



BRAINWARE UNIVERSITY

Course – MBA

Advanced Statistics (MBA 203)

(Semester – 2)

Time allotted: 3 Hours

Full Marks : 70

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Questions)

1. Choose the correct answer from the given alternatives:

10x1=10

i) A coefficient of correlation is computed to be -0.95 means that

- a) The relationship between two variables is weak
- b) The relationship between two variables is strong and positive
- c) The relationship between two variables is strong and but negative
- d) Correlation coefficient cannot have this value

ii) Pulse rates of adult men are approximately normal with a mean of 70 and a standard deviation of 8. Which choice correctly describes how to find the proportion of men that have a pulse rate greater than 78?

- a) Find the area to the left of $z = 1$ under a standard normal curve.
- b) Find the area between $z = -1$ and $z = 1$ under a standard normal curve.
- c) Find the area to the right of $z = 1$ under a standard normal curve.
- d) Find the area to the right of $z = -1$ under a standard normal curve.

iii) A sampling distribution is the probability distribution for which one of the following:

- a) A sample
- b) A sample statistic
- c) A population
- d) A population parameter

iv) Which of the following statements best describes the relationship between a parameter and a statistic?

- a) A parameter has a sampling distribution with the statistic as its mean.
- b) A parameter has a sampling distribution that can be used to determine what values the statistic is likely to have in repeated samples.
- c) A parameter is used to estimate a statistic.
- d) A statistic is used to estimate a parameter.

v) In order to reduce the likelihood of committing a Type II error, the researcher could

- a) increase the confidence coefficient
- b) increase the sample size
- c) decrease the sample size
- d) decrease the level of significance

vi) In binomial distribution, formula of calculating standard deviation is

- a) square root of p
- b) square root of pq
- c) square root of npq
- d) square root of np

vii) Mean of binomial probability distribution is 857.6 and probability is 64% then number of values of binomial distribution

- a) 1040
- b) 1340
- c) 1240
- d) 1140

viii) If value of x for normal distribution is 35, mean of normal distribution is 65 and standard deviation is 25 then standardized random variable is

- a) -1.5
- b) -1.2
- c) -1.7
- d) 4

ix) Normal distribution is also classified as

- a) Gaussian Distribution
- b) Poisson distribution
- c) Bernoulli's distribution
- d) weighted average distribution

x) If z -score of normal distribution is 2.5, mean of distribution is 45 and standard deviation of normal distribution is 3 then value of x for a normal distribution is

- a) 97.5
- b) 47.5
- c) 37.5
- d) 67.5

Group – B
(Short Answer Type Question)
Answer any three questions

3 x 5 = 15

2. If 5% of the electric bulbs manufactured by a company are defective, use poisson distribution to find the probability that in a sample of 100 bulbs i) none will be defective, ii) 5 bulbs will be defective, iii) more than 2 defectives. (Given $e^{-5}=0.007$, $e^{-4}=0.0183$).
3. Define Errors of Type-I and Type-II with suitable examples.
4. A sample of 6500 screws is taken from a large consignment and 75 are found to be defective. Estimate the % of defectives in the consignment and assign limits within which the % lies.
5. Distinguish between Simple Random Sampling and Stratified Random Sampling.
6. For a binomial distribution the mean is 4 and variance is 3. Find the value of n, p and q.

Group – C
(Long Answer Type Question)
Answer any three questions

3 x 15 = 45

7. a) In a sample of 120 workers in a factory the mean and sd of wages were Rs 11.35 and Rs 3.03 respectively. Find the percentage of workers getting wages between Rs 9 and Rs 17 in the whole factor, assuming that the wages are normally distributed. (Given, Area under standard normal curve from $z=0$ to $z=0.78$ is 0.2823 and to $z=1.86$ is 0.4686).
- b) A manufacturer of metal pistons finds that on the average, 12% of his pistons are rejected because they are either oversize or undersized. What is the probability that a batch of 10 pistons will contain (a) no more than 2 rejects? (b) at least 2 rejects? [8+7]
8. a) A random sample of 60 persons was taken to test the independence of hair colour and eye colour of persons. The following table was obtained:

Eye color	Hair Color	
	Light	Dark
Blue	24	06
Brown	08	22

Test wheather eye color of a person depends on the hair color. Given 955 CRITICAL VALUE OF Chi-square with 1 df is 3.84.

b) Make a sign test for the following paired sample data and comment on the difference between the hindleg and foreleg length of deer.

Deer	1	2	3	4	5	6	7	8	9	10
Hindleg	142	140	144	144	142	146	149	150	142	148
Foreleg	138	136	147	139	143	141	143	145	136	146

[8+7]

9. a) An automatic machine was designed to pack exactly 2 kg of Vanaspati. A sample of 100 tins was examined to test the machine. The average weight was found to be 1.94 kg with standard deviation of 0.1 kg. Is the machine working properly? At 5% level of significance $z = 1.64$ for one tailed test and $z = 1.96$ for two tailed test.

b) A manufacturer supplies dot pens in boxes of 50. He claims that 2% of the pens are defective. In any box what is the probability of finding 6.

i) exactly two defectives ?

ii) more than two defectives ?

[8+7]

10. a) Students in an e-business technology course were given a written final examination as well as project to complete as part of their final grade. For a random sample of 10 students, the scores on both the exam and the project are as follows:

Exam	81	62	74	78	93	69	72	83	90	94
Project	76	71	69	76	87	62	80	75	92	79

Find the spearman rank correlation coefficient and also test for association. Given critical value of r for $n= 10$ and $\alpha=0.025$ is 0.648.

b) Write a short note on Sign Test.

[10+5]

11. a) 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 sample mean?

b) The mean of a certain normal distribution is equal to the standard error of the mean of samples of 25 from the distribution. Find the probability that the mean of a sample of 49 from the distribution will be negative.

[8+7]