

SECOND SEMESTER P.G. DEGREE EXAMINATION, APRIL 2021

(CCSS)

Economics

ECO 2C 07—STATISTICS FOR ECONOMICS

(2019 Admissions)

Time : Three Hours

Maximum : 80 Marks

Part A (Multiple Choice questions)

Answer **all** questions.

Each question carries 1 mark.

1. If A and B are two events, the probability of occurrence of either A or B is given :
 - a) $P(A \cup B)$.
 - b) $P(A) + P(B)$.
 - c) $P(A \cap B)$.
 - d) $P(A)P(B)$.
2. How many different ways the letters of word "LEADER" can be arranged ?
 - a) 240.
 - b) 320.
 - c) 360.
 - d) 380.
3. What is the probability of getting more than 2 when a die is tossed :
 - a) $\frac{1}{3}$.
 - b) $\frac{1}{2}$.
 - c) $\frac{2}{3}$.
 - d) 1.
4. A normal Distribution Curve :
 - a) Is Symmetrical.
 - b) Has a single peak.
 - c) Has the same value of mean, median and mode.
 - d) All the above.
5. Mean of Binomial Distribution is :
 - a) np.
 - b) n/p.
 - c) square root of np.
 - d) npq.

6. Chi square distribution curve is :
- a) Symmetrical.
 - b) Positively skewed.
 - c) Negatively skewed.
 - d) None of the above.
7. Bias of an estimator can be :
- a) Positive.
 - b) Negative.
 - c) Either Positive or Negative.
 - d) Always zero.
8. Least square theory was proposed by :
- a) R.A Fisher
 - b) Karl Pearson
 - c) C.F Gauss
 - d) J. Neymann
9. Analysis of variance (ANOVA) is test for :
- a) Difference in sample variance
 - b) Difference in sample means
 - c) Difference in sample standard deviation
 - d) Difference in sample skewness
10. Which of the following is the most appropriate non-parametric test ?
- a) T test.
 - b) F test.
 - c) Z test.
 - d) U test.

(10 × 1 = 10 marks)

Part B (Very Short Answer Questions)

Answer any **five** questions.

Each question carries 2 marks.

Answer in one **or** two sentences each.

- 11. What is conditional probability ?
- 12. State Baye's Theorem.
- 13. Distinguish between unit set and universal set.
- 14. Identify a log normal distribution.
- 15. When Chi-square test is used ?
- 16. What is Ordinary Least Square Method ?
- 17. Define Type-1 and Type-2 errors in hypothesis testing.
- 18. When Krushall Wallis test is used ?

(5 × 2 = 10 marks)

Part C (Short Answer Questions)

Answer any **eight** questions.

Each question carries 5 marks.

19. Explain critical region and Type I & II errors in hypothesis testing.
20. What is exponential probability distribution ?
21. The sales manager of a watch company wants to study whether the sales of company's different brands of watches is independent of the states in which it is sold. The researcher has taken a random sample of 823 consumers who have purchased watches across four states. The observations of the researcher with respect to the sales of each brand across states is given below.

States	Brand 1	Brand 2	Brand 3	Total
TAMIL NADU	75	85	82	242
KERALA	70	50	74	194
KARNATAKA	55	62	60	177
ANDRA PRADESH	65	75	70	210
Total	265	272	286	823

Determine whether the brand preference is independent of the states ? (Use Chi square test at 5% level of significance)

22. The table below shows the marks of a sample of 8 students from Batch A and 9 students from Batch B. Use the Mann-Whitney U Test to determine whether the marks differ between Batch A and Batch B.

Marks (out of 100) : 75 71 72 79 73 76 73 70

Marks (Out of 100) : 82 84 77 75 74 68 80 69 74

23. A Laptop manufacturing company employed 300 employees of whom 80 are mechanical engineers and 220 are diploma holders in management. Thirty percent of the management diploma holders are mechanical engineers. Suppose an employee is selected at random. What is the probability that the selected employee is a management diploma holder and a mechanical engineer ?
24. Explain the Law of Large Numbers and Central Limit Theorem.
25. A company has conducted a written test to recruit people as managers. Assume that the test marks are normally distributed with mean as 60 and standard deviation as 25. Find the following :
- Probability of randomly obtaining score greater than 40 in the test.
 - Probability of randomly obtaining a score that is between 35 to 85.

Turn over

26. What is conditional probability ? Explain Bayes's Theorem.
27. Explain the characteristics of F distribution.
28. Explain mean and variance of normal probability distribution.
29. What is a Wilcoxon Signed rank test ? What are its uses ?
30. A new electrical company claims that the average life of its bulbs is 4000 hours. A retailer has taken a sample of 10 bulbs to test this claim and found that the mean life of bulbs is 39,00 hours with a sample standard deviation of 270 hours. Conduct t test at 5% level of significance and find whether the claim by the company is acceptable.

(8 × 5 = 40 marks)

Part D

*Answer any two questions.
Each question carries 10 marks.*

31. The following data pertaining to the number of units of a product manufactured by four different brands of machine :

Machine Types

A	B	C	D
46	40	49	38
48	42	54	45
36	38	46	34
35	40	48	35
40	44	51	41

Test whether the mean productivity is same for the four brands of machine. Use ANOVA and test at 5% significance level.

32. Using method of least square to fit a regression line of the form $P = a + bW$ to the following data :

Weight (kg)	:	50	70	100	120	140
Price (Rs.)	:	12	15	21	25	30

Estimate P (Price) when W (weight) is 150.

33. Explain the procedure for testing a hypothesis with suitable example.
34. Discuss the features of Binomial and Poisson distributions and bring out its relative merits and merits.

(2 × 10 = 20 marks)