HG-239-240 Seat No._____

B. Sc. (Sem. VI) Examination

March / April - 2015

Business Mathematics

(Subject Elective)

(1) : Business Mathematics - 4

(2) : ES-32 : Business Mathematics - 2

Time : 2 Hours] [Total Marks : 50

(1) : Business Mathematics - 4

1 Attempt any five : 25

(1) Using truth table, for any statements p, q; prove that $(p \wedge q) \wedge \sim(p \vee q)$ is a contradiction.

(2) For any sets $A, B, C \in P(U)$, Verify $A-(B \cap C)=(A-B) \cup (A-C)$.

(3) In a class of 75 peoples, 32 peoples have taken Tea, 8 have taken coffee but not Tea. 25 peoples take both. Find the no. of peoples neither tea not coffee.

(4) If $A=\{1,2,3,4,5\}$; $B=\{2,4,5,7,8\}$; $C=\{1,3,4,5,6\}$ and $U=\{1,2,\ldots\ldots,10\}$ then compute : $(A' \cap B') \cup C'$ and $A' \cap (B' \cup C')$.

(5) Using the algebra of propositions, prove that $(\sim p \vee q) \wedge (p)$ and $p \wedge (\sim q)$ are not equivalence statements.

(6) For sets $A=\{a,b,c,d,e\}$, $B=\{b,c,d,p,q,r\}$, $C=\{a,c,d,p,q\}$ then verify :

$A-(B\cup C)=(A-B)\cap(A-C)$

(7) Write which of these is a tautology or a faulty :

(a) $p\wedge(\sim p)$

(b) $p\vee\sim(p\wedge q)$

(c) $(p\wedge q)\wedge\sim(p\wedge p)$

2 Attempt any **five** : **25**

(1) How many numbers greater than a million can be formed with the digits 4, 5, 5, 0, 4, 5, 3.

(2) Find the number of arrangements that can be made out of the letters of the word "MISSISSIPPII".

(3) How many numbers of six digits can be formed from the digits 4, 5, 6, 7, 8, 9; no digit being repeated. How many of them are not divisible by 5 ?

(4) If ${}^{10}P_r=604800$ and ${}^{10}C_r=120$ then find the value of r.

(5) In how many ways can 10 letters be posted in 5 letter boxes ?

(6) How many numbers between 300 and 500 can be formed with the digits 1, 2, 3, 4, 5 ? How many of them are divisible by 5 ?

(7) A cricket club consists of 16 members of which only 6 can bowl. In how many ways can an eleven be chosen to include at least 4 bowlers.

Instructions : (1) There are two questions.
(2) Figures to the right indicate marks of the corresponding question.

1 Attempt any **five** :

(a) 1000 tickets each of Rs. 2 are sold in a lottery. There is only one ticket in the lottery bearing a prize of Rs. 900. A person is having one ticket of the lottery. Find his expectation.

(b) The probability of a defective screw in a manufacturing process is $\frac{1}{100}$. Find mean and variance of defective screws in a sample of 4000 screws.

(c) A machine is made up two parts A and B. The probability that part A is defective is 0.06 and probability that part B is defective is 0.08. Find the probability that the entire machine is not defective.

(d) If $P(A) = 2P(B) = P(A/B) = 0.4$; then find the following probabilities :
(i) Only B happens
(ii) Neither of A and B happen.

(e) The probability distribution of demand of a commodity is given below :

Demand x :	5	6	7	8	9	10
Probability $p(x)$:	0.05	0.1	0.3	0.4	0.1	0.05

Find the expected demand and its variance.

(f) A person takes an insurance of Rs. 1,00,000 and pays premium of Rs. 200. The probability that any person of his age group dies within a year is 0.1. Find the expected gain of the insurance company.

2 Attempt any **five** :

(1) Six cubical dice are thrown for 1458 times. If 2 or 3 is regarded as success; find the probabilities of different number of successes and their expected frequencies.

(2) For a binomial variate $n = 10$ and $p(x = 5) = 2\,P(x = 4)$. Find the value of P.

(3) The probability that a person hits a target is $\frac{1}{3}$. Find the probability that he will hit the target in 3 times out of 5 trials.

(4) The probability of occurrence of an occupational disease to a worker of a chemical factory is $\frac{1}{4}$. Find the probability that 2 out of 5 workers chosen at a random will suffer from this disease.

(5) x is distributed as a binomial variate with mean 3 and variance 2, find $P(3 \leq x \leq 6)$.

(6) The mean of Binomial distribution is 4 and its variance is 2, 4. Find its parameters and write down its probability density function.