BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP/2024)

CLASS: IMSc **SEMESTER: VI**
BRANCH: CQEDS **SESSION : SP/2024**

SUBJECT: ED313 NON-PARAMETRIC METHOD AND DECISION THEORY
TIME: 02 HOURS **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. The critical value tables will be supplied to the candidates.

			CO	BL
Q1(a)	Find the density function of the largest order statistic in a random sample of size n from the exponential distribution. $f_X(x) = exp\{-x\}, x \geq 0$.	[2]	1	
Q1(b)	Find the expected value of the smallest order statistic in a random sample of size n from the exponential distribution. $f_X(x) = exp\{-x\}, x \geq 0$.	[3]	1	
Q2	Find the distribution of the range of a random sample of size n from the population $f_X(x) = 4\,exp\{-4x\}, x \geq 0$ does not exceed 4.	[5]	1	
Q3(a)	The Educational Testing Service reports that the 75th percentile for scores on the quantitative portion of the GRE is 693 in a certain year. A random sample of 15 first year graduating students majoring in statistics report their GRE scores as 690, 750, 680, 700, 660, 710, 720, 730, 650, 670, 740, 730, 660, 750, and 690. Calculate the p-value for testing whether the scores are consistent with the 75th percentile value for this year.	[4]	2	
Q3(b)	Interpret the above result.	[1]	2	
Q4	An office has three computers, A, B, and C. Analyze the data below on weekly computer usage rates to determine whether there is a significant difference in average usage.	[5]	2	

A	B	C
12.3	15.7	32.4
15.4	10.8	41.2
10.3	45.0	35.1
8.0	12.3	25.0
14.6	8.2	8.2

Q5	Test the null hypothesis that the data below arose from a one-parameter exponential distribution. 1.5, 2.3, 4.2, 7.1, 10.4, 8.4, 9.3, 6.5, 2.5, 4.6.	[5]	2	

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