

UNIT - V

9. An experiment consists of m treatments being applied to n blocks. Show how you will use one-way ANOVA to test for differences in treatment means? 14
10. (a) Distinguish between parametric and non-parametric tests. What are the shortcomings of non-parametric tests?
- (b) Explain how you would use the Runs Test for determining whether two populations have identical distributions, if
- (a) sample sizes are small
- (b) sample sizes are large.
- (c) Consider the following information for one-way classified data.

Variation	df
Between Groups : 36	2
Within Group : 36	9

Test whether there is significant difference between the population means. $(2+2)+(3+4)+3=14$

PG EVEN SEMESTER EXAMINATION, 2023**ECONOMICS**

2nd Semester

Course No. : ECO CORE - 553

(Statistics for Economics)

Full Marks : 70

Pass Marks : 28

Time : 3 hours

*The figures in the margin indicate full marks for the questions
(Answer any five, selecting one from each unit)*

UNIT - I

1. (a) Distinguish between partial and multiple correlation co-efficients and deduce the relation between them.
- (b) Consider the following Population Regression Function (PRF)
- $$y_i = \beta_0 + \beta x_i + u_i$$
- Obtain the estimates of the regression coefficients using OLS method. $(2+3)+9=14$
2. (a) Show that the regression co-efficients are independent of the change of origin but not of scale.
- (b) For 50 students of a class, the regression of marks in Statistics (x) on marks in Mathematics (y) is $3y-5x+180=0$. The mean marks in Mathematics is 44

(Turn Over)

(2)

and variance of marks in Statistics is 9/16 of the variance of marks in Mathematics. Find the mean marks in Statistics and correlation co-efficient of marks in the two subjects.

- (c) Twenty five pairs of values of variables X and Y led to the following results.

$N = 25, \Sigma x = 127, \Sigma y = 100, \Sigma x^2 = 760, \Sigma y^2 = 449$ & $\Sigma xy = 500$. A subsequent scrutiny showed that the two pairs of values were copied down as

X	Y		X	Y
8	14		8	12
8	6		6	8

Obtain the correct regression equation of Y on X.

$4+(2+3)+5=14$

UNIT - II

3. (a) Let X be a d.r.v with the following p.m.f

x	-3	6	9
p(x)	1/6	1/2	1/3

Find E(X) and V(X). 2+2=4

- (b) A continuous random variable (crv) has a p.d.f given as

$P(x) = \frac{1}{2} - ax, \quad 0 \leq x \leq 4$

- i) Calculate a
- ii) Find p ($1 \leq x \leq 2$) 2+2=4

(5)

- (c) For a random samples of size 10, the mean is 12.1 and s.d is 3.2. Is it reasonable to assume that this sample came from a normal population with mean 14.5? 4+6+4=14

8. (a) Distinguish between Confidence Interval Approach and Test of Significance Approach to testing of hypothesis.

- (b) A variable X is normally distributed with mean 20 and s.d 5. If a random sample of size 25 is drawn, what is the probability that the sample mean (\bar{x}) is greater than 21?

- (c) Ten soldiers visit a rifle range for two consecutive weeks. Their scores are

Soldier No.	First Week	Second Week
1	43	38
2	67	70
3	24	38
4	57	58
5	55	58
6	63	56
7	54	67
8	56	68
9	68	72
10	33	42

Examine if there is any significant improvement in their performance. 4+3+7=14

(Turn Over)

(4)

- (c) A population consists of 5 numbers (2, 3, 6, 8, 11). List all possible samples of size 2 which can be drawn with replacement from this population when samples are (i) ordered (ii) unordered $8+3+3=14$
6. (a) Distinguish between point estimation and interval estimation.
- (b) State and explain the properties of a good point estimator.
- (c) A random sample of size 200 is drawn from a normal population with variance 36. A researcher wants to test the null hypothesis that the population mean is 60 against the alternative hypothesis that it is greater than 60. Obtain 95% and 99% confidence interval for the sample mean.
- (d) Ages of 5 persons have been recorded as 14, 19, 17, 20, 25. Random samples of size 2 are drawn without replacement from this population. Obtain the sampling distribution of the sample mean. $3+3+4+4=14$

UNIT - IV

7. (a) What do you mean by standard error of a statistic? Describe its utility in the testing of hypothesis.
- (b) What are normal tests? Explain how you would test normal tests to test for
- (i) Single population proportion
- (ii) Difference in population means.

(3)

- (c) Find the mean and variance of Binomial Distribution. 6
4. (a) State the area property of a normal curve.
- (b) An insurance company insures 4000 people against loss of both eyes in a car accident. Based on previous data, the insurance premiums here computed on the assumption that on an average 10 persons in 1,00,000 will have car accidents that result in this type of injury. What is the probability that more than 3 people will claim insurance in a given year?
- (c) The mean yield from one acre plots is 602 kgs with a s.d of 32 bgs. Assuming normal distribution how many one-acre plots in a batch of 1000 plots would you expect to have yield (i) over 700 kg (ii) below 650 kgs.
- (d) What do you mean by uniform distribution. $2+5+3+3+1=14$

UNIT - III

5. (a) Distinguish between probabilistic and non-probabilistic sampling. Explain any two methods of selecting a probability sample. $2+3+3=8$
- (b) A simple random sample of size 5 is drawn without replacement from a finite population consisting of 41 units. If the population standard deviation is 6.25, what is the standard error of the sample mean. 3

(Turn Over)