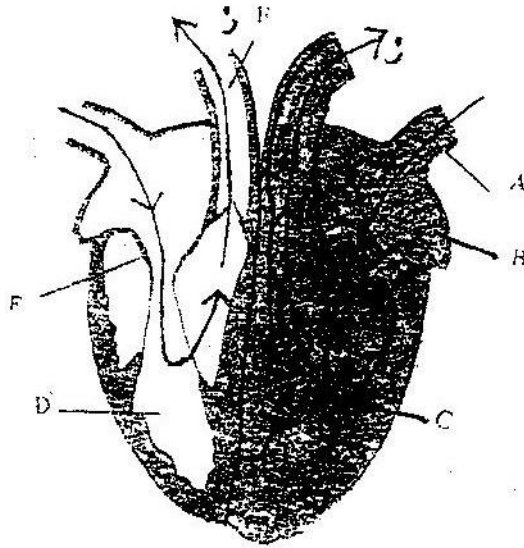


**K.C.S.E 2004 MARKING SCHEME
BIOLOGY PAPER 231 /1**

1. a) Intervertebral disc.
b) -Act as a cushion / absorbs shock;
- Reduce frictions; flexibility of the vertebral column. Rej. prevent avoid.
2. - Natural immunity is inherited / transmitted from parent to offspring;
- Acquired immunity is developed after suffering from a disease / thought vaccination.
* Accept innate / inborn for natural Rej. Born with it.
3. Has air spaces; which store gases for gaseous exchange buoyancy;
Acc. Floating.
4. -Ethanol / Alcohol
-Energy / ATP/ 210kj / heat;
Rej. atp, formula of alcohol.
5. Prophase 1;
6. a) Myopia/ shortsightedness / short sight
b) Concave lens / divergent lenses; to diverge the rays so that the image is focused on the retina Acc. Concave.
7. a) Stores hydrolytic enzymes for destruction of worn out organelles / cells / tissues / digestion of bacteria. / pathogens;
Acc. Digestion of food / accept autolysis.
b) processing / packaging synthesized and transporting of packaged cell materials;
Production of lysosomes/ secretions of packaged material;
8. Insecta; Rej insects/ exopoda
9. Nitrogen;
Magnesium;
Iron, acc. Magnesium ion/ iron rej symbols of elements
10. Thickened walls/ lignified accept lignin
11. Parthenocarpy
12. (a) RR WW
(b) Parental genotypes RW
Gametes R W X WW
R W
Fertilization
Offsprings RR RW RW WW
(c) (i) Phenotypic ration Red Pink White
1 2 1
(ii) 1RR : 2RW; 1WW
(a) (ABO) blood grouping; blood groups; reject Rh factor
13. (a) A Pulmonary vein
B Left atrium I auricle
E Tricuspid valve
F Pulmonary artery

(b)



- (a) The left ventricle 'C' pumps blood a longer distance to all parts of the body; while the right ventricle 'D' pumps blood to a shorter distance/ to the lungs; therefore the left ventricle has thicker walls to generate exert more pressure.

14. (a) Lamarckian

Inheritance of acquired characteristics/ Environment induces production of inheritable character which is then inherited.

Darwinian

Inheritance of genetically acquired characteristics/ character happens to appear spontaneously which then gives advantage to organisms therefore better-adaptable characters are then inherited by natural selection.

- (b) (i) Have a common (embryonic) origin modified to perform different functions; vertebrae for limb/ pentadactyl limb
Example
Vertebrate fore limb/ pretadactyl limb; acc beaks of birds (fee of birds/ mouthparts in insects.
- (ii) Have different (embryonic) origins (but have evolved) to perform similar functions.
- (iii) Are greatly reduced in size and therefore caused to function
Acc. Third digit of wing of bird
- Halteres in flies
 - Presence of hind limb (buds) in python
 - Human ear muscles

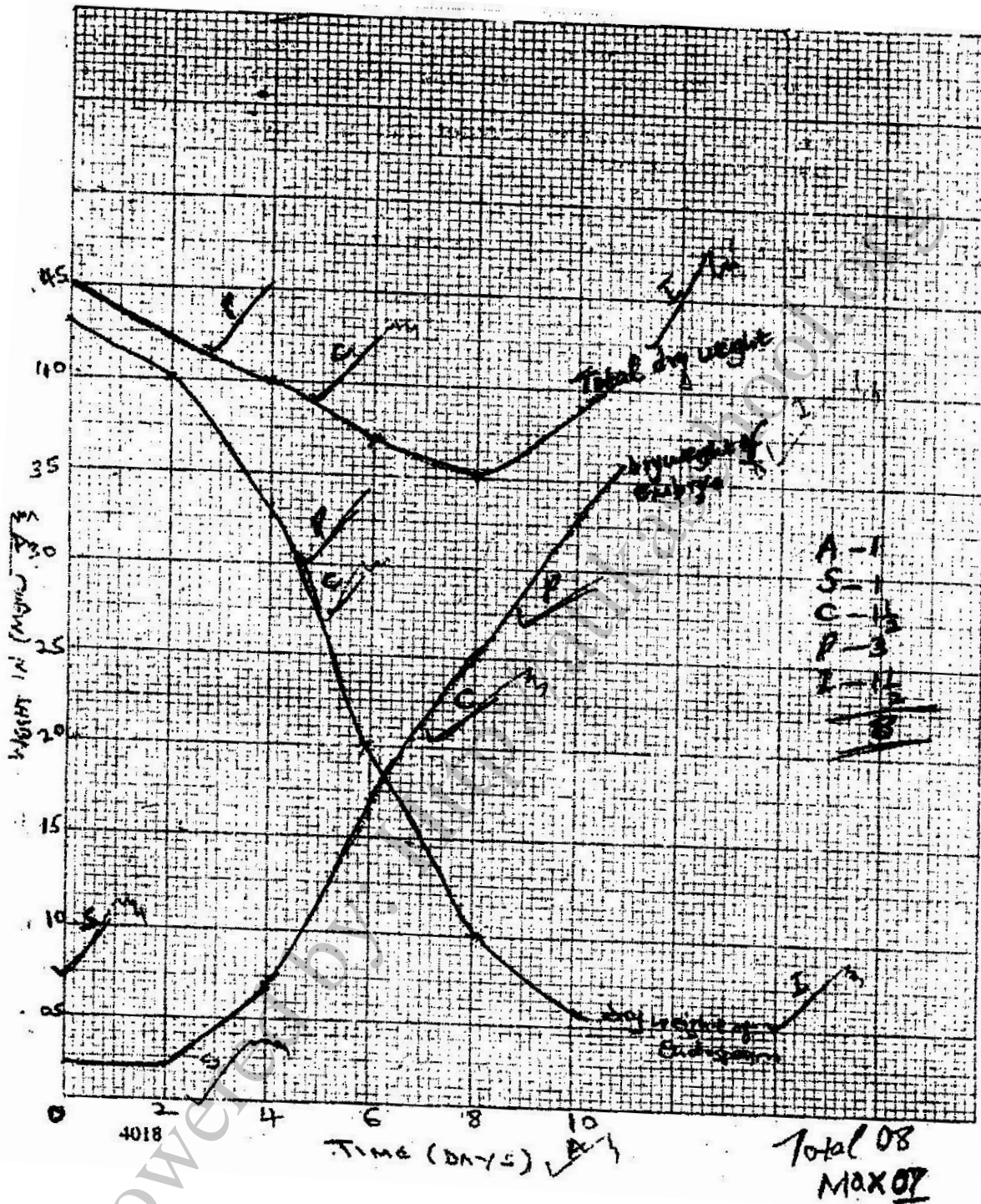
Example

Human appendix / kiwi (flightless bird) with reduced wings/ vestigial wings in flies human hair/ presence of hind limbs in python; reduced pelvic girdle of whale.

15. (i) anther Insect Wind
Small short anther firmly Large/ long anthers/ loosely attached to
Attached to elements filaments

- (ii) Large heavy/ spiky small/ light/ smooth
- (iii) Small/ sticky Long feathery
- Reject short stigma/ negative comparisons
- (b) Source of variation/ hybrid acc. Production of hybrid
Rej heterosis/ vigour
16. (a) The movement of molecules; from a region of high concentration to a region of low concentration; until the molecules are uniformly distributed in the medium) Acc. Particles for molecules;
Rej substance for molecules
- (b) (i) The higher diffusion gradient between (two points) the rate of diffusion; acc converse.
- (ii) The higher the surface area:: Volume ratio, the faster is the rate of diffusion ; acc converse
- (iii) Increasing temperature increases the rate of diffusion; acc converse.
- (c) Reabsorption of glucose/ some salts in the kidney/ by kidney tubules;
- Absorption of digested food/ from the alimentary canal
- Reabsorption of useful material in the blood stream
- Accept sodium pump mechanism in the nervous system, the nerve cell
Rej. Sodium pump mechanism alone.

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(b) 38.5 (mg); Acc. + 0.5 (i.e. 38 – 39)

(c) (i) Hydrolysis of starch into simple sugars; which are translocated to the embryo;

Respiration/ to give energy/ heat/ gases

Acc. Simple sugar oxidized

Rej. Oxidation of starch/ endosperm.

(ii) New materials are synthesized from protein); bringing about growth of embryo; acc new cells/ protoplasm synthesized

(iii) The rate of respiration is faster than that of synthesis of materials for growth

(iv) First leaf (carried out photosynthesis) leading to growth

(d) (i) Presence of abscisic acid/ germination inhibitors;

Embryo not fully developed

Absence of hormones/ enzymes that stimulate germination

Impermeable seed coat; rej hard seed coat

Acc. Inactive enzymes/ hormones/ absence of gibberellins/ cytokinins.

(ii) – Unsuitable / unfavourable temperature

- absence of light
- lack of water
- lack of oxygen
- rej. Premature for immature

(b) Dense cytoplasm

- Thin cell wall
- Absence of vacuoles (cell sap)

18. The skin is made of epidermis and dermis. The epidermis is made up of three layers. The outermost layer is known as cornified layer; made up of dead cells that protect against mechanical damage/ desiccation/ microbes; the granular layer; is made up of living cells that give rise to the cornified layer, the malpighian layer; contain actively dividing cells that rise to new epidermal cells, that contain melanin that protects the skin against ultra violet rays.

- The dermis has several components has sweat glands' sudorific glands that produce sweat; sweat evaporates carrying it with latent of vaporization) thus reducing the body temperature; under cold conditions little/ no.
- Sweat is produced thus heat is conserved; the sweat contains water/ sodium chloride/ uric acid/ urea; the skin is excretory organ.
- Has hair, the hair stands erect to trap air when temperature is low to reduce heat loss/ lies flat to allow heat loss when the temperature is high.
- Has nerve endings, which are sensitive to stimuli/ such as heat/ cold/ pain/ pressure/ touch
- Has subcutaneous fats/ adipose tissue, that insulate the body against heat loss.
- Has arteriole; that vasodilate when temperature are high to lose heat by radiation/ convection (see converse)
- Has sebaceous gland; which secrete sebum, an antiseptic/ water repellent/ that prevent drying/ cracking of skin/ skin supple
Acc blood vessels/ capillaries for arterioles to supply food/ nutrients/ oxygen/ remove excretory products.

19.

Wind.

In windy conditions the rate of transpiration increases; wind disperses fruits/ seeds; is an agent of pollination; acc. Spores for seed.

Temperature

Changes in temperatures affects the rate of photosynthesis and other biochemical reactions/ metabolic reactions/ enzymatic reactions/ enzymatic reactions, temperature increases rate of transpiration;

Lights

Plants need light for photosynthesis, some plants need light for flowering/ photoperiodism/ seeds like lettuce require light for germination.

Humidity

When humidity is low, the rate of transpiration increases;

PH

Each plant requires a specific pH to grow well/ acidic/ alkalinity/ neutral;

Salinity

Plants with salt tolerant tissues grow in saline area, plants in estuaries adjust to salt fluctuations;

Topography

North facing slopes in temperate lands have more plants than south facing slope

Plants on windward side have stunted/ distorted growth;

Acc. Comparisons of mountains and valleys

Acc. Description of other areas with other topographies e.g. River valley rainfall/ water

- Fewer plants in areas/ semi arid and
- Water is needed for germination/ is a raw material for photosynthesis/ dissolves/ minerals salts/ provides turgidity for support/ fruits/ seeds

Pressure;

Variation in atmospheric pressure affect availability of CO₂ which affects photosynthesis and low pressure increase rate of transpiration; and affect amount of oxygen; for respiration

Mineral salts/ trace elements

- Affects distribution of plants in the soils
- Plants thrive well where there are mineral salts in the soil

Plants living in the soil deficient in particular mineral element have special methods obtaining it; for example legumes obtaining from nitrogen by fixation or carnivorous.