B **494B1** **Total pages: 2**

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SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FOURTH SEMESTER INTEGRATED MCA DEGREE EXAMINATION(R,S), MAY 2024

(2020 SCHEME)

Course Code : 20IMCAT204

Course Name : Statistical Applications

Max. Marks : 60 **Duration:3 Hours**

Scientific calculator and statistical tables are allowed in the examination hall.

PART A

(Answer all questions. Each question carries 3 marks)

1. Write any three properties of Karl Pearson's correlation coefficient.
2. Define positive correlation with an example.
3. Write any three properties of regression coefficients.
4. Differentiate between Correlation Analysis and Regression Analysis.
5. Distinguish between purposive sampling and probability sampling.
6. Differentiate between Population and Sample.
7. Define Statistical Hypothesis.
8. Describe critical region in testing of hypothesis.
9. What are the assumptions for difference of Mean Test in small samples?
10. What are the conditions for the validity of chi-square test?

PART B

(Answer one full question from each module, each question carries 6 marks)

MODULE I

11. The ranks of students in Mathematics and Physics are as follows. Calculate the rank correlation coefficient for proficiencies of same 16 students in Mathematics and Physics. (1,1), (2,10), (3,3), (4,4), (5,5), (6,7), (7,2), (8,6), (9,8), (10,11), (11,15), (12,9), (13,14), (14,12), (15,16), (16,13). (Two numbers within brackets denote the ranks of the students in Mathematics and Physics). 6

OR

12. For the following data, calculate the Karl Pearson's correlation coefficient: 6

x	80	91	99	71	61	81	70	59
y	123	135	154	110	105	134	121	106

MODULE II

13. From the data given below find: 6
    (a) The two regression coefficients.
    (b) The two regression equations.
    (c) The most likely marks in Statistics when marks in Economics is 30.

Marks in Economics	25	28	35	32	31	36	29	38	34	32
Marks in Statistics	43	46	49	41	36	32	31	30	33	39

OR

14. Obtain the equations of the two lines of regressions for the following data: 6

x	43	44	46	40	44	42	45	42	38	40	42	57
y	29	31	19	18	19	27	27	29	41	30	26	10

MODULE III

15. Find the maximum likelihood estimator for the S.D. of a normal distribution. 6

OR

16. Suppose that we have a random sample of size 2n from a population denoted by X, and $E(X) = \mu$ and $Var(X) = \sigma^2$. Let $\bar{X}_1 = \frac{1}{2n}\sum_{i=1}^{2n} X_i$ and $\bar{X}_2 = \frac{1}{n}\sum_{i=1}^{n} X_i$ be two estimators of μ. Which is the best estimator of μ? 6

MODULE IV

17. In order to make a survey of the buying habits, two markets A and B are chosen at two different parts of a city. 400 women shoppers are chosen at random in market A. Their average daily expenditure on food is found to be Rs. 250 with a standard deviation of Rs. 40. The figures are Rs.220 and Rs.55 respectively in the market B where also 400 women shoppers are chosen at random. Test at 1% level of significance whether the average daily food expenditures of the two populations of shoppers are equal. 6

OR

18. A manufacturer claimed that at least 95% of the equipment which he supplied to a factory conformed to specifications. An examination of a sample of 200 pieces of equipment revealed that 18 were faulty. Test this claim at a significance level of 0.05. 6

MODULE V

19. The time taken by workers in performing a job by method 1 and method 2 is given below: 6

$$Method\ 1: \quad 20 \quad 16 \quad 26 \quad 27 \quad 23 \quad 22$$

$$Method\ 2: \quad 27 \quad 33 \quad 42 \quad 35 \quad 32 \quad 34 \quad 38$$

Do the data show that the variance of time distribution from population from which there samples are drawn do not differ significantly.

OR

20. A random sample of size 16 has 53 as mean. The sum of squares of deviations from mean is 150. Can this sample be regarded as taken from the population having 56 as mean? 6

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