BCA–203(O)

B. C. A. (Second Semester)
EXAMINATION, May, 2013

(Old Course)

Paper Third

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE – II

Time : Three Hours]   [*Maximum Marks : 75*

Note : Section A is compulsory. Attempt *seven* questions out of ten from Section B and *one* question from Section C.

Section — A

1. Define the following :

   F-distribution, moment generating function, probability, distribution function and mutually exclusive events.   8

2. (a) What is the chance that a leap year selected at random, will have 53 Sundays ?   3

   (b) Two bags contain respectively 3 white, 5 black and 5 white, 3 black balls. One ball is drawn from each bag. Find the probability that they are white.   4

Section — B   7 each

3. State and prove Baye's theorem for probability.

4. If 10% of bolts produced by a machine are defective, determine the probability that out of 20 bolts chosen at random (a) one (b) none (c) at most 2 bolts will be defective.

5. State and prove Central limit theorem.

6. One type of aircraft is found to develop engine trouble in 5 flights out of a total of 100 and another type in 7 flights out of a total of 200 flights. Is there a significant difference in two types of aircrafts so far as engine defects are concerned.

7. The first four moments of a distribution about the value 4 of variable are – 1·5, 17, – 30 and 108. Find the moments about mean, β_1 and β_2.

8. If r is Poisson variate such that $P(r=1) = P(r=2)$ then evaluate $P(r=4)$.

9. Find the moment generating function for triangular distribution defined by :

$$f(x) = \begin{cases} x & 0 \leq x \leq 1 \\ 2-x & 1 \leq x \leq 2 \end{cases}$$

10. The diameter of an electric cable is assumed to be continuous random variate with probability density function :

$$f(x) = 6x(1-x), 0 \leq x \leq 1$$

   (i) Verify that above is a probability density function.
   (ii) Find mean and variance.

11. State and prove addition theorem of probability.

12. Define testing of hypothesis with two types of error.

Section–C 11 each

13. Compute the student t for the following values in a sample of eight : – 4, – 2, – 2, 0, 2, 2, 3, 3 taking the mean of universe to be zero.

14. Find the first three moments of the binomial distribution.

15. From the following table, showing the number of plants having certain characters, test the hypothesis is that the flower colour is independent of flatness of leaf :

	Flate Leaves	Curled Leaves	Total
White flowers	99	36	135
Red flowers	20	5	25
Total	119	41	160

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