Roll No. .....

Total Pages : 4

CMBA/D-22

27206

STATISTICS AND ANALYTICS FOR DECISION MAKING

Paper–MBA–106

Time Allowed : 3 Hours]

[Maximum Marks : 70

Note : Attempt **six** questions in all, Question No. **1** is compulsory. Attempt remaining **five** questions, out of remaining **eight** questions carrying 10 marks each.

Compulsory Question

1. Explain the following aspects of statistics with examples : 5×4=20

   (a) Explain the Relative Frequency approaches to define probability.

   (b) Describe the procedure of testing hypothesis.

   (c) Describe the characteristics of Binomial probability distribution.

   (d) Explain Stratified random sampling.

   (e) Central Limit Theorem.

2. The weekly wages of 1000 workers are normally distributed around a mean of ₹70 and a standard deviation of ₹5. Estimate the number of workers whose weekly wages will be : 10

   (a) Between 70 and 72

P. T. O.

   (b) Between 69 and 72

   (c) More than 75

   (d) Less than 63.

3. What is a Chi-square test? Point out its applications. Under what conditions is this test applicable? 10

4. Ten Individuals are chosen from a normal population and their heights (in inches) are given below. Test whether the sample comes from a normal population whose mean height is 66 inches or not at 5% level of significance? Use Single sample t-test (L5) 63, 63, 66, 67, 68, 69, 70, 70, 71, 71. 10

5. Three samples below have been obtained from normal populations with equal variances. Test the hypothesis at 5% level that the population means are equal. 10

A	B	C
8	7	12
10	5	9
7	10	13
14	9	12
11	9	14

6. Explain and illustrate sampling distribution of mean and difference of two means. Also write down use of SPSS in data analytics. 10

7. A clinical trial is run to assess the effectiveness of a new anti-retroviral therapy for patients with HIV. Patients are randomized to receive a standard anti-retroviral therapy (usual care) or the new anti-retroviral therapy and are monitored for 3 months. The primary outcome is viral load which represents the number of HIV copies per millilitre of blood. A total of 20 participants are randomized and the data are shown below. 10

Standard Therapy	New Therapy
7500	400
8000	250
2000	800
550	1400
1250	8000
1000	7400
2250	1020
6800	6000
3400	920
6300	1420

Is there Statistical evidence of a difference in Viral load in patients receiving the standard versus the New Anti-retroviral therapy ?

8. (a) Explain Wilcoxon Rank Sum test with illustration.

(b) Match each of the Nonparametric procedure presented on the left with the corresponding experimental design from the list on the right (use each alternative only once).

1.	Kruskal-Wallis H Test	(a)	two independent samples
2.	Wilcoxon Rank-Sum Test	(b)	paired samples
3.	Wilcoxon Signed-Rank Test	(c)	several independent samples

10

9. Suppose we compare four instructors for consistency of grading. Use the following table to apply the Kruskal–Wallis test to determine whether there is a difference among instructors. 10

Grade counts for Students by Instructor.

	Instructor				
Grade	**1**	**2**	**3**	**4**	**Row Totals**
A	4	10	6	20	40
B	14	6	7	10	37
C	17	9	8	5	39
D	6	7	6	5	24
F	2	6	1	10	19
Total # of students	**43**	**38**	**28**	**50**	**159**