

Code: IT4T4

II B.Tech - II Semester – Regular Examinations - JUNE 2015

**PROBABILITY STATISTICS & QUEUING THEORY
(INFORMATION TECHNOLOGY)**

Duration: 3 hours

Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

1 a) The chances that doctor A will diagnose a disease X correctly is 60%. The chances that a patient will die by his treatment after correct diagnosis is 40% and the chance of death by wrong diagnose is 70%. A patient of doctor A, who has disease X, died. What is the chance that his disease was diagnosed correctly? 7 M

b) A random variable X has the following probability function values of X. 7 M

X	0	1	2	3	4	5	6	7
P(x)	0	k	2k	2k	3k	k ²	2k ²	2k ² +7

i) Find k ii) evaluate $p(x < 6), p(x \geq 6)$.

2 a) Fit Poisson distribution to the following data. 7 M

X	0	1	2	3	4
F	109	65	22	3	1

- b) In 800 families with 5 children each, how many families would be expected to have 7 M
- i) 3 boys and 2 girls
 - ii) 2 boys, 3 girls
 - iii) no girls.
- 3 a) The mean height of 500 male students in a certain college is 151cm, assuming the heights are normally distributed, how many students have heights between 120 and 155cm . 7 M
- b) Find mean and variance of uniform distribution. 7 M
- 4 Population consists of five numbers 2,3,6,8,11. Consider all possible samples of size 2 that can be drawn with replacement from this population, find 14 M
- i) The mean of the population
 - ii) The standard deviation of the population
 - iii) The mean of the sampling distribution of means.
 - iv) The standard deviation of the sampling distribution of means.
- 5 a) The heights of 10 members of a given locality are found to be 70,67,62,68,70,64,66,61,68,64 Is it reasonable to believe that the average height is greater than 64 inches? Test at 5% level of significance. 7 M

- b) Explain the following 7 M
- i) type I error ii) type II error
 - iii) null hypothesis iv) alternate hypothesis.

- 6 a) A die is thrown 264 times with the following results 7 M

Number appeared on the die	1	2	3	4	5	6
Frequency	40	32	28	50	54	60

Show that the die is biased.

- b) Two independent samples of 8 and 7 items respectively had the following values. 7 M

Sample I	9	11	13	11	15	9	12	14
Sample II	10	12	10	14	9	8	10	

Do the estimates of population variance differ significantly.

- 7 Explain $M/M/1; \infty / \text{FIFO}$ queuing model and its applications . 14 M

- 8 Consider a self service store with one cashier, assume Poisson arrivals and exponential service times. Suppose that nine customers arrive on the average every 5 minutes and the cashier can serve 10 in 5 minutes find 14 M

- i) average no. of customer in the queue
- ii) average no. of customers in the system
- iii) average waiting time of a customer in the queue .