Subject : Probability & Combinatories

Day : Thursday | **S.D.E.** | Time : 02.00 P.M. TO 05.00 P.M.
Date : 15/12/2016 | 33523 | Max Marks : 80   Total Pages : 2

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 book.

SECTION-I

Q.1 **a)** A pair of unbiased dice is rolled. If the sum on the two dice is 9. Find the probability that one of the dice showed 3. **(05)**

b) A bag contains 20 tickets marked with numbers 1 to 20. One ticket is drawn at random. Find the probability that it will be multiple of 2 or 5. **(05)**

Q.2 Two cards are drawn at random successively one after another. **(10)**
i) with replacement   ii) without replacement
from a well shuffled deck of 52 cards. Find the probability distribution of the number of aces in each case.

Q.3 What is the solution of the recurrence relation **(10)**
$a_n = 6a_{n-1} - 9a_{n-2}$ with initial conditions $a_0 = 1$ and $a_1 = 6$?

Q.4 Define Combinations. Prove that: **(10)**
$C(2n+2,\ n+1) = C(2n,\ n+1) + 2C(2n,n) + C(2n,n-1)$

Q.5 Define Simulation. Explain steps of Simulation process. Also explain various application areas of Simulation. **(10)**

Q.6 Find the coefficient of $x^3 y^2 z^5$ in the expansion of $(x+y+z)^{10}$? **(10)**

Q.7 Write short notes on any **TWO** of the following: **(10)**
a) Normal distribution and its properties
b) Beta distribution
c) Derangements

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