

MBA (2nd Semester) Examination, June 2020 (DDE)

[Session: July 2019 – June 2021]

Subject: Quantitative Techniques in Management

Paper: MBA-2805

Time: 3 Hours

Full Marks: 80

*The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.*

Group – A

Answer any six questions.

5×6=30

1. Scores of 40 students in a science class consist of 60 items and they are tabulated below:

Class Interval	Frequency
10-14	5
15-19	2
20-24	3
25-29	5
30-34	2
35-39	9
40-44	6
45-49	3
50-54	5
	n = 40

Calculate the mode of the score distribution.

2. What are the characteristics of an ideal measure of dispersion?
3. State the merits and demerits of coefficient of variation. What are its practical uses?
4. Calculate the first four moments about 30 for the following distribution and convert them into central moments.
- | | | | | | |
|-----------------|--------|-------|-------|-------|-------|
| Class Intervals | : 5-15 | 15-25 | 25-35 | 35-45 | 45-55 |
| Frequency | : 8 | 12 | 15 | 9 | 6 |
5. Calculate the coefficient of skewness for the following distribution.
- | | | | | | | |
|-----------------------------------|--------|-------|-------|-------|-------|-------|
| Debt as % of total Capitalization | : 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 |
| No. of companies | : 15 | 17 | 19 | 27 | 19 | 12 |
6. Calculate spearman's rank correlation coefficient between advt. cost & sales from the following data (₹ in lakhs):
- | | | | | | | | | | | |
|---------------------|----|----|----|----|----|----|----|----|----|----|
| Advertisement cost: | 39 | 65 | 62 | 90 | 82 | 75 | 25 | 98 | 36 | 78 |
| Sales: | 47 | 53 | 58 | 86 | 62 | 68 | 60 | 91 | 51 | 84 |
7. What is meant by stepwise regression? List out the uses of regression analysis.
8. An investigator collected 50 different samples; each sample contained 17 scores. He studied the 50 means and estimated σ^2 to be 2.9. Estimate σ^2 of the original population.

Please Turn Over

Group -B

Answer any five questions.

10×5=50

9. (a) Distinguish between absolute and relative measures of variation.
 (b) The number of vehicles sold by a major Toyota Showroom in a day was recorded for 10 working days. The data is given as –

Day	1	2	3	4	5	6	7	8	9	10
Frequency	20	15	18	5	10	17	21	19	25	28

Find the Quartile Deviation and its coefficient for the given discrete distribution case.

10. (a) Find standard deviation, mode and median when mean = 50, coefficient of variation = 40%, skewness = -0.4.
 (b) The following data are given to an economist for the purpose of economic analysis. The data refers to the length of life of a certain type of batteries.

$$N = 100, \sum fd = -50, \sum fd^2 = 1970, \sum fd^3 = -2948, \sum fd^4 = 86,752. \text{ Here, } d = X - 48.$$

Do you think that the distribution is platykurtic?

11. (a) State the properties of coefficient of correlation. What is the relationship between coefficient of correlation and coefficient of determination?
 (b) There are two series of index numbers P for price index and S for stock of the commodity. The mean and standard deviation of P are 100 and 8 and of S are 103 and 4 respectively. The correlation coefficient between the two series is 0.4. With these data obtain the regression lines of P on S and S on P .
12. (a) Explain the meaning of each of the following terms:
 (i) Statistical independence of events
 (ii) Conditional probability
 (c) Four cards are to be dealt successively, at random and without replacement, from an ordinary deck of playing cards. Find the probability of receiving a spade, a heart, a diamond, and a club, in that order.

13. (a) List out the steps in the procedure of systematic random sampling.
 (b) Suppose a random sample of 10 observations is to be drawn where x_1, x_2, \dots, x_{10} are independent normally distributed random variables each with mean μ , and variance σ^2 . Find the $\Pr(\sigma^2 \geq .5319s^2)$ where $S^2 = \text{sample variance} = \frac{1}{9} \sum_{i=1}^{10} (x_i - \bar{x})^2$.

14. (a) Find the Maximum likelihood parameter for the parameter λ of a poisson distribution from n sample values.
 (b) To estimate the average time, it takes to assemble a certain computer component, the industrial engineer at an electronic firm timed 40 technicians in the performance of this task, getting a mean of 12.73 minutes and a standard deviation 2.06 minutes. With what confidence we can assert that the sample mean does not differ from the true mean by more than 30 seconds.

15. (a) What is a hypothesis? State the characteristics of a testable hypothesis.
 (b) The marketing department of a company that makes brand X laundry detergent found in a random sample of 200 housewives that 20% favoured brand X over all others. After an intensive advertising campaign, another random sample of 300 housewives showed that 27% favoured brand X. Can president of the company conclude that the advertising campaign was successful?