al No. of Questions – [3] Total No. of Printed Pages: 03

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May 2023 (ENDSEM) EXAM
S.Y. B.TECH (COMPUTER ENGINEERING)
(AY 2022-23 SEMESTER - II)
COURSE NAME: PROBABILITY AND STATISTICS
COURSE CODE: ES22201CS
(PATTERN 2020)

Time: [1Hr] [Max. Marks: 30]

Instructions to candidates:

1) **Use of scientific calculator is allowed**
2) **Use suitable data where ever required**
3) **All questions are compulsory**

Question No.	Question Description	Max. Marks	CO mapped	BT Level
Q.1	a) Compare stratified random sampling with simple random sampling without replacement. What are the basic principles on which sampling theory rests?	[4]	[4]	[Understand]
	b) Distinguish between random sampling and stratified sampling. Suppose it is desired to survey petrol buying habits of car owners in a particular city. How would you proceed? Draw a brief questionnaire for the purpose.	[6]	[4]	[Analyze]
	OR			
	c)"Mere size, of course, does not assure representativeness in a sample. A small random or stratified sample is apt to be much superior to a large but badly selected sample." Discuss this statement pointing out the advantages, disadvantages and limitations of the sample method.	[6]	[4]	[Analyze]
Q.2	a) What do you mean by hypothesis? Differentiate the t-test with ANOVA?	[4]	[5]	[Understand]
	b) A movie producer is bringing out a new movie. In order to map out his advertising campaign, he wants to	[6]	[5]	[Analyze]

determine whether the movie will appeal most to particular age groups or whether it will appeal equally to all age groups. The producer takes a random sample from person attending preview of the new movie, and obtains the following results:

Age groups					
	Under 20	**20-39**	**40-59**	**60 & above**	**Total**
Liked the movie	146	78	48	28	300
Disliked the movie	54	22	42	22	140
Indifferent	20	10	10	20	60
Total	220	110	100	70	500

Analyze the data and What inference will you draw from this data? {Given chi-square value at 5% significant level and 6 d.f. is 12.59}

OR

c) To study the performance of three detergents and three different water temperatures, the following 'whiteness' readings were obtained with specially designed equipment:

Water Temp	**Detergent A**	**Detergent B**	**Detergent C**
Cold water	57	55	67
Warm water	49	52	68
Hot water	54	46	58

Perform a one way ANOVA, using 5% level of significance and find conclusions. (Given F-value at 5% is 6.94)

[6] [5] [Analyze]

Q.3 a) Differentiate the correlation analysis and regression analysis? Also explain the methods of performing **[4]** [6] [Understand]

correlation and regression analysis

b) Newspapers in India are complaining that rising levels of unemployment are affecting the level of crime in the country. To study this claim a research team studied a random sample of 12 states in the country. For each state, they measured the level of unemployment rate and the crime rate in the state. Then they did a ranking X=level of unemployment, Y=crime rate, the results are shown in the following table. Higher X ranks more unemployment, and higher Y ranks means higher crime rate. Test the claim of the newspaper.	**[6]**	[6]	[Apply]

State	1	2	3	4	5	6	7	8	9	10	11	12
Level of unemployment(X)	5	8	3	2	6	1	10	12	7	4	9	11
Crime rate(Y)	8	6	9	12	7	10	2	1	5	11	4	3

OR

c) The following table shows the ages (X) and blood pressure (Y) of persons	**[6]**	[6]	[Apply]

Age (X)	56	42	72	39	63	47	52	49	40	42	68	60
Blood pressure (Y)	127	112	140	118	129	116	130	125	115	120	135	133

Obtain the regression equation of Y on X and find the expected blood pressure of a person who is 50 years old.