S.D.E.

M.C.A. Sem -II (Old Course) : SUMMER - 2019

SUBJECT : PROBABILITY & COMBINATORIES

Day: Wednesday
Date: 08/05/2019

S-2019-5259

Time : 02.00 PM TO 05.00 PM
Max. Marks : 80

N. B.

1) Attempt any **FIVE** Questions from section-I and any **TWO** Questions from section-II
2) Figures to the right indicate full marks.
3) Answers to both the sections should be written in SAME answer books.

SECTION – I

Q.1 a) Prove that $\binom{n+2}{r}=\binom{n}{r}+2\binom{n}{r-1}+\binom{n}{r-2}$ **(05)**

b) What is meant by derangement? List all the derangement of 6,7,8, and 9 **(05)**

Q.2 **a)** What is the coefficient of $x^{10}\,y^{15}$ in the expansion of $(x+y)^{15}$ **(05)**
b) Find the values of C(9,3) and P(15,6) **(05)**

Q.3 A die is thrown once, find : **(10)**
i) P(odd number) ii) P(a number ≥ 4)
iii) P (a number >6) iv) P (a number < 7)

Q.4 What is the solution of the recurrence relation $a_n = 6a_{n-1} - 9a_{n-2}$ *with initial conditions* $a_0 = 1$ *and* $a_1 = 6$? **(10)**

Q.5 State and prove Baye's theorem **(10)**

Q.6 **a)** A card is drown from a well shuffled pack of playing cards. Find the probability that it is either a diamond or a king. **(10)**

Q.7 Write Short notes on **(10)**
a) Negative Binomial
b) Inclusion and Exclusion principle

SECTION – II

Q.8 Define Poisson distribution. Assume that one in 80 births is a care of twins. Calculate the probability of 2 or more sets of twins on a day when 30 births occur. Compare the results obtained by using. **(15)**
i) Binomial distribution ii) Poisson distribution

Q.9 Define Simulation. Also give their advantages and limitations. A trader deals in a perishable commodity. The daily demand is a random variable records of past 100 days show the following **(15)**

Demand	1	2	3	4	5
No. of days	10	20	30	30	10

The trader buys the commodity at Rs.10 per unit and sells at Rs 15 per unit. Calculate the profit in 10 days by simulating the system. Use the following random numbers 12, 75, 14, 72, 20, 82, 74, 08, 01, 69

Q.10 **a)** State and prove Total probability theorem. **(07)**
b) State and prove Pigeonhole principle. **(08)**

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