Code: 9FBS101

MCA I Semester Supplementary Examinations May 2016

PROBABILITY & STATISTICS

(For students admitted in 2010, 2011, 2012, 2013, 2014 & 2015 only)

Time: 3 hours Max. Marks: 60

Answer any FIVE questions
All questions carry equal marks
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1 (a) Two digits are selected from the digits 1 through 9 randomly.
(i) If the sum is odd, what is the probability that 2 is one of the numbers selected?
(ii) If 2 is one of the digits selected, what is the probability that the sum is odd?
(b) State and prove Bayes theorem.

2 A continuous random variable has the probability density function:

$$f(x) = \begin{cases} k\,x\,e^{-\lambda x}, & for\ x \geq 0,\ \ \lambda > 0 \\ 0, & other\ wise \end{cases}$$

Determine: (i) k.
(ii) Mean.
(iii) Variance.

3 The marks obtained in mathematics by 1000 students are normally distributed with mean 78% and standard deviation 11%.
Determine: (i) How many students got marks above 90%?
(ii) What were the highest marks obtained by the lowest 10% of the students?
(iii) Within what limits did the middle of 90% of the students lie?

4 A population consists of five numbers 2, 3, 6, 8 and 11. Consider all possible samples of size 2 that can be drawn with replacement from this population. Find:
(a) The mean of the population.
(b) The standard deviation of the population.
(c) The mean of the sampling distribution of mean.
(d) The standard deviation of the sampling distribution of means.

5 (a) A random sample of size 81 was taken whose variance is 20.25 and mean is 32. Construct 98% confidence interval.
(b) Determine 99% confidence interval for the mean of contents of soft drink bottles if, contents of 7 such soft drink bottles are 10.2, 10.4, 9.8, 10, 9.8, 10.2, 9.6 ml.

6 (a) Write about one tailed and two tailed tests.
(b) An ambulance service claims that it takes on an average less than 10 minutes to reach its destination in emergency calls. A sample of 36 calls has a mean of 11 minutes and the variance of 16 minutes. Test the significance at 0.05 level.

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7 (a) Two horses A and B were tested according to the time (in seconds) to run a particular track with the following results.

Horse A	28	30	32	33	33	29	34
Horse B	29	30	30	24	27	29	28

Whether the two horses have the same running capacity.

(b) The following figures show the distribution of digits in number chosen at random from a telephone directory:

Digits	0	1	2	3	4	5	6	7	8	9
Frequency	1026	1107	997	966	1075	933	1107	972	964	853

Test whether the digits may be taken to occur with equal frequency in the directory or not.

8 (a) Fit a parabola for the following data:

X	1	2	3	4	5	6	7	8	9
Y	2	6	7	8	10	11	11	10	9

(b) Explain the method of Regression analysis.

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