QP CODE: 24803822

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Reg No : .....

Name : .....

INTEGRATED MSC DEGREE EXAMINATION, JULY 2024

Fourth Semester

INTEGRATED MSC BASIC SCIENCE-STATISTICS

CORE - IST4CR03 - TESTING OF HYPOTHESIS

2020 Admission Onwards

0B8EE4B8

Time: 3 Hours Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. Define Statistical Hypothesis.
2. What is meant by most powerful critical region?
3. What is meant by uniformly most powerful test?
4. On inspection of random sample of 500 items produced by a machine, 30 are found to be defective. Does this justify the assumption that the machine is producing 2% items on an average?
5. What is the formula for paired t test?
6. What is the meaning of testing regression coefficient?
7. Twenty students took a management course examination. The sample variance is found to be 80. The teacher claims that based on his past experience the true variance has been 100. Does the sample result show that variance in the sample is significantly different.
8. What is a 2×2 contingency table?
9. Explain median test shortly.
10. When does we use Kruskal-Wallis test? Explain.

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. i) Which are two different types of errors that arise in testing of hypothesis?Explain.
    ii) Explain the four possible situations that arise in any test procedure, while taking a decision to accept or reject null hypothesis with the help of a table.
12. Let p be the probability that a coin will fall head in a single toss in order to test $H_0 : p = (1/2)$ against $H_1 : p = (3/4)$. The coin is tossed 5 times and the null hypothesis is rejected if more than 3 heads are obtained.

a) Find the probabilities of type I error and type II error.

b) Also find power of the test.

13. Random samples of 260 bolts produced by machine A and 220 bolts produced by machine B showed 22 and 20 defective bolts respectively. Test the hypothesis that the machine A shows higher quality of performance at 5% level of significance?

14. A sample of 20 pairs of values of X and Y variables have coefficient of correlation 0.62. Can this sample be drawn from a population with coefficient of correlation 0.75.

15. Two random samples of sizes 10 and 14 taken independently from normal populations gives their means 11, 12 and standard deviations 3, 2.8 respectively. Test whether the samples are taken from same normal populations at 10% level of significance.

16. In a course of anti-malarial work in a certain city over a period of time, Quinine was administrated to 606 adults out of a total population of 3540. The data regarding incidencce of malarial fever is given below. Examine whether Quinine has the effect of preventing a fever.

	Fever	No fever	Total
Quinine	19	587	606
No quinine	193	1741	2934
Total	212	3328	3540

17. Describe Mann Whitney U Test .

18. Explain Kolmogorov-Smirnov test.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. i) List out the procedure of solving testing of hypothesis problem.

ii) To test H_0 : θ = 2 against the alternative H_1 : θ = 3 based on a random sample of size one taken from the population with pdf

$f(x) = \frac{1}{\theta}$; $0 \leq x \leq \theta$ and is zero elsewhere.

Find the size and power of tests if the critical region is x > 1.5 .

20. Explain the testing procedure for testing the given population mean.

21. Fit a normal distribution to the following data and check the goodness of fit.

Class	60-65	65-70	70-75	75-80	80-85	85-90	90-95	95-100
Frequency	4	21	150	335	325	135	26	4

22. i) Write a short note on non parametric methods.And also state why they are referred as distribution free methods.

ii) List out the advantages and disadvantages of non parametric methods over parametric methods.

(2×5=10 weightage)