

BIOLOGY (S.G.) 1

SECTION A. (40 marks).

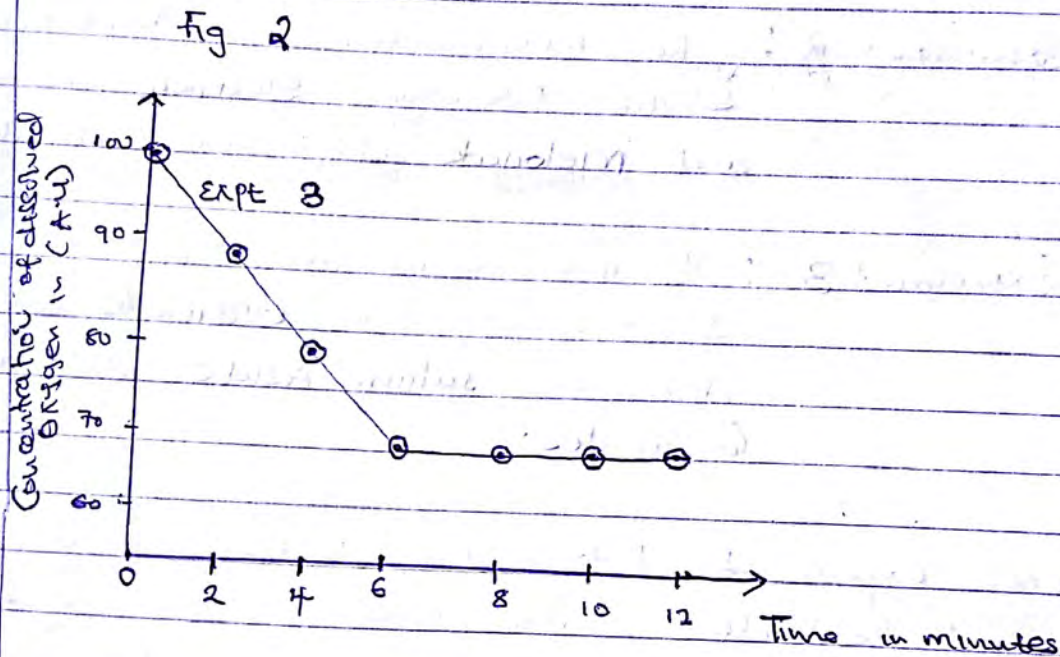
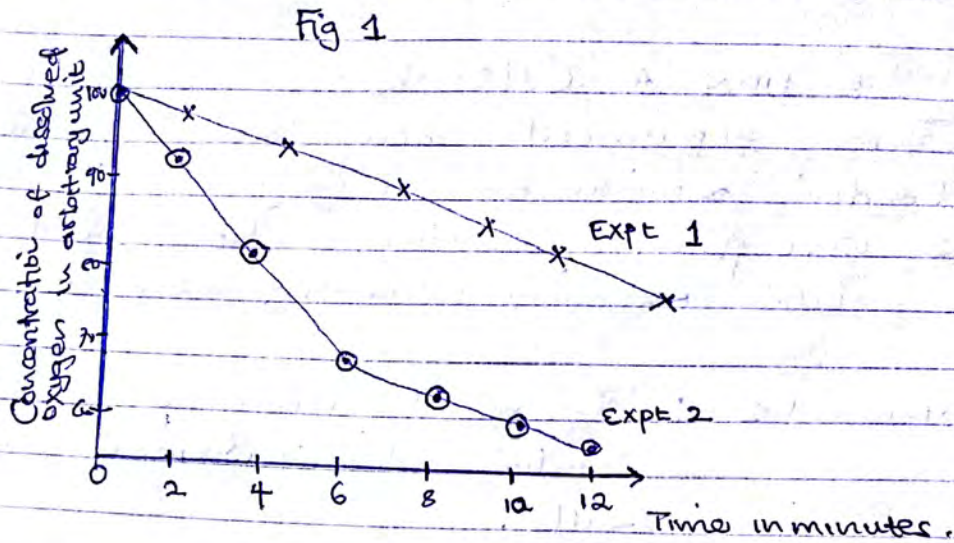
1. Three experiments were conducted, where mitochondria obtained from a highly respiring muscle tissue were placed in a buffer solution and the solution obtained incubated at 30°C .

In Experiment 1 : The mitochondria were kept in buffer solution containing sucrose and inorganic salts.

In Experiment 2 : The mitochondria were kept in buffer solution into which succinate was added and Malonate added after 6 minutes.

In Experiment 3 : The mitochondria were kept in buffer solution into which succinate was added and sodium Azide added after 6 minutes.

In each experiment 1 to 3, Concentration of dissolved Oxygen in the buffer solution was measured using electrode and the results are shown in the figures 1 and 2



- 9) Account for the
- i) Changes in the Concentration of Oxygen in Experiment 2 (12m)
 - ii) Effect of adding sodium Azide in Experiment 3 (15m)
 - iii) The difference in the Concentration of dissolved Oxygen in experiment 1 & 2

5) Compare the Concentration of Oxygen in Experiment 2 and 3 (05m)

- c) Why were the mitochondria used in this experiment
- i) placed in buffer solution (02 mks)
 - ii) Obtained from a highly respiring tissue (01 mks).
- d) From Figures 1 & 2, state the factors that influenced the experiments (03 mks)
- e) In what ways is the energy production in the mitochondria similar to that of Chloroplast

SECTION B (60 mks)

- 2a) Distinguish between Reflex action and Conditioned reflex (05)
- b) How is a Resting potential fully restored across a membrane (07)
- c) Explain the advantages of Reflexes and Parental care (07 mks)

- 3a) Outline the significance of excretion in mammals (04 mks)
- b) Describe the physiological differences that exist in Osmoregulation between fresh water and marine fish.
- c) Account for the production of small volume of Hypertonic urine in mammals. (09 mks)

- 4a) Describe the roles of certain membranous and non membranous organelles in formation of glycoproteins within a cell (06 mks)

b) Discuss the existence of the following in the plasma membrane

- i) Fluid mosaic nature of the membrane (10 mks)
- ii) Bilayer (04 mks).

5a) Give immediate Physiological changes that occur following no fertilisation during menstrual cycle (04 marks)

b) Differentiate between mode of reproduction:
i) algae and flowering plants (06 marks)

6) Discuss hormonal interactions during menstrual cycle which lead to the development of

i) Granulosa follicle (05 marks)

ii) Corpus luteum (05 marks)

6) a) Describe the significance of

i) Synthesis of ATP and $NADPH_2$ molecules during photosynthesis (06 marks)

ii) The secondary thickening in flowering plants (04 marks)

b) How does the red wave length of light induce various process of growth in particular plants (10 marks)