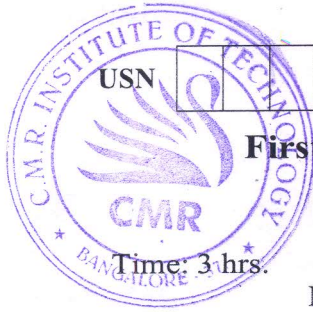


CBCS SCHEME



18MBA14

First Semester MBA Degree Examination, Feb./Mar. 2022 Business Statistics and Analytics

Time: 3 hrs.

Max. Marks:100

- Note:** 1. Answer any *FOUR* full questions from Q.No.1 to 7.
2. Q.No. 8 is compulsory.
3. Use of Statistical table is permitted.

- 1 a. What is infeasibility in L.P.P? (03 Marks)
b. The investor buys Rs.1200 worth of shares in a company each month. During the first 5 months he bought the shares at a price of Rs.10, Rs.12, Rs.15, Rs.20 and Rs.24 per share. After 5 months what is the average price paid for the shares by him. (07 Marks)
c. Information on the activities required for a project is as follows:

| | | | | | | | | | | | |
|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Name: | A | B | C | D | E | F | G | H | I | J | K |
| Activities Node: | 1-2 | 1-3 | 1-4 | 2-5 | 3-5 | 3-6 | 3-7 | 4-6 | 5-7 | 6-8 | 7-8 |
| Duration days | 2 | 7 | 8 | 3 | 6 | 10 | 4 | 6 | 2 | 5 | 6 |

Draw the network and calculate the ES, EF, LS, LF TF times of each of the activities and critical path. (10 Marks)

- 2 a. Explain with an example, what do you mean by mutually exclusive event. (03 Marks)
b. Elucidate different types of probability distribution. (07 Marks)
c. Fit a straight line trend by the method of least squares to the following data. Assuming the same rate of change continues what be the predicted sales for the year 2009?

| | | | | | | | | |
|------------------|------|------|------|------|------|------|------|------|
| Year | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
| Sales (Rs. lakh) | 76 | 80 | 130 | 144 | 138 | 120 | 174 | 190 |

Calculate trend values from 2000 to 2007. (10 Marks)

- 3 a. Bring out the striking difference between correlation and regression. (03 Marks)
b. What is Linear Programming? Mention its Areas of Applications. (07 Marks)
c. The income of a group of 10,000 person was found to be normally distributed with mean Rs.1750 p.m and standard deviation Rs.50. Show that of this group 95% had income exceeding Rs.1668 and only 5 percent had income exceeding Rs.1832. What was the lowest income among the richest 100? (10 Marks)

- 4 a. Bring out the relationship between measures of dispersion. ie. QD, MD and SD Quartile Deviation, Mean deviation and Standard deviation. (03 Marks)
b. Calculate Karl Pearson's coefficient of correlation between age and playing habits from the data given below. Also calculate probable error and comment on the value.

| | | | | | | |
|-----------------|-----|-----|-----|-----|-----|-----|
| Age | 20 | 21 | 22 | 23 | 24 | 25 |
| No. of Students | 500 | 400 | 300 | 240 | 200 | 160 |
| Regular player | 400 | 300 | 180 | 96 | 60 | 24 |

(07 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

c. Solve graphically

$$\text{Max } Z = 0.07x_1 + 0.10x_2$$

$$\text{S.T. } x_1 + x_2 \leq 30,000$$

$$x_1 \geq 6,000$$

$$x_2 \leq 12,000$$

$$x_1 - x_2 \geq 0$$

$$x_1, x_2 \geq 0$$

(10 Marks)

- 5 a. What is absolute measure and relative measure of variation? (03 Marks)
- b. Mr. Gupta applies for personal loan of Rs.1,50,000 from a nationalized bank to repair his house. The loan offer informed him that over the years, bank has received about 2920 loan applications per year and the probability of approval was on average above 0.85.
- (i) Mr. Gupta wants to know the average and standard deviation of the number of loans approved/year.
- (ii) Suppose bank actually received 2654 loan applications per year, with an approval probability of 0.82. What are the mean and standard deviation now. (07 Marks)
- c. From the data given below:

(i) Find two regression equation

(ii) The correlation coefficient between marks in economics and statistics.

(iii) The most likely marks in statistics when the economics marks is 30.

| | | | | | | | | | | |
|---------------------|----|----|----|----|----|----|----|----|----|----|
| Marks in Economics | 25 | 28 | 35 | 32 | 31 | 36 | 29 | 38 | 34 | 32 |
| Marks in Statistics | 43 | 48 | 49 | 41 | 36 | 32 | 31 | 30 | 33 | 39 |

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(10 Marks)

- 6 a. Bring out the important properties of good measures of variation. (03 Marks)
- b. Explain the methods of measurement of seasonal variation. (07 Marks)
- c. Calculate Spearman's coefficient of correlation between marks assigned to ten students by Judges X and Y in a certain competitive test as shown below:

| | | | | | | | | | | |
|------------------|----|----|----|----|----|----|----|----|----|----|
| S.No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Marks by Judge X | 52 | 53 | 42 | 60 | 45 | 41 | 37 | 38 | 25 | 27 |
| Marks by Judge Y | 65 | 68 | 43 | 38 | 77 | 48 | 35 | 30 | 25 | 50 |

(10 Marks)

- 7 a. What is degeneracy in transportation model? (03 Marks)
- b. Calculate the trend value by the method of least square from the given data:

| | | | | | | | |
|-------|------|------|------|------|------|------|------|
| Year | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| Value | 75 | 67 | 68 | 65 | 50 | 54 | 41 |

(07 Marks)

c. Solve the given transportation problem by using VAM.

| From | To | BHARAT | JANATA | RED LAMP | Supply (Tonnes) |
|-----------------|----|--------|--------|----------|-----------------|
| A | | 7 | 10 | 5 | 90 |
| B | | 12 | 9 | 4 | 50 |
| C | | 7 | 3 | 11 | 80 |
| D | | 9 | 5 | 7 | 60 |
| Demand (tonnes) | | 120 | 100 | 110 | |

Because of road construction shipments are temporarily prohibited from warehouse at city A to BHARAT company. Find the feasible solution. (10 Marks)

- 8 A project consists of 9 activities whose time estimates are in weeks and other characteristics given below:

| Activity | Preceding Activity | T_0 | T_m | T_p |
|----------|--------------------|-------|-------|-------|
| A | - | 2 | 4 | 6 |
| B | - | 6 | 6 | 6 |
| C | - | 6 | 12 | 24 |
| D | A | 2 | 5 | 8 |
| E | A | 11 | 14 | 23 |
| F | B, D | 8 | 10 | 12 |
| G | B, D | 3 | 6 | 9 |
| H | C, F | 9 | 15 | 27 |
| I | E | 4 | 10 | 16 |

- (i) Show the PERT Network and identify critical activity.
(ii) What is expected project completion time and its variance?
(iii) What is probability of completing project one week before?
(iv) If the project required to be completed by December 31 of a given year and the manager wants to be 95% sure of meeting the deadline, when should he start the project?

(20 Marks)
