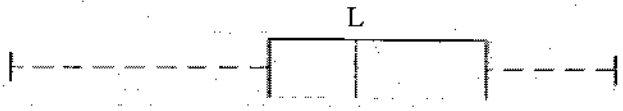
Statistics Olympiad 2018 (Junior Level)
Time: One hour

Instructions to the candidates:

- This paper consists of two parts (Part A and Part B).
- Part A consists of 10 multiple choice questions. Underline the most appropriate answer. Each correct answer is worth 5 marks.
- Part B consists of 6 questions. Write down the answer in the space provided. The marks given for each correct answer is indicated below the question.
- Calculators are not allowed.

Part A

1. In the following box plot, the line L represents



(a) Mean (b) Median (c) Mode (d) Q_1 (e) Q_3

2. Which of the following is a measure of dispersion?

(a) Mean (b) Median (c) Mode (d) Range (e) Q_1

3. The measure that cannot be calculated for a grouped frequency distribution with open ended classes is

(a) Standard deviation (b) Median (c) Mode (d) Q_1 (e) Q_3

4. It is decided to represent the grades obtained by a group of students for mathematics by a pie chart. Sixty students have obtained B grade and a sector of 108 degrees was required to represent them. The number of students in the group is

(අ) 108 (ආ) 120 (ඇ) 180 (ඈ) 200 (ඉ) Given information is not enough for the calculation.

5. The mean of the marks of 40 students for the first term is 65.2 and the median is 50. The student with the lowest mark, which is 19 left the class. Which of the following is valid for the mean and the median of the marks of the rest of the students?

(a) mean = 65.2, median = 50 (b) mean = 65.2, median < 50 (c) mean < 65.2, median = 50
(d) mean > 65.2, median = 50 (e) mean < 65.2, median < 50

6. Let A and B be two mutually exclusive events defined on the same sample space. Which of the following statement is correct?

(a) $P(A \cap B)=0$ (b) $P(A \cup B)=1$ (c) $P(A \cup B)=0$ (d) $P(A \cap B)=1$ (e) $P(A \cap B)=P(A)P(B)$

7. Let A and B be two events defined on the same sample space. If $A \subset B$, then which of the following statement is incorrect?

(a) $P(A \cup B)=P(A)+P(B)-P(A \cap B)$ (b) $P(A \cup B)=P(B)$ (c) $P(A \cup B)<P(A)$ (d) $P(A \cap B)=P(A)$ (e) $P(A)<P(B)$

8. Student A measured the lengths of set of nails in centimeters while student B measured the lengths of the same set of nails in millimeters. Let V(A) and V(B) are the values of the variances of measurements of student A and B respectively. Which of the following is correct?

(a) V(A) = V(B) (b) 10V(A)= V(B) (c) V(A)>=100 V(B) (d) V(A) = 10V(B) (e) 100V(A) = V(B)

9. A coin was tossed in three occasions. In each occasion it was tossed 10 times and recorded the number of heads appeared. The outcomes are summarized below.

Occasion	Number of heads appeared
1	9
2	7
3	8

Five students (A, B, C, D, E) commented on the results.

A: Surely the coin is not a fair coin
B: Surely the coin is a fair coin
C: It seems that it is not a fair coin
D: It seems that it is a fair coin
E: Nothing could be said about the fairness of the coin

Which student is correct?

(a) A (b) B (c). C (d). D (e). E

10. In a bias coin, probability of getting a head is twice as that for getting a tail. If this coin is tossed three times independently what is the probability of getting the observation sequence (Head, Head, Tail)?

(a) 0 (b) 1/2 (c) 2/27 (d) 4/27 (e) 1

Part B

11. The median of the five data points 2, 12, 8, x and 3 is 5. Find the value of x.

[4 Marks]

12. In an experiment, a biased coin and a fair die is tossed simultaneously. It is given that the probability of getting a head from the biased coin is 0.75. Write the sample space of the experiment.

[5 Marks]

13. Construct an appropriate stem and leaf plot to represent the following data set.

22, 33, 45, 21, 28, 35, 43, 51, 59, 61, 40, 39, 34, 36

[5 Marks]

14. Grouped frequency distribution of weights of 60 students is given below.

(i). Fill the adjusted frequency column. Show your calculations.

Class boundaries	Frequency	Adjusted Frequency
25.5-30.5	10	
30.5-35.5	11	
35.5-40.5	16	
40.5-45.5	10	
45.5-50.5	06	
50.5-65.5	03	
65.5-85.5	04	

[12 Marks]

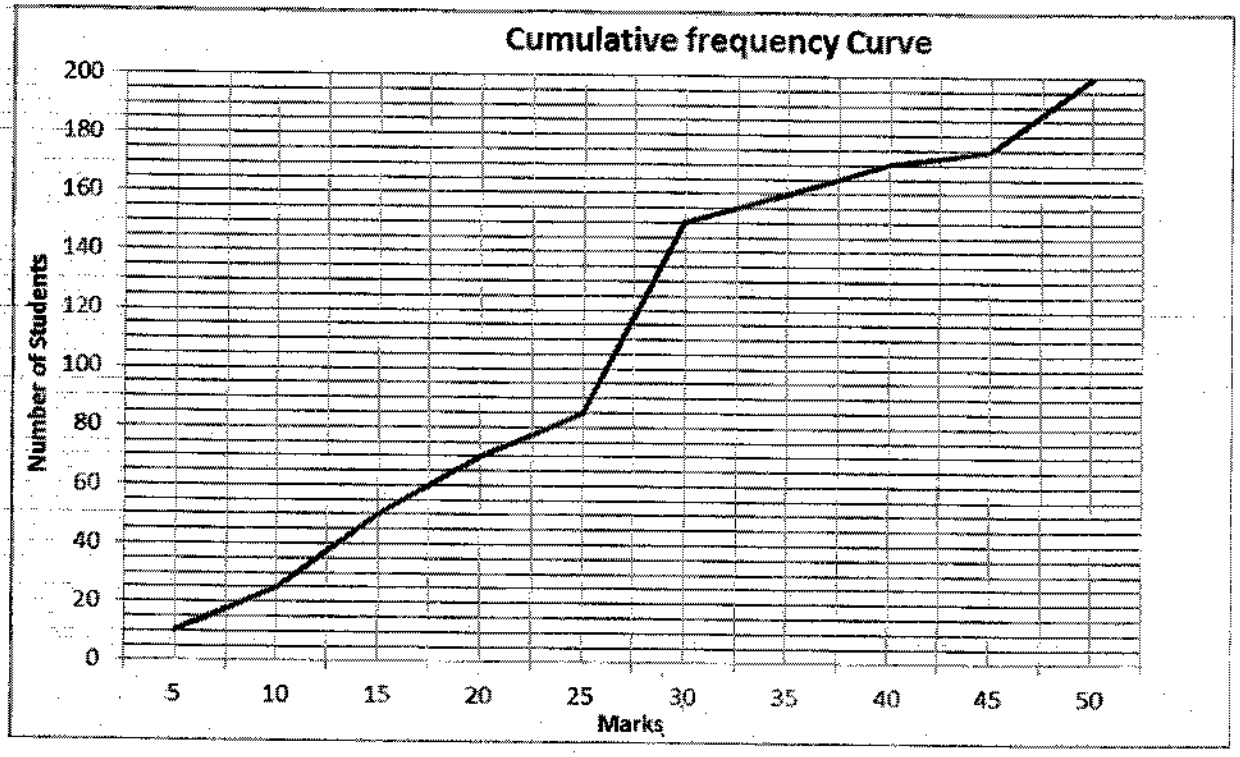
(ii) Suggest most suitable measures to measure the central tendency and dispersion of the above distribution.

(a). The most suitable measure of central tendency .....

(b). The most suitable measure of dispersion .....

[7 Marks]

15. The cumulative frequency curve for marks obtained by a set of students is given below.



(i). Find the first, second and third quartile of the marks.

[6 Marks]

(ii). Find the percentage of students who have scored at least 35 marks

[5 Marks]

16. Consider the following stem and leaf plot drawn for the age (in years) for 20 employees of a particular company.

2	258
3	3456678
4	133448
5	1245

Find the mode and median of the employees.

[6 Marks]