Total No. of Questions – [3]

Total No. of Printed Pages:

G.R. No.	

PAPER CODE	U223 -211(ESE)

MAY 2023 (ENDSEM) EXAM

S.Y. B.Tech (AI & DS) (AY 2022-23 SEMESTER - II)

COURSE NAME: PROBABILITY AND STATISTICS

COURSE CODE: ES22201AD

(PATTERN ~~2018~~/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
Q.1	a) Suppose a data set consists of the following observations: 0.32; 0.53; 0.28; 0.37; 0.47; 0.43; 0.36; 0.42; 0.38 and 0.43. Calculate mean, median, mode and Inter-quartile range.	[4]
	b) Suppose you do a study of acupuncture to determine how effective it is in relieving pain. You measure sensory rates for 15 subjects with the results given. Use the sample data to construct a 95% confidence interval for the mean sensory rate for the population (assumed normal) from which you took the data. 8.6, 9.4, 7.9, 6.8, 8.3, 7.3, 9.2, 9.6, 8.7, 11.4, 10.3, 5.4, 8.1, 5.5, 6.9	[6]
	OR	
	c) An electrical firm manufactures light bulbs that have a length of life that is approximately normally distributed, with mean equal to 800 hours and a standard deviation of 40 hours. Find the probability that a random sample of 16 bulbs will have an average life of less than 775 hours. Also draw the area under curve for the given example.	[6]
Q.2	a) Explain Type-I and Type-II errors in hypothesis testing with examples.	[4]
	b) The mean response time for a random sample of 30 fruit packets deliveries is 32 minutes. The population standard deviation is believed	[6]

to be 10 minutes. The fruit packet delivery service director wants to perform a hypothesis test with α=0.05 level of significance, to determine whether the service goal of 30 minutes or less is being achieved. (Use p-value approach).

OR

c) A company wants to test the claim that their batteries last more than 40 hours. Using a simple random sample of 15 batteries yielded a mean of 44.9 hours, with a standard deviation of 8.9 hours. Test this claim using a significance level of 0.05. **[6]**

Q.3 a) For null hypothesis, median (n) =5, compute the values of T+, T- and T for the following observations: **[4]**
8, 9, 3, 5, 4, 11

b) The data below show the sugar content of a fruit (SUGAR) for different numbers of days after picking (DAYS). Obtain the estimated regression line to predict sugar content based on the number of days the fruit is left on the tree. **[6]**

Days	0	1	3	4	5	6	7	8
Sugar	7.9	12.0	9.5	11.3	11.8	11.3	4.2	0.4

OR

c) In an art competition, two judges accorded following ranks to the 10 participants: **[6]**

Judge X (R1)	1	2	3	4	5	6	7	8	9	10
Judge Y (R2)	6	2	9	7	1	4	8	3	10	5

Calculate coefficient of Spearman's rank correlation.