Total No. of Questions – [3]

Total No. of Printed Pages: 2

G.R. No.	

PAPER CODE	U222-211(ESE)

May 2022 (ENDSEM) EXAM

S.Y. B. TECH. (SEMESTER - II)

COURSE NAME: Probability and Statistics

COURSE CODE: ES22201AD

(PATTERN 2020)

Time: [1Hr]

[Max. Marks: 30]

(*) Instructions to candidates:

1) **Figures to the right indicate full marks.**
2) **'a' part of every question is compulsory**
3) **Use of scientific calculator is allowed**
4) **Use suitable data where ever required**

Question No.	Question Description	Marks
Q.1	**a)** Differentiate between sampling with replacement and sampling without replacement with the help of appropriate example.	[4]
	b) The population of grade point averages of an examination has mean 2.61 and standard deviation 0.5. If a random sample of size 100 is taken from the population, Measure the probability that the sample mean will be between 2.51 and 2.71?	[6]
	OR	
	b) A random sample of 120 students from university yields mean CGPA 2.71 with sample standard deviation 0.51. Construct a 90% confidence interval for the mean CGPA of all students at the university. Interpret the results.	[6]
Q2	**a)** Explain the concepts of One-Tailed and Two-Tailed Hypothesis tests with the help of real-life situations. Also show rejection regions for both types of Hypothesis testing using appropriate diagrams.	[4]

b) It is claimed that a vacuum cleaner uses an average of 46 kilowatt hours per year. If a random sample of 12 homes included indicates that vacuum cleaners use an average of 42 kilowatt hours per year with a standard deviation of 11.9 kilowatt hours. Test at the 0.05 level of significance that vacuum cleaners use, on average, less than 46 kilowatt hours annually? Assume the population of kilowatt hours to be normal. [6]

OR

b) In a post office the standard deviation of normally distributed waiting times for customers is 7.2 minutes. The post office experiments with a single, main waiting line and finds that for a random sample of 25 customers, the waiting times for customers have a standard deviation of 3.5 minutes. With a significance level of 5%, test the claim that a single line causes lower variation among waiting times (shorter waiting times) for customers. [6]

Q.3 **a)** Elaborate the term correlation coefficient. Elaborate, what does its magnitude and sign signify? Make use of appropriate diagrams and real-life example. [4]

b) For given data, derive an exponential equation of the form $y=ax^b$. (Use Log base 10) [6]

x:	2	3	4	5
y:	27.8	62.1	110	161

OR

b) A random sample of 10 students' marks are noted as 71, 79, 40, 70, 82, 72, 60, 76, 69, 75. Devise whether there is evidence at the 5% confidence level to suggest that the median mark is greater than 67? [6]