[Nov-23]

GITAM (Deemed to be University)
[MATH2361]
GST/GSS/GSB/GSHS Degree Examination
III Semester
PROBABILITY & STATISTICS

(Effective for the admitted batch 2021-2022)

Time: 2 Hours **Max. Marks: 30**

Instructions: All parts of the unit must be answered in one place only.

Section-A

1. **Answer all Questions:** **(5×1=5)**

   a) Define a Random variable

   b) In a binomial distribution, mean and standard deviations are 4 and 3. Find n and p.

   c) If $y = a_0 + a_1 x + a_2 x^2$ then the third normal equation by least squares method is $\sum x_i^2 y_i = -------$.

   d) Explain type-I and type-II errors.

   e) Write two properties of normal distribution.

Section-B

Answer the following: **(5×5=25)**

UNIT-I

2. The following table shows the marks obtained by 50 candidates in an examination. Calculate the median.

Marks obtained	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of candidates	6	5	8	15	7	6	3

OR

3. Of the three men, the chances that a politician, a business man or an academician will be appointed as vice-chancellor of a university are 0.5, 0.3, 0.2 respectively. Probability that research will be promoted by these persons if they are appointed as V.C. are 0.3, .07, 0.8 respectively.

   a) Determine the probability that research is promoted

   b) If research is promoted, what is the probability that V.C. is an academician?

UNIT-II

4. If X is a Poisson variate such that

$3P(x=4)=\frac{1}{2}P(x=2)+P(x=0)$ find (i) mean

(ii) $P(x \leq 2)$.

OR

5. Fit a binomial distribution to the following data

x	0	1	2	3	4	5	6
f	13	25	52	58	32	16	4

UNIT-III

6. Calculate the correlation coefficient for the following heights (in inches) of fathers (X) and their sons (Y):

X	65	66	67	67	68	69	70	72
Y	67	68	65	68	72	72	69	71

OR

7. Fit a straight line y = a + bx to the following data

x	1	2	3	4	5
y	14	27	40	55	68

UNIT-IV

8. An oceanographer wants to check whether the depth of the ocean in a certain region is 57.4 fathoms, as had previously been recorded. What can he conclude at the 0.05 LOS, if readings taken at 40 random locations in the given region yielded a mean of 59.1 fathoms with a standard deviation of 5.2 fathoms. (Z-tab at 5% LOS is 1.96)

OR

9. A researcher wants to know the intelligence of students in a school. He selected two groups of students. In the first group there are 150 students having mean IQ of 75 with a standard deviation of 15, in the second group there are 250 students having mean IQ of 70 with standard deviation of 20. Does the two groups come from the same population.

UNIT-V

10. Random samples of specimens of a coal from two mines A and B are drawn and their heat-producing capacity(in millions of calories /ton) were measured yielding the following results

MineA	8350	8070	8340	8130	8260	-----
MineB	7900	8140	7920	7840	7890	7950

Is there significant difference between the means of these two samples at 0.01 level of significance (t-tab at 0.01 LOS is 2.821)

OR

11. In one sample of 10 observations, the sum of the squares of the deviations of the sample values from the sample mean was 120 and in another sample of 12 observations it was 314. Test whether this difference is significant at 5% level of significance.

[IIIS/123]