EASTERN UNIVERSITY SRI LANKA
SECOND YEAR IN SCIENCE (2014/2015) –Nov 2016
ZL-251 Principles of Ecology

Time: 03 hours

Answer **all** questions.

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1. **A.**

Body weight (in kilograms) of students (40) were taken by a researcher to measure the BMI are given below

57.8	48.4	59.2	56.9	61.3	56.2	55.6	42.9
62.1	43.4	63.7	57.7	66.7	61.7	55.5	49.3
49.9	56.5	41.2	53.1	54.3	64	55.9	51.3
56	46.7	46.8	60.6	44.5	57.9	40.8	63.8
53.2	52.7	61.3	53.1	54.9	59.3	56	42

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

(b). Determine the **Minimum number of Class and Class Interval** of the data?

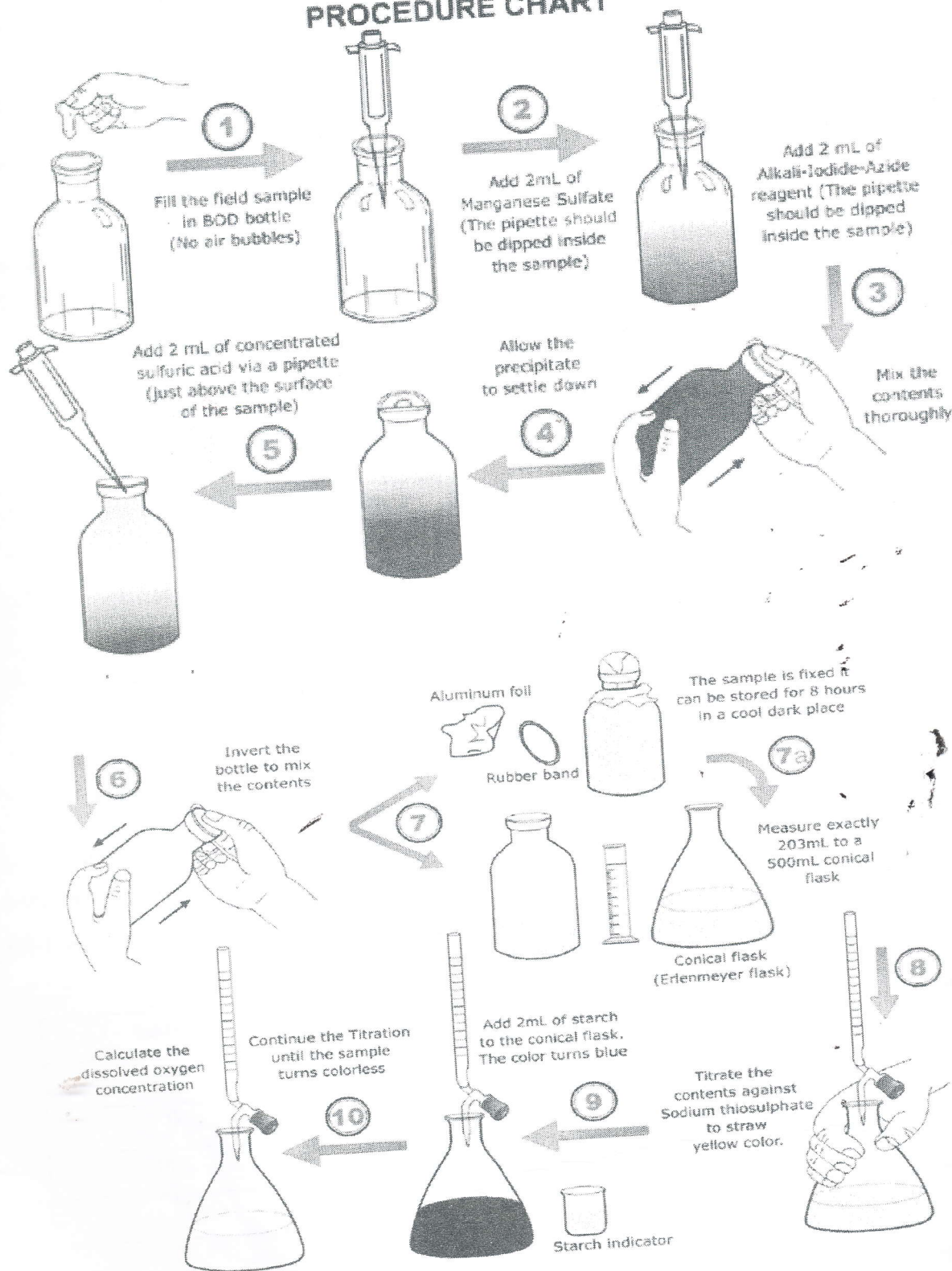(c). Determine the **Mean, Median, Mode and Standard Deviation**?

(15 marks)

B.

During the survey of mammals in three different ecosystem the following results were obtained calculate the **Shannon diversity (H), Simpson's index (D)** and **Simpson's index of diversity(1-D)** compare and comment the results

Species	Ecosystem – A	Ecosystem – B	Ecosystem – C
1	40	1	0
2	40	1	0
3	40	196	200
4	40	1	0
5	40	1	0
Total	**200**	**200**	**200**

(10 marks)

2. In an experiment to determine the Dissolved Oxygen (DO) concentration of an aquatic system the following steps were performed and obtained readings given bellow.

PROCEDURE CHART

① Fill the field sample in BOD bottle (No air bubbles)

② Add 2mL of Manganese Sulfate (The pipette should be dipped inside the sample)

③ Add 2 mL of Alkali-Iodide-Azide reagent (The pipette should be dipped inside the sample)

Mix the contents thoroughly

④ Allow the precipitate to settle down

⑤ Add 2 mL of concentrated sulfuric acid via a pipette (just above the surface of the sample)

⑥ Invert the bottle to mix the contents

Aluminum foil
Rubber band

⑦

The sample is fixed it can be stored for 8 hours in a cool dark place

⑦a Measure exactly 203mL to a 500mL conical flask

Conical flask (Erlenmeyer flask)

⑧ Titrate the contents against Sodium thiosulphate to straw yellow color.

⑨ Add 2mL of starch to the conical flask. The color turns blue

Starch indicator

⑩ Continue the Titration until the sample turns colorless

Calculate the dissolved oxygen concentration

Initial volume of $Na_2S_2O_3$ (ml)	Final volume of $Na_2S_2O_3$ (ml)	Required volume of $Na_2S_2O_3$ (ml)
0.00	0.70	0.70
3.00	3.75	0.75
6.00	6.80	0.80

(i)   Suggest the standard method to estimate the DO level of a water body

(ii)   Briefly describe the method of filling sample bottle

(iii)   State the observation were noticed during step 2 and 3

(iv)   write the balanced equation for the reaction which occurs at the step -2 and 3

(v)   Write the balanced equation for the reaction which occurs at the step -6

(vi)   State the observation were noticed during step – 6

(vii)   Find out the ratio between Thiosulphate and oxygen from the equations you have derived from previous step

(viii)   Calculate the concentration of Dissolved Oxygen reading obtained from an experimental given below using the data

           (*Hint:* 250 ml $MnSO_4$ solution, 250 ml (NaI (3M) + NaOH (8 M)), 200 ml Con. H_2SO_4, 0.0125M Thiosulfate solution)

(ix)   Comment the status of this water body based on their calculated DO value.

(x)   State the precaution measures to minimize the error during the experiment

                                                                       (20 Marks)

3. Identify **A, B, C, D** and **E** and comment on special identifying features

                                                                                 (15 marks)

4. Using the provided instrument measure the salinity of given water sample **F** and **G** and discus briefly on the ecosystem based on your results.

                                                                                (10 marks)

5. Identify and comment on the ecological significances of **H, I , J** and **K**

                                                                                 (05 marks)

7. Comment on the model **M** provided to you based on an ecosystem and state the problems existing and how could you restore the ecosystem in an environmentalist prospective.

(20 marks)

8. Prepare a food web with minimum of five food chains from the given array of provided organisms from different ecosystems.

(05 marks)

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