**Decision Science**

**April 2025 Examination**

**1) Calculate Quartile Deviation from the following**

|  |  |
| --- | --- |
| **Earnings (Rs)** | **Number of Persons** |
| **25** | **25** |
| **26** | **70** |
| **27** | **210** |
| **28** | **275** |
| **29** | **430** |
| **30** | **550** |

|  |  |
| --- | --- |
| **31** | **340** |
| **32** | **130** |
| **33** | **90** |
| **34** | **55** |
| **35** | **25** |

**(10 Marks)**

**Here is a structured approach to writing the answer for the question on calculating Quartile Deviation:**

**Ans 1.**

**Introduction**

Decision science involves using quantitative and analytical methods to aid decision-making. Quartile Deviation (QD) is a statistical tool used to measure the spread or variability in a dataset, focusing on the middle 50% of the observations. Unlike standard deviation, which considers all values in the dataset, QD emphasizes the interquartile range (IQR), providing a robust measure of dispersion unaffected by extreme values.

In decision science, understanding variability is crucial for predicting outcomes and making informed decisions, particularly when analyzing financial data like earnings. For example, analyzing the distribution of earnings helps identify the degree of concentration or dispersion

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**2) Calculate Median from the following**

|  |  |
| --- | --- |
| **Class - Interval** | **Number of Students** |
| **0-10** | **5** |
| **10-20** | **8** |
| **20-30** | **7** |
| **30-40** | **12** |
| **40-50** | **28** |
| **50-60** | **20** |
| **60-70** | **10** |
| **70-80** | **10** |

**(10 Marks)**

### **Ans 2.**

### **Introduction**

The median is a fundamental measure in statistics, representing the middle value of a dataset when arranged in ascending order. For grouped data, the median is the class interval where the cumulative frequency reaches or exceeds half of the total observations. It provides a central value that divides the data into two equal halves, making it a robust measure of central tendency, especially for skewed distributions.

In educational contexts, calculating the median can provide insights into the performance or participation of students across intervals, as demonstrated in this problem. For instance, understanding the median class in a dataset of student numbers distributed across score

**3.a) A bag contains 6 white and 4 black balls. Two balls are drawn at random one after another without replacement. Find the probability that both drawn balls are white. (5 Marks)**

### **Ans 3a.**

### **Introduction**

Probability is a fundamental concept in mathematics, used to measure the likelihood of an event occurring. In this problem, we are calculating the probability of drawing two white balls consecutively from a bag containing 6 white and 4 black balls. Since the draws are without replacement, the total number of balls decreases after each draw, which influences

**3.b) In an intelligence test administered on 1000 children, the average was 42 and standard deviation was 24. Find the number of children exceeding a score of 50. (5 Marks)**

### **Ans 3b.**

### **Introduction**

The standard normal distribution is a critical concept in statistics used to understand data behavior and probabilities. In this problem, we calculate the number of children scoring above 50 in an intelligence test where the scores are normally distributed with a mean of 42 and a standard deviation of 24. Using the Z-score and standard normal tables, we will find the probability of exceeding a score of 50 and determine the corresponding number of children. This calculation is valuable in educational assessments, helping measure performance relative