

**R09**

**Code: 9ABS304**

B.Tech III Year II Semester (R09) Supplementary Examinations December/January 2015/2016

**PROBABILITY & STATISTICS**

(Biotechnology)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions  
All questions carry equal marks

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- 1 There are 3 boxes. Box I contains 7 red, 3 Black and 5 white balls. Box II contains 9 red, 2 black and 4 white balls and Box III contains 10 red, 5 black, 5 white balls. One box is chosen and one ball is drawn from it what is the probability that: (i) Red ball is drawn. (ii) Black ball is drawn. (iii) White ball is drawn.
- 2 The diameter of an elective cable say  $X$  is assumed to be a continuous random variable with p.d.f of  $f(x) = kx(1-x^2)$  in  $0 \leq x \leq 1 = 0$  elsewhere. Find the value of  $k$  and  $P(0 \leq x \leq 1/2)$ ,  $P(x \geq 1/4)$ .
- 3 One fifth percent of the blades produced by a blade manufacturing factory turn out to be defective. The blades are supplied in packets of 10. Use Poisson distribution to calculate the approximate number of packets containing: (i) No defective blade. (ii) One defective blade in a consignment of 10000.
- 4 A random sample of size 100 is taken from an infinite population having the mean  $\mu = 76$  and the variance  $\sigma^2 = 256$ . What is the probability that  $\bar{x}$  will be between 75 and 78.
- 5 (a) What is a "Good Estimator"? Explain its properties.  
(b) A random sample of size  $n = 100$  is taken from a population with  $\sigma = 5.1$ . Given that the sample mean is  $\bar{x} = 21.6$ . Construct a 95% confidence interval for the population mean  $\mu$ .
- 6 (a) In a sample of 600 students of a certain college 400 are found to use ball pens. In another college from a sample of 900 students 450 were found to use ball pens. Test whether 2 colleges are significantly different with respect to the habit of using ball pens.  
(b) The mean consumption of food grains among 400 sampled middle class consumers is 380 gms per day per person with a S.D. of 120 gms. A similar sample survey of 600 working class consumers gave a mean of 410 gms, with a S.D of 80 gms. Are we justified in saying that the two classes consume the same quality of food grains? Use 5% level of significance.
- 7 (a) What are the applications of  $\chi^2$  test and what are the properties of  $\chi^2$  test?  
(b) From the following table test whether the colour of son's eyes is associated with that of the fathers.

Eye colour of son Eye colour of father	Light	Not light	Total
Light	471	151	622
Not light	148	230	278
Total	619	381	1000

- 8 (a) Explain about Poisson distribution in the queuing system.  
(b) Explain about Exponential distribution in the queuing system.

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