S.D.E.

M.C.A.-SEM-II : SUMMER-2018

SUBJECT : PROBABILITY & COMBINATORIES

Day: Wednesday
Date: 06-06-2018

Time : 2:00 P.M. TO 5:00 P.M.
Max. Marks : 80

S-2018-4612

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 **SEPARATE** answer books.

SECTION – I

Q.1 State and prove Baye's theorem **(10)**

Q.2 **a)** What do you mean by Derangements? Explain. **(05)**
b) What is the probability that a number selected randomly from 1 to 100 is **(05)**
i) Divisible by 5 ii) Divisible by 2, 5 and 10

Q.3 **a)** Find the value of C (15, 3) and P (24, 8) **(05)**
b) Explain various application areas of simulation **(05)**

Q.4 **a)** Define Binomial distribution. Find its mean and variance **(05)**
b) Solve recurrence relation **(05)**
$a_n - 2a_{n-1} + 2a_{n-2} - a_{n-3} = 0$; *for* $n \geq 3$ *given* $a_0 = 2, a_1 = 1, a_2 = 1$

Q.5 **a)** Two unbiased dice are rolled. What is the probability of sum on upper face is **(05)**
i) even ii) odd

b) Probability of a continuous random variable is given as : **(05)**
$f(x) = C(2x^3 - 4x)$ *for* $0 < x < 2$
$= 0$ *otherwise*
Find i) C ii) P(X>1)

Q.6 **a)** Write a short note on moment generating function. **(05)**
b) What is the coefficient of $x^5 y^8$ in the expansion of $(x+y)^{13}$? **(05)**

Q.7 Write short Notes on **(10)**
a) Pigeonhole principle
b) Geometric distribution

SECTION – II

Q.8 **a)** Define Normal distribution. State its properties. **(07)**
b) A card is drawn from a full pack of cards. What is the probability of drawing a black king given that, the card drawn was a face card ? **(08)**

Q.9 In a cricket season for a one day match a bowler bowled 50 balls . The frequency distribution of number of run scored per ball is given below **(15)**

Number of run scored per ball	0	1	2	3	4	5	6	Total
Number of balls	15	10	10	4	8	1	2	50

Simulate the system for 2 overs and find number of runs given in two overs. Use the following random numbers 88, 03, 05, 29, 28, 48, 65, 19, 55, 17, 37, 82

Q.10 **a)** State and prove Inclusion –Exclusion principle **(07)**
b) If 5% of electric bulb manufactured by a company are defective use Poisson distribution to find the probability that in a sample of 100 bulbs **(08)**
i) None is defective ii) 5 bulbs will be defective (Given, e^{-5}=0.007)

* * * * *