii) Find the simple interest of Rs.5000 deposited at 5% interest rate per annum for 5 years.

(iv) Write the sample space for the event of tossing three fair coins.

(v) For the sets A = {5, 8, 10, 15} and B = {8, 12, 15} , find $A \times B$.

(vi) find the adjoint of the matrix $A = \begin{bmatrix} 2 & 5 \\ -1 & 7 \end{bmatrix}$.

Q.2 Answer the following. (4 mark each. <u>All Compulsory</u>) **(12)**

A. State De Morgan's law and verify it for the sets $U = \{1, 3, 5, 8, 10, 12, 13, 15\}, A = \{5, 8, 10, 15\}$ and $B = \{8, 12, 15\}$.

B. Solve by Cramer's rule $x + 2y = 3$ and $5x + 7y = 10$

C. Find the present value of Rs.50740 to be received after 3 years, at the interest rate of 8% p.a. compounded quarterly. [$1.02^{12} = 1.2682$]

Q.3 Answer the following. (6 mark each. Any Three out of Four) **(18)**

A. Three machine M_1 ,M_2 and M_3 manufacture 20, 45, and 35 percent respectively. Of the total output 3,5 and 4 percent respectively are defective. One product is selected at random from the total output and is found to be defective. Find the probability that it is manufactured by machine M_1.

B. There are 100 people living in a society, out which 40 persons use Whatsapp and 68 uses Facebook. Moreover each person use at least one of them. Find (a) number of persons using both, (b) number of persons using only Whatsapp, and (c) number of persons using only Facebook.

C. Find the product AB of the two matrices: A = $\begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$,$B = \begin{bmatrix} 1 & 5 & 9 \\ 7 & 5 & 3 \end{bmatrix}$ and solve the following system using Inverse Matrix method: $3x + 15y = 5$,$7x + 9y = 2$.

D. Define sinking fund. How much amount is required to be invested every year so as to accumulate Rs.1000000 at the end of 5 years if the effective rate of interest is 12% p.a.? [$1.12^5 = 1.7623$]

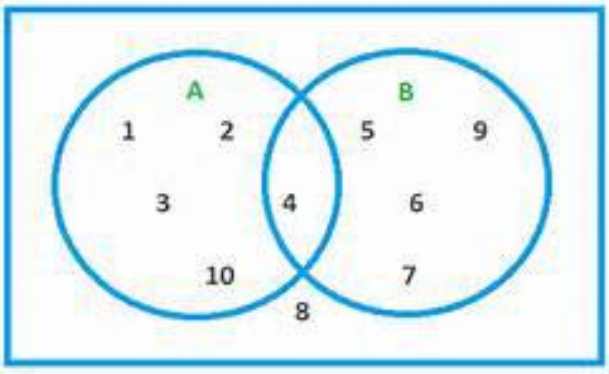
Q.4 Answer the following. (9 mark each. Any Two out of Three)

A. Define Annuity. A person has to pay 10 installments each of Rs.18000 at the end of every year against a loan. If the rate of interest is 10% per annum, find the amount of the loan. [$1.1^{-10} = 0.3855$] **(09)**

B. (i) The probability distribution of demand of a commodity is given below. Find the expected demand E(X) and its variance V(X). **(06)**

Demand x	5	6	7	8	9	10
Probability P(x)	0.05	0.1	0.3	0.4	0.1	0.05

(ii) From the Venn diagram find the following: (a) $A \cup B$ $(b)\ A \cap B$ $(c)\ (A \cup B)'$ **(03)**



(C) (i) Find the inverse of the matrix $A = \begin{bmatrix} 1 & 2 & -1 \\ 5 & 4 & 8 \\ 2 & 7 & 6 \end{bmatrix}$ **(06)**

(ii) The probability that a contractor will get a contract is $\frac{1}{3}$ and the probability that he will get on other contract is $\frac{5}{9}$. If the probability of getting at least one contract is $\frac{4}{5}$, what is the probability that he will get both the contracts? **(03)**