R18

Time: 3 hours   Max. Marks: 75

Answer any five questions
All questions carry equal marks
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1.   Two dice are thrown the random variable is assigned to the sum. Write the distribution. Find the mean and variance.   [15]

2.a)   If the probability distribution function of a continuous random variable is $ke^{|x|}, -\alpha \le x \le \alpha$ Find i) k   ii) mean   iii) variance.

 b)   A sample of 4 items is selected from 12 out of which 5 are defective. Find the expected number of defective items.   [8+7]

3.a)   Eight coins are tossed. Find the probability of getting heads: i) $p(x = 3)$ ii) $p(x \le 4)$.

 b)   The probabilities of a Poisson variate taking the values 1 and 2 are equal. Calculate: i) $p(x = 0)$ ii) $p(x = 3)$ [7+8]

4.a)   Mean heights of students is 159cms with a standard deviation of 20. Find how many students heights lie between 150cms and 170cms in a class of 100 students.

 b)   The expected number of typographical errors on a page of a certain magazine is 0.2. What is the probability that the next page you read contains i) 0 and ii) 2 or more typographical errors?   [7+8]

5.   From the following data find whether there is any significant liking in the habit of taking soft drinks among the categories of employees.   [15]

Soft drinks	Employees		
	Clerks	Teachers	Officers
Pepsi	10	25	65
Thumsup	15	30	65
Maaza	50	60	30

6.   Two horses A and B were tested according to the time (in seconds) to run a particular track with the following results. Test whether two horses have the same running capacity.

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

[15]

7.a) A random sample of 100 electric bulbs, produced by a manufacturer A showed a mean life of 1190 hrs with a standard deviation of 90. Another sample of 75 electric bulbs produced by a manufacturer B showed a mean life of 1230 with a standard deviation of 120 hrs. Find whether there is significant difference between the mean.

   b) 50 people were attacked by a disease and 30 were survived. If the survival rate is 70%, test the chain at 5% level. [8+7]

8. Consider a three-state Markov chain with the transition matrix. If the initial probabilities $P_0 = (0.2, \ 0.3, \ 0.5)$.

$$P = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 2/3 & 1/3 \\ 1/16 & 15/16 & 0 \end{bmatrix}$$

a) Find the probabilities after two transitions.
b) Find het limiting probabilities. [8+7]

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