Seat No. : _____

DC-108

December-2013

5 Years MBA Integrated (KS) SY MBA

Business Mathematics

Time : 3 Hours] **[Max. Marks : 100**

Instructions : (1) Non-programmable scientific calculator can be used.

(2) Statistical tables will be provide on request.

1. Solve following any **two** : **20**

(A) (i) In how many ways can 4 men and 3 women be arranged at a round table if the 3 women are never sit together and always sit together ?

(ii) How many combination can be formed of 8 counters marked 1, 2, 3, 4, 5, 6, 7, 8 taking them 4 at a time, there being atleast one odd and one even counter, in each combination ?

(B) (i) The figures 1, 2, 3, 4, 5 are written in every possible order. How many of the numbers 50 formed will be greater than 23000 ?

(ii) A gentleman invites a party of 13 guests to a dinner and places 8 of them at one table and the remaining 5 at other, the tables being round. Find the number of ways in which he can arrange the guests.

(C) (i) If $(n + 1) P_4 = 12 \times nP_3$, then find value of n.

(ii) $20 C_r = 20 C_{r+4}$ then find value of r and ${}_rC_4$.

2. (A) Define following : **5**

(1) Independent Events

(2) Exclusive events

(3) Mutually exhaustive events

(4) Equiprobable events

(5) Experiment

(B) Solve following : (any **three**) **15**

(1) Two unbiased dice are thrown at a time. Find the probabilities that the sum of the numbers on the dice is

(i) less than 10

(ii) at most 6

(2) In lottery 2 tickets bear a prize and 10 tickets do not. A person has 2 tickets. Find the probability of his getting the prize.

(3) There are three drugs B_1, B_2 and B_3 for curing a patient. Probability of curing the patient by drug B_1 is 0.75, by drug B_2 is 0.84 and by drug B_3 is 0.90. If the patient select any one drug at random, what is the probability that he will be cured ? If it is given that the patient is cured, what is the probability that he has selected drug B_2 ?

(4) The probability distribution of a random variable X is given below. Find E $(x + 5)$ and V(x).

X	0	1	2	3	4	5
P (*x*)	P	6/20	1/10	1/5	2/10	P

3. Solve following : (any **two**) **20**

(A) (i) Find middle terms in the expansion of $(3x - \frac{x^3}{6})^9$.

(ii) By using principle of mathematical induction prove that $3^{2n} + 7$ is divisible by 8.

(B) (i) Find sum of the series

$$\frac{1^3}{1} + \left(\frac{1^3 + 2^3}{2}\right) + \left(\frac{1^3 + 2^3 + 3^3}{3}\right) + \ldots \text{ to n terms.}$$

(ii) By principle of mathematical induction prove that for every natural number $n > 1$ that $3^n > 3n + 1$.

(C) (i) If the coefficient of x^7 and x^8 in the expansion of $\left(3 + \frac{x}{2}\right)^n$ are equal, find the value of n.

(ii) Find the term having coefficient x^{-7} in the expansion of $\left(\sqrt{x} - \frac{2}{x}\right)^{10}$

4. Solve following any **two** : **20**

(A) The sum of five numbers in A.P. is 15 and the sum of their squares is 55, find the numbers.

(B) The $(p + q)^{th}$ term of a G.P. is m and its $(p - q)^{th}$ term is n then prove that p^{th} term is $\sqrt{mn}$

(C) (i) Two numbers are in the ratio 1 : 9. Prove that their A.M. and G.M are in the ratio 5 : 3.

(ii) The 2^{nd} term of a G.P. is 48 and its 7^{th} term is 364 ½ , find its 4^{th} term.

5. Solve the following : (any **two**) **20**

(A) Estimate the population for the year 1980 by using following data :

Year :	1970	1978	1981
Population (in lakhs) :	12	15	18

(B) If $\sqrt{2} = 2.41$, $\sqrt{5} = 2.24$, $\sqrt{6} = 2.45$, then find value of $\sqrt{8}$.

(C) By using backward interpolation interpolate the premium at the age of 37 years :

Age in years :	20	25	30	35	40
Premium (in ₹) :	23	26	30	35	42