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AAM-420 Seat No. _____

B. Sc. (Sem. III) Examination

October / November – 2016

ES-MAT-21 : Business Mathematics - I

(Elective Subject)

Time : **2** Hours] [Total Marks : **50**

1 Attempt any five : **25**

(1) Using truth table, for any statements p and q, verify that $[(p \Rightarrow q) \wedge (\sim q)] \Rightarrow \sim p$ is tautology or not ?

(2) Prove the De-Morgan's law for any given statements p and q.

(3) Using algebra of sets, for any sets A, B and C, prove that $A-(B \cup C)=(A-B) \cap (A-C)$.

(4) For sets $A=\{1,2,3\}, B=\{2,3,4\}; S=\{1,3,4\}; T=\{2,4,5\}$, verify that, $(A \times B) \cap (S \times T)=(A \cap S) \times (B \cap T)$.

(5) For any sets $A, B \in P(U)$, prove that, $(A \cup B) \cap (A \cup B')=A$ and $(A \cap B) \cup (A \cap B')=A$.

(6) A town has a total population of 50,000. Out of it 28,000 read Patriot and 23,000 read Times of india, while 4,000 read both the papers. Indicate how many read neither Patriot nor Times of India ? Answer verify also by Venn-diagram.

2 Attempt any five : 25

(1) Out of 10 consonants and 4 vowels, how many words can be formed each containing 6 consonants and 3 vowels ?

(2) Find the number of combinations that can be made by taking 4 letters of the word "COMBINATION".

(3) If ${}^{10}P_{n-1} : {}^{11}P_{n-2} = 30 : 11$, then find the value of n.

(4) How many words can be formed by using the letters of the word BUSINESS ? Find the number of words in which all the three 'S' are together. Also find the number of words which start with "BUSI".

(5) Prove that :

$${}^{(n-2)}C_{(r-2)} + 2 \cdot {}^{(n-2)}C_{(r-1)} + {}^{(n-2)}C_r = {}^nC_r .$$

(6) A question-paper includes 12 questions in all. If 7 questions including at least one from the first three questions are to be attempted, find the number of ways of answering the paper.

(7) How many different numbers of five digits can be formed by using all digits of number 50231 ?