

Code: IT3T3

**II B.Tech - I Semester–Regular/Supplementary Examinations  
November 2017**

**PROBABILITY AND STATISTICS  
(INFORMATION TECHNOLOGY)**

Duration: 3 hours

Max. Marks: 70

**PART – A**

Answer *all* the questions. All questions carry equal marks

11x 2 = 22 M

1.

a) What are the axioms of probability?

b) If a random variable has the probability density  $f(x)$  as

$$f(x) = \begin{cases} 2e^{-2x}, & \text{for } x > 0 \\ 0, & \text{for } x \leq 0 \end{cases} \quad \text{then find } p(x \geq 0.5).$$

c) State Baye's theorem.

d) A die is tossed thrice. A success is getting 1 or 6 on a toss. Find the mean and variance of the number of successes.

e) If a random variable has a Poisson distribution such that  $p(1) = p(2)$ , find the mean of the distribution.

f) Define population and sample with examples.

g) A random sample of size 100 has a standard deviation of 5. What can you say about the maximum error with 95% confidence.

h) Define Null &amp; Alternative Hypothesis.

i) Write the student's t-test for difference of means.

j) For an F-distribution find

i)  $F_{0.95}(19,24)$

ii)  $F_{0.99}(28,12)$

k) Construct a one way classification of analysis of variance table.

### PART – B

Answer any **THREE** questions. All questions carry equal marks.  
3 x 16 = 48 M

2. a) Box I contains 1 white, 2 red, 3 green balls, Box II contains 2 white, 3 red, 1 green balls, Box III contains 3 white, 1 red, 2 green balls. Two balls are drawn from a box chosen at random. These are found to be one white and one red. Determine the probability that the balls so drawn come from box II. 8 M

b) Let X denote the minimum of the two numbers that appear when a pair of fair dice is thrown once. Determine the  
i) Discrete probability distribution  
ii) Expectation  
iii) variance. 8 M

3. a) Fit a Poisson distribution for the following data and calculate the expected frequencies. 8 M

x	0	1	2	3	4
f(x)	109	65	22	3	1

b) If the masses of 300 students are normally distributed with mean 68kgs and standard deviation 3 kgs, how many students have masses

- i) Greater than 72 kg
  - ii) Less than or equal to 64 kg
  - iii) Between 65 and 71 kg inclusive.
- 8 M

4. a) A normal population has a mean of 0.1 and standard deviation of 2.1. Find the sample size, if maximum error is 1.1372 with 95% confidence. 8 M

b) The mean and standard deviation of a population are 11,795 and 14,054 respectively. What one can assert that 95% confidence about the maximum error if  $\bar{X} = 11,795$  and  $n=50$ . And also construct 95% confidence interval for the true mean. 8 M

5. a) A die was thrown 9000 times and of these 3220 yielded a 3 or 4. In this consistent with the hypothesis that the die was unbiased. 8 M

b) 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	-

8 M

6. a) A sample analysis of examination results of 500 students was made. It was found that 200 students had failed, 170 had secured a third class, 90 were placed in second class and 20 got a first class. Do these figures commensurate with the general examination result which is in the ratio of 4:3:2:1 for the various categories respectively. 8 M

b) The following figures relate to production in kg of three varieties A,B,C of wheat shown in 12 plots.

A	14	16	18	-	-
B	14	13	15	22	-
C	18	16	16	19	20

Test whether the production of wheat of three varieties are equal. 8 M