Answer all questions   **Time: 3 Hours**

1.

A.   The length of the 50 fish (**cm**) were taken during survey are given below

17.0	15.6	13.1	13.9	16.6	15.1	12.3	10.4	17.8	14.7
12.8	19.2	16.3	16.2	13.8	11.7	15.4	17.7	14.9	11.4
16.0	12.6	18.0	13.3	16.6	15.3	13.7	12.5	15.9	14.1
11.7	17.3	14.8	16.4	12.3	13.9	14.0	15.1	13.6	16.5
15.8	12.9	17.2	13.2	11.8	16.1	13.2	16.2	12.0	14.3

(a).   Re-arrange the data in **Rank Order**?

(b).   Calculate the **minimum class interval**?

(c).   Determine the **Range** of the data?

(d).   Determine the **Mean, Median, Mode and Standard Deviation**?

(e).   How would you report the mean with a measure of **Variability**?

(f).   Show the **frequency distribution** by the **Histogram & Polygon** on the same graph?

(20 Marks)

B.
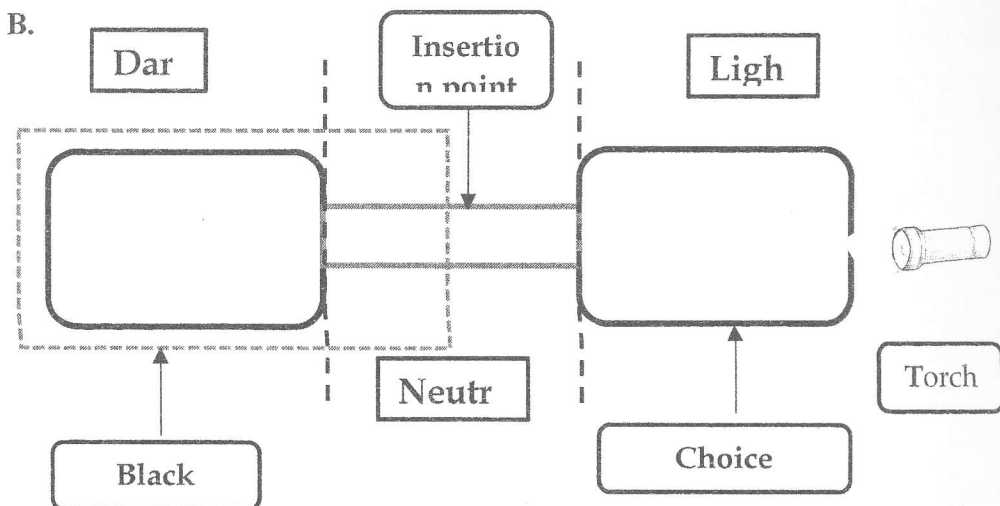
In an investigation of *Tribolium* larvae, a covered choice chamber is used to test whether the spatial distribution of larvae is affected by the presence light. To test the larvae' preference for light whether its moves towards the light or away from the light or it is not preferring to light or dark, 10 larvae are introduced into the middle of the choice chamber at the insertion point indicated by the arrow in the figure below. A strong light illumination placed is placed at one end of the chamber, and other end covered by black paper to make complete dark condition at the other end. The positions of larvae are observed and recorded every minute for 10 minutes.

DISTRIBUTION OF LARVAE CHOICE CHAMBER

Time (Minutes)	Position in Chamber		
	Light	Neutral	Dark
1	4	2	3
2	3	1	1
3	3	1	
4	1	1	
5	1		1
6			
7			
8			
9			
10			

Perform a suitable statistical test supported by hypothesis on the data given in the above experiment and concluding your findings with justification?

(20 Marks)

2. Identify **A** to **J** and answer the questions along it.

(15 Marks)

3. Measure the following water quality parameters of provided ecosystem samples **K, L** and comment on the results.
   - Salinity
   - Density
   - Conductivity
   - pH
   - TDS

(10 Marks)

4. Identify the given environmental problems (**i** to **iv**) and state the root causes, threats and remedial measures.

(20 Marks)

5. Identify problems of given model and comment to how to overcome those problem in environmentally friendly manner

(15 Marks)

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