<span style="color:red">**CIA - Question Paper Model – to practice**</span>
**RVS College of Arts and Science(Autonomous),Sulur**
**Department of Management Studies & Research**
**MBA Degree CIA Examinations –October 2023**
**2023 Batch**
**Subject: Statistics for Management – I MBA BA**

Date:  .10.2023
Time: 2 Hours                                                                     Maximum 50 marks

**PART –A (4 x 4 = 16 Marks)**
**Answer ALL Questions – 200 Words**

1.  (a) Child-Care Community Nursery can continue to be supported by the county social services office as long as the average annual income of the families whose children attend the nursery is below $12,500. The family incomes of the attending children are

| | | | | |
|---|---|---|---|---|
| $14,500 | $15,600 | $12,500 | $8,600 | $7,800 |
| $6,500 | $5,900 | $10,200 | $8,800 | $14,300 | $13,900 |

Does Child-Care qualify now for county support?

**(OR)**

(b) Here are student scores on a history quiz. What score do 70% of the students get equal to or less than?

| 95 | 81 | 59 | 68 | 100 | 92 | 75 | 67 | 85 | 79 |
|---|---|---|---|---|---|---|---|---|---|
| 71 | 88 | 100 | 94 | 87 | 65 | 93 | 72 | 83 | 91 |

2.  (a) Bank of Lincoln is interested in reducing the amount of time people spend waiting to see a personal banker. The bank is interested in the relationship between waiting time (Y) in minutes and number of bankers on duty (X). Customers were randomly selected with the data given below.

| X | 2 | 3 | 5 | 4 | 2 | 6 | 1 |
|---|---|---|---|---|---|---|---|
| | 3 | 4 | 3 | 3 | 2 | 4 | |

| Y | 12.8 | 11.3 | 3.2 | 6.4 | 11.6 | 3.2 | 8.7 |
|---|---|---|---|---|---|---|---|
| | 10.5 | 8.2 | 11.3 | 9.4 | 12.8 | 8.2 | |

Visualize these data using Scatterplot and write the inference after calculating correlation.

**(OR)**

(b) The North Carolina Consumers' Bureau has conducted a survey of cable television providers in the state. Here are the number of channels they offer in basic service:

32    38    31    15    25    14    12    29    22

28    29    32    33    24    26    8    35

   (i)     Calculate the median number of channels provided.
   (ii)    Calculate the mean number of channels provided.
   (iii)   Which value is the better measure of the central tendency of these data?

3.  (a) For a normal distribution with mean 47 and standard deviation 6, find the upper value and lower value of the range of outcomes associated with the middle 25%.

**(OR)**

   (b) The lifetime of an electrical component may be modelled by a Normal distribution with mean 2500 hours and variance 900 hour$^2$. How long would you expect 50% of the components to last?

4.  (a). Assume that the lifetime of a certain type of light bulb (which you bought) can be modelled by the Normal distribution. The mean life time is 2500 hours. It is also found that 95% of the bulbs lasts between 2300 and 2700 hours. Suppose, the bulb which you bought lasts for 2200 hours. What may be the percentage of the bulbs last less than yours?

**(OR)**

   (b) Jam is packed into jars at a food processing plant. The amount of jam, in grams, packed into a jar is Normally distributed with mean 460 and variance 25. Any jar containing less that the 454 grams stated on the label is described as 'underweight'.
   (i) Find the probability that a randomly selected jar will be underweight.

**PART - B (3 x 8 = 24 Marks)**
**Answer the Questions from the following- 500 Words**

5.(a) A farmer expects to harvest a crop of 3.8 tonnes, on average, from each hectare of his land, with standard deviation 0.2 tonnes.
One year there was much more rain than usual and he harvested 4.1 tonnes per hectare.
(i)      Was this exceptional
(ii)     Do you think the crop was affected by the unusual weather or was the higher yield part of the variability which always occurs?

**(OR)**

**(b)** The number of checks cashed each day at the five branches of the Bank of Orange County during the past month had the following frequency distribution:

| Class | Frequency |
|-------|-----------|
| 0 – 199 | 10 |
| 200 – 399 | 13 |
| 400 – 599 | 17 |
| 600 – 799 | 42 |
| 800 – 999 | 18 |

Hank Spivey, director of operations for the bank, knows that a standard deviation in check cashing of more than 200 checks per day creates staffing and organizational problems at the branches because of the uneven workload. Should Hank worry about staffing next month?

6.   (a). The distribution of the masses of some baby parrots is normal and has a mean of 60 g and a standard deviation of 5 g. Find the probability that a randomly selected bird is:
   (i)  under 63 g
   (ii) over 63 g
   (iii) over 68 g
   (iv) between 63 and 68 g.

**(OR)**

(b) (i) Lengths of certain type of beans have a normal distribution with mean 15.1 cm and standard deviation 4.1 cm. 25% of beans are shorter than c cm. Find the value of c.
(ii) For a normal distribution with mean 222 and standard deviation 17, find the value associated with the top 28%.

7. (a) There are a number of possible measures of sales performance, including how consistent a salesperson is in meeting established sales goals. The data that follow represent the percentage of goal met be each of three salespeople over the last 5 years.

| Patricia | 88 | 68 | 89 | 92 | 103 |
|----------|-----|-----|-----|-----|-----|
| John | 76 | 88 | 90 | 86 | 79 |
| Frank | 104 | 88 | 118 | 88 | 123 |

Which salesperson is the most consistent? Comment on the adequacy of using a measure of consistency along with percentage of sales goal met to evaluate sales performance.

**(OR)**

**(b)** An aptitude test for deep-sea divers has been designed to produce scores that are approximately normally distributed on a scale from 0 to 100 with standard deviation 25. The scores from a random sample of people taking the test were as follows.

| 23 | 35 | 89 | 35 | 12 | | 45 | 60 | 78 | 34 | 66 |

(i)     Find the mean score of the people in this sample.
(ii)    Construct a 90% confidence interval for the mean score of people taking the test.

# PART - C (1 x 10 = 10 Marks)
## Case Study (Compulsory)

8. By using the dataset given in the Harvard case "Capital Bikeshare: Analyzing the Bike Rental Demand" which is discussed in the class, perform the initial Exploratory Data Analysis (EDA) to answer the question,

- How do temperature values change over the seasons?

Dataset Download Link:

https://drive.google.com/file/d/1_fI9TRpTojSUCJ6hg8KLorckhB1NFCuB/view?usp=sharing