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QUESTION PAPER

Name of the Examination: Fall 2023-24 Semester – CAT-2

Course Code: MAT1011 **Course Title: Applied Statistics**

Set number: 01 **Date of Exam:** 19/10/2023 (FN)(E1)

Duration: 90 Min **Total Marks: 50**

Instructions:

1. Assume data wherever necessary.
2. Any assumptions made should be clearly stated.

Q1. A coffee machine is regulated so that it discharges an average of 200 millilitres per cup. If the amount of drink is normally distributed with a standard deviation equal to 15 millilitres, then what is the probability that the cup contains 190 to 210 millilitres. **[08M]**

Q1. The mean and standard deviations sales are 40, 10 and the mean and standard deviation of advertisement expenditures are 4 and 1.5 respectively. When the coefficient of correlation, r = 0.9. Now, calculate the regression coefficient and obtain the lines of regression. **[12M]**

Q4. Find the Spearman Rank Correlation coefficients for the following data set **[10M]**

X (Maths)	78	89	69	59	79	68	62
Y (Physics)	121	72	60	81	87	123	92

Q3. A sample of 10 students from a school has the following scores in an I.Q. test. 89,87,77, 79,83,74,83,75,76 and 90. Do this data support that the mean I.Q. mark of the school students is 80? Test at 5% level of significance. **[10M]**

Q.5 We want to test if the mean daily wage of a party workers is equal to 225 rupees, given that the population standard deviation is 30 rupees. We assume that the daily wages follow a normal distribution. We take a random sample of 40 workers and find that their mean daily wage is 220 rupees. We use a significance level of 0.05 for our hypothesis test. **[10M]**

QP MAPPING

Q. No.	Module Number	CO Mapped	PO Mapped	PEO Mapped	PSO Mapped	Marks
Q1	3	3	1,2			08
Q2	4	4	1,2			12
Q3	4	4	1,2			10
Q4	5	5	1,2			10
Q5	5	5	3			10

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Name of the Examination: Fall 2023-24 Semester – CAT-2

Course Code: MAT1011 **Course Title: Applied Statistics**

Set number: 03 **Date of Exam:** 17/10/2023 (AN)(C4)

Duration:90 Min **Total Marks: 50**

Instructions:

1. Assume data wherever necessary.
2. Any assumptions made should be clearly stated.

Q1. A certain machine makes electrical resistors having a mean resistance of 40 ohms and a standard deviation of 2 ohms. Assuming that the resistance follows a normal distribution and can be measured to any degree of accuracy,

(a) what percentage of resistors will have a resistance exceeding 43 ohms? and
(b) What will be the strength of the resistors that are less than 10%? **(10M)**

Q2. A study was made by a retail merchant to determine the relation between weekly advertising expenditures and sales.

Advertising Costs ($)	Sales ($)
40	385
20	400
30	395
20	365
50	475

(a) Compute and interpret the sample correlation coefficient between weekly advertising expenditures and sales.
(b) Find the equation of the regression line to predict weekly sales from advertising expenditures. Also estimate the weekly sales when advertising costs are $35. **(20M)**

Q3. Suppose the hospitality of wary otter pops has a population that is normally distributed with a standard deviation of 7. Your friend gets you to sample 58 wary otter pops from this population and obtain a mean hospitality of 65.29 and a standard deviation of 6.0893. Using $\alpha = 0.01$, is this observed mean significantly different than an expected hospitality of 66? **(10M)**

Q4. Based on field experiments, a new variety green gram is expected to give a yield of 12.0 quintals per hectare. The variety was tested on 10 randomly selected farmers' fields. The yield (quintals/hectare) were recorded as 14.3, 12.6, 13.7, 10.9, 13.7, 12.0, 11.4, 12.0, 12.6, 13.1. Do the results conform the expectation at 5% level of significance? **(10M)**