‘A’ LEVEL GUIDE
BIOLOGY
Paper 1

SECTION A

1	*D*	*11*	*C*	*21*	*D*	*31*	*C*
2	*C*	*12*	*C*	*22*	*C*	*32*	*A*
3	*B*	*13*	*B*	*23*	*D*	*33*	*D*
4	*D*	*14*	*A*	*24*	*A*	*34*	*D*
5	*B*	*15*	*D*	*25*	*C*	*35*	*C*
6	*B*	*16*	*C*	*26*	*D*	*36*	*B*
7	*D*	*17*	*B*	*27*	*D*	*37*	*B*
8	*A*	*18*	*A*	*28*	*B*	*38*	*A*
9	*B*	*19*	*D*	*29*	*D*	*39*	*A*
10	*C*	*20*	*C*	*30*	*D*	*40*	*A*

SECTION B (60 MARKS)

41.

(a) Explain the changes in the concentration of ammonium ions downstream from the point of sewage discharge

The concentration of dissolved oxygen increases rapidly and then gradually to maximum with increasing distance downstream; because sewage contains ammonium ions from decomposition of dead organic matter which are added at the point of discharge; the concentration of ions later falls rapidly to minimum with further increase in distance down stream; because nitrifying bacteria converts ammonium ions into nitrates; reducing their level in water.

(b) Explain why the concentration of dissolved oxygen decreases initially and later increases again, downstream. (04 marks)

Initially, the oxygen concentration falls rapidly then slowly to minimum because sewage contains aerobic bacteria and fungi which consume oxygen to depletion; and they eventually die due to oxygen lack;

Later oxygen concentration rises gradually to normal; becasu ephotosynthetic algae adds oxygen to the stream;

(c) At night, there is no photosynthesis; thus the oxygen used in the decomposition of organic matter is not recovered; while during the day, the used up oxygen is recovered by photosynthetic algae;

42. (a) Explain each of the following observations;

(i) Fresh water fishes die when placed in sea water.

The internal osmotic pressure of fresh water fish is lower than that of sea water; this results in osmotic extraction f water from their bodies; leading to dehydration; or physiological drought.

(ii) Spider crab dies when placed in fresh waters. (03 marks)

Fresh water is hypotonic to the body fluids of the bab; yet it cannot osmoregulate at all / is an osmocon former; therefore water osmotically enters the crab and its osmotic pressure decreases to very low levels; that it eventually dries. Owtte;

(b) Halophytes are plants that live in salt marshes.

(i) Explain why it is necessary for halophytes to have osmo-regulatory

The internal osmotic pressure of the cell sap of halophytes is lower than that of the surroundings; water so they are likely to lose water by omosis leading to dehydration or and suffer from a physiological drought;

(ii) Suggest how halophytes are adapted for living in salt marshes.

- *They store water in succulent tissues;*
- *Some excrete excess salts through salt glands in their leaves / shed of their leaves;*
- *Some can tolerate high salt concentrations;*
- *Actively absorb salts into their roots or root cell sap has higher solute concentration that surrounding water.*

43. (a) Distinguish between apical and lateral meristems. (02 marks)

Apical meristems are those found in the root and shoot apex and bring about primary growth; while lateral meristems are those found in the outer parts of the stem and they bring about secondary growth;

Award 2 or 0, accept increase in length, increase in girth of stem

(b) How do each of the following tissues bring about growth in higher plants?

(i) Apical meristem. (04 marks)

The apical meristem is found at the root and shoot apex; the cells of the apical meristem or initial divide by mitosis; producing daughter cells one of which remains in the meristem while the others increase in size; and differentiates to become part of the permanent plant body; thus apical meristem causes increase in length of the plant by increasing the number of cells and their size of cells;

OR

The apical meristem contains the funica part and corpus part; the tunica cells divide by mitosis; at right angles to the surface which <u>lenthens</u> the stem papex; the corpus cells divide by mitosis parallel to the surface which broadens the stem apex;

Award mitosis once.

(ii) Vascular cambium. (04 marks)

- *The vascular cambium consists of fusiform and ray initials; the fusiform initials divide by mitosis; to form secondary phloem to the outside and secondary xylem to the inside; the amount of xylem produced is greater than the amount of phloem; the ray initials divide by mitosis producing parenchyma cells which accumulate to form rays between neigbouring xylem and phloem; thus successive divisions result into increase in girth; of the stem.*

Mark division by mitosis once

44. (a) Give three characteristics of chromosomes in diploid cells. (03 marks)

- *Exist in pairs;*
- *Have the same length;*
- *Have the same size*
- *Have same number of genes / genotypes;*
- *Their genes are arranged in the same order / sequence*
- *Each member of the pair comes from a different parent; (one from mtoerh and other from father)*

Any 3 x 1 mark @

*(b) Figure **5** shows a stage of cell division.*

(i) Giving a reason, identify the stage of cell division. (03 marks)

Prophase I; of meiosis; this is due to the presence of chiasma / biralents / paired homologoes; owtte

3 x 1 mark @

Reject prophase I alone

Without type of division

(ii) From the figure, explain how the behavior of chromosomes contributes to genetic variation. (04 marks)

The non - sister chromatids are in contact / presence of chiasma; allows the chromatids to exchange genes / equivalent portions of chromosomes; which separates linked genes / produces new linkage groups / leads to gene mixing; thus producing varied garments / gametes with new gene combinations;
4 x 1 mark @

Reject whole answer if evidence of chiasma not mentioned at 1st by candidate.

*45. Figure **6** shows*

(a) From the figure, state two differences in the behavior of haemoglobin of the two animals. (02 marks)

Haemoglobin of animal A is fully saturated at lower partial pressure of oxygen than that of animal B;
Haemoglobin of animal A contains more oxygen than that of B throughout;

2 x 1 mark @ owtte

(b) Explain the advantages of the position of the dissociation curve for each animal in its habitat.

*(i) Animal **A**. (04 marks)*

The curve for animal A is situated on the left; because haemoglobin of A has a higher affinity for oxygen; so that it can readily reach full saturation or maximum saturation; at lower oxygen partial pressures found at the bottom of the sea; 4 x 1 mark @

*(ii) Animal **B** (4 marks)*

The curve for animal B is situated on the right side; because haemoglobin of B has a lower affinity for oxygen; since it lives in the surface waters of the sea which have <u>plenty</u>

of oxygen and its haemoglobin can readily release oxygen to the tissues to sustain high level of activity; 4 x 1 mark @

*46. (a) Give **one** characteristic of cells where active transport occurs. (01 mark)*

- *Have <u>numerous</u> mitochondria*
- *Have high concentration of ATP;*
- *Have a high respiratory rate;*
- *Any 1 x 1 mark @*

(b) How does active transport occur across the plasma membrane? (05 marks)

Active transport takes place by means of carrier proteins that span the entrie cell membrane; the molecule to be transported attaches onto the carrier protein on the outside of the membrane; causing the protein to change shape / configuration; the substance is then transported through the carrier to the inside of the cell; ATP attached on the carrier is hydrolysed and energy is released; that causes the carrier to release the substance to inside; this eventually causes the carrier to revert to its original shape / configuration; (ready to pick up another molecule). Any 6 x 1 mark @

(c) Explain the role of each of the following processes in cells.

(i) Exocytosis (02 marks)

Secretion of pancreatic enzymes;

- *Exporting materials needed to form new cell walls in plants;*
- *Excretion of wastes out of cells / elimination of undigested remains from phagocytotic vacuoles; any 2 x 1 mark @*

(ii) Endocytosis (02 marks)

Human egg cells take up nutrients from surrounding follicle cells by pinocytosis;
Follicle cells of thyroid gland take up thyroglobin by pinocytosis;
White blood cells destroy harmful bacteria b phagocytosis;
Feeding in amoeba occurs by phagocytosis
Any 2 x 1 mark@

END