Code No: 153BN **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, March - 2021
PROBABILITY AND STATISTICS
(Civil Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

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1.a) A researcher has to consult a recently published work. The probability of its being available is 0.5 for library A and 0.7 for library B. Assuming the two events to be statistically independent, find out the probability of the book being available in library A and not available in B?

b) State Baye's theorem. In a population of workers, suppose 40% are school graduates, 50% are high school graduates, and 10% are college graduates. Among the school graduates, 10% are unemployed; among the high school graduates, 5% are unemployed, and among the college graduates 2% are unemployed. If a worker is chosen at random and found to be unemployed, what is the probability that he is from?
i) Scool graduate ii) Highschool graduate iii) College graduate. [7+8]

2.a) A random variable X has the probability law $f(x) = Ax^2, 0 \leq x \leq 1$, then (i) determine A (ii) find the probability that X lies between 0.2 and 0.5 and (iii) the mean of X.

b) If the mean of a poisson distribution is 1 find i) P(x=0) ii) P(1<x≤4) iii) P(x=2). [8+7]

3. Fit a Poisson distribution to the following data and calculate the theoretical frequencies: [15]

x:	0	1	2	3	4
f:	123	59	14	3	1

4. The mean of a normal distribution is 77.0. Find the standard deviation if 20% of the area under the curve lies to the right of 90.0. [15]

5. From the following data calculate the rank correlation coefficient after making adjustment for tied ranks. [15]

x:	48	33	40	9	16	16	65	24	16	57
y:	13	13	24	6	15	4	20	9	6	19

6.a) Fit a least square straight line to the following data and estimate y when $x = 10$.

x:	4	3	2	9	6	1	8	4	16	57
y:	13	12	11	16	15	14	12	9	6	8

b) The two lines of regression are $3X + 2Y = 26$ and $6X + Y = 31$. Find (i) the mean of X and Y (ii) the coefficient of correlation between X and Y. [7+8]

7.a) A die is thrown 9000 times and a throw of 3 or 4 is observed 3240 times. Show that the die cannot be regarded as an unbiased one.

b) In a test given to two groups of students, the marks obtained are as follows:

First group	19	20	35	50	48	36	34	50	40
Second group	29	28	25	34	29	43	45	45	49

Examine the significance of the difference between the arithmetic mean of the marks secured by the students of the above two groups. [7+8]

8. The nicotine content (in milligrams) of two samples of tobacco were found to be as follows:

Sample A	24	27	26	21	25	
Sample B	27	30	28	31	22	36

Can it be concluded that the two samples come from the same normal population? [15]

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