

FORM FOUR CLUSTER KCSE MODEL 2

BIOLOGY PAPER 2 ANSWER

SECTION A (40 Marks)

Answer all questions in the spaces provided after every question.

1. (a) A-Lenticel.

B-Cork cambium.

(b) X-Carbon (IV) oxide.

Y-Oxygen.

(c) Undergoes mitosis to produce new cork cells.

(d) Respiration.

(e) Mineral ions are absorbed by active transport which requires energy; low oxygen concentration leads to less respiration hence little or no ATP is produced. 2

2. (a) Primary oocytes;

(b)(i) Germinal epithelium;

(ii) Mitosis;

(c) (i) Oestrogen;

(ii) Healing and repair of the uterine wall following menstruations; stimulates the pituitary glands to secrete luteinizing hormone;

(d)(i) Funnel of fallopian tube/oviduct;

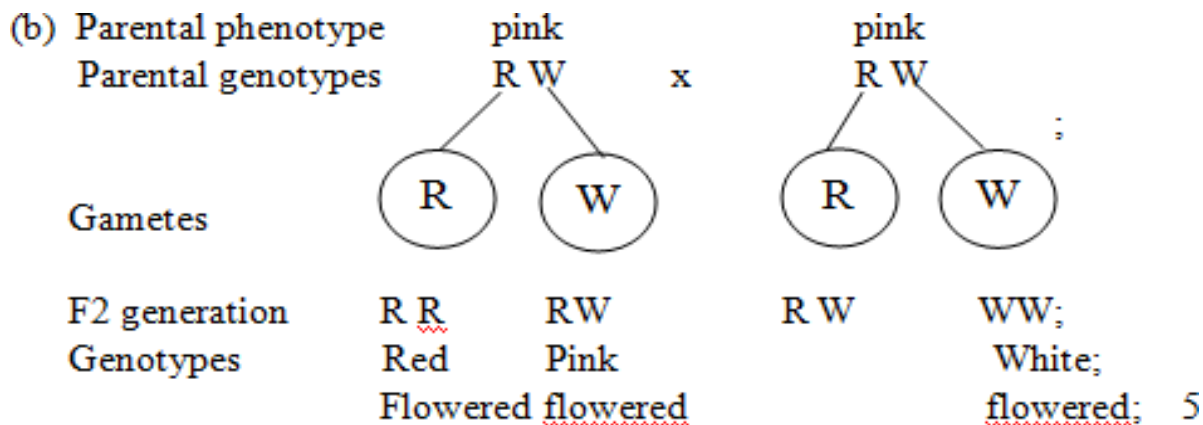
(ii) Luteinising hormone;

3. (a) (i) Outward expression of a gene/outward appearance of an organism;

(ii) Alternative form of the same gene occupying a given position on a chromosome;

(iii) A recessive gene is a gene that can only express itself phenotypically in the Homozygous state

e.g. tt



4. (a) Villus; Rej villi (1)

(b) To provide large surface area for absorption of digested food; (1)

(c) A-Microvilli; Rej microvillus (1)

B-Lacteal; (1)

C-Blood vessel; (1)

(d) (i) Succusm entericus/Intestinal juice;(1)

(ii) Maltase; Lactase; sucrose; Peptides; (2) (Any two correct)

5. 5.(a)(i) Positive thigmotropism; (1)

(ii) Auxins; (1)

(b) Contact with the tree trunk causes lateral migration of auxins towards the outer part of the twinning stem; Higher auxin concentration causes faster growth; so outer part grows faster to coil around the tree trunk; 2=2

(c) (i) Gibberellins; cytokinins; (2)

(ii) Gibberellins stimulates rapid cell division leading to root and stem elongation; Cytokinins

enhance cell division hence lead to root and stem elongation; (2)

SECTION B (40 Marks)

Answer question 6 (compulsory) in the spaces provided and either question 7 or 8 in the spaces after question 8.

6. (b) 37.50 C (1)

(c)

(i) 150 C -350C

-As the temperature increases the enzymes became more active; it therefore took less time to

decompose all the hydrogen peroxide; (2)

(ii) 350 C-400C –This is the optimum temperature for the enzyme because its rate of activity was its highest; hydrogen peroxide was decomposed within a very short time; (2)

(iii) 400 C -500 C -Temperature are too high; and cause the enzyme to get denatured; hence Hydrogen peroxides takes longer time to be decomposed; (3)

(d) Catalase enzymes e.g.

-Enzyme concentration;

-Substance concentration;

-Presence of inhibition;

-pH.

(f) Competitive inhibitor;

Non- competitive inhibitors;

7. Fossil study (paleontology); Fossils describes ancestral forms of organisms that were accidentally preserved in naturally occurring materials such as sedimentary rocks/ and resins; They provide direct evidence of gradual change from one type of organism to another; They are preserved in sedimentary rocks in layers; lowest oldest layers contain oldest fossils while uppermost younger layers contain recent fossils; Fossils show morphological changes of given organisms over long period of time; e.g. human skull/leg of a horse;

Earliest fossils were those of monera, followed by protista then fungi. Comparison of fossils of different organisms may give phylogenetic relationship between organisms; Comparative anatomy.

This brings out comparison between anatomical structures of living organisms using different structures e.g. Homologous structure which imply same ancestry at some time of evolutionary history; One structure can give rise to various forms that are different-this is called divergent evolution; Divergent forms same ancestry become adapted to particular function; Divergent forms from same ancestry become adapted to particular function; Divergent forms from same ancestry become adapted to a particular function adaptive radiation; examples are pentadactyl limbs present in vertebrates, beak structures in birds etc. Analogous structures (convergent evolution) show how adaptation to similar environment can lead to a similarity in structure and function in unrelated organisms; e.g. wings of birds and wings of insects, eye structure of human and octopus; Vestigial structures are structures that have ceased to function or are rudimentary (greatly reduced) in course of evolution; As were selected against as animals became adapted to different models of life; examples –caecum and appendix in man, coccyx in man, nictitating membrane in mammals; Comparative embryology; -embryos of different vertebrate species have many common features, suggesting a common ancestry; e.g. all vertebrate embryos have tails, all vertebrate embryos have a gill as some developmental stage.

The closer the resemblances between the early stage of embryos the closer their evolutionary relationship. The shows or indicating same ancestry or phylogeny; Cell biology; -all eukaryotic

cells contain cell organelles as mitochondria, lysosomes etc., They also have similar chemicals like ATP, RNA and DNA; √This indicates a common ancestry; √Blood pigments e.g. haemoglobin, haemocyanin, thyoglobin etc. are present in most animals; plant cells have cellulose cell wall, chloroplast, sap vacuoles etc. indicating common ancestry; √Comparative serology; √Blood (antigens and antibodies) and their reactions in different animals show phylogenetic relationship; antibody antigen reaction in an immunological reaction leading to precipitate formation when blood sera of different organisms are mixed shows common ancestry; √The greater the amount of precipitate formed in two different animals the closer the phylogenetic relationship; Geographical distribution; √Initially, the earth was one land mass called Pangea;

√Due to plate tectonic forces, it split into present day continents (continental drift) ; √Before the split, areas had similar climates; after split, members of some spheres became isolated, by barriers and complied different regions evolving along different lines; √and leading to formation from those found in other areas;

(24 marks) (Max 20)

8. Inhalation:

External intercostal muscles contract; √while the internal intercostal muscles relax; √This action raises the rib cage upwards; √and outwards; √diaphragm muscles contract; √hence it flattens; The volume of the thoracic cavity increases; √causing the pressure inside to decrease; √Higher pressure in the atmosphere forces air into the lungs; √through the nostril; √trachea/bronchi the bronchioles; √into the lungs)

Exhalation

Internal intercostal muscles contract; √while external intercostal muscles relax; √This action lowers the ribcage downwards and inwards; √The diaphragm to assume dome shape; √The volume of the thoracic cavity decreases; √while the pressure within increases; √higher pressure in thoracic cavity than the atmosphere ; √forces air out of the lungs; √through the trachea; √then nostrils; √

(22max) max 20