

END TERM 3 2026
231/2
FORM 3
2 HOURS
MARKING SCHEME

1.

a)

A – hepatic artery;

(1 mk)

B – hepatic portal vein;

(1 mk)

b)

(i) B;

(1 mk)

(ii) B;

(1 mk)

(iii) C;

(1 mk)

c) During fasting no glucose from the alimentary canal making glucose concentration in vessel B low;

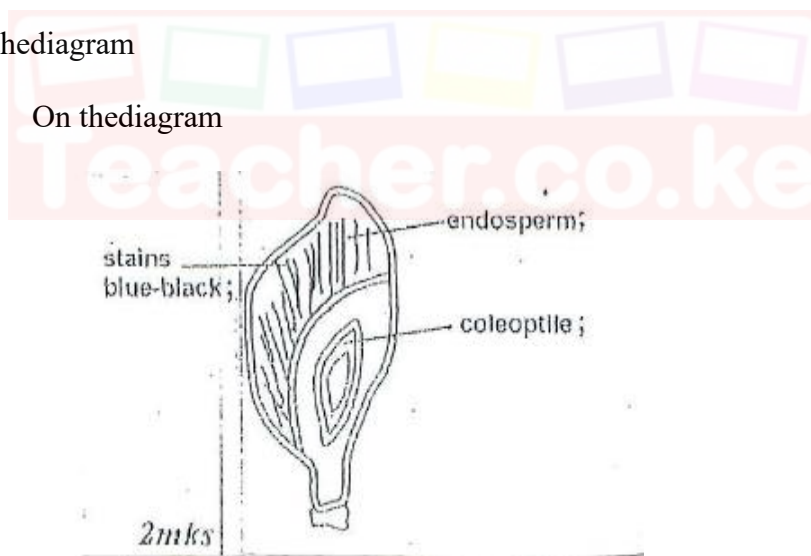
Vessel C obtains glucose derived from the hydrolysis of glycogen in the liver; (2 mks)

2.

a) On the diagram

b)

(i) On the diagram



2mks

(1 mk)

(ii) Has starch/ starch stored in endosperm;

(1 mk)

c) Has two scars;

(1 mk)

Presence of pericarp; (award for one only)

- d) Protects the radicle from mechanical damage; (1 mk)
 e)
 (i) Hypocotyl elongates faster upwards pulling the cotyledons and plumule out of seedcoat/ and out of the soil; (1 mk)
 (ii) Required for respiration/ oxidation of stored food to release energy; (1 mk)

3.

- a) Diffusion; (1 mk)
 b) The starch would change colour to blue black; the level of the starch solution in the capillary tube would rise; (2 mks)
 c)
 (i) The level of sucrose solution in the capillary tube would rise; (1 mk)
 (ii) Water moved into the visking tubing by osmosis; because the sucrose solution is hypertonic to the distilled water; (2 mks)
 d)
 (i) Osmotic pressure is the tendency of a solution to take up water from another solution when separated by a semi-permeable membrane; (1 mk)
 (ii) It is the tendency of water molecules to diffuse out of a solution; (1 mk)

4.

- a)
 - Increases its speed/rate of beating; (i.e. contraction and relaxation);
 - It also increases its strength of contraction and relaxation. (2 mks)
 b) To increase oxygen supply to the tissues; to break lactic acid into water, carbon (IV) oxide and energy; (2 mks)
 c)
 (i) Mitochondrion; rej. Mitochondria. (1 mk)
 (ii) Matrix; (1 mk)
 (iii) To increase surface area for attachment of respiratory enzymes; (1 mk)
 (iv) Adenosine triphosphate; rej. abbreviations (1 mk)

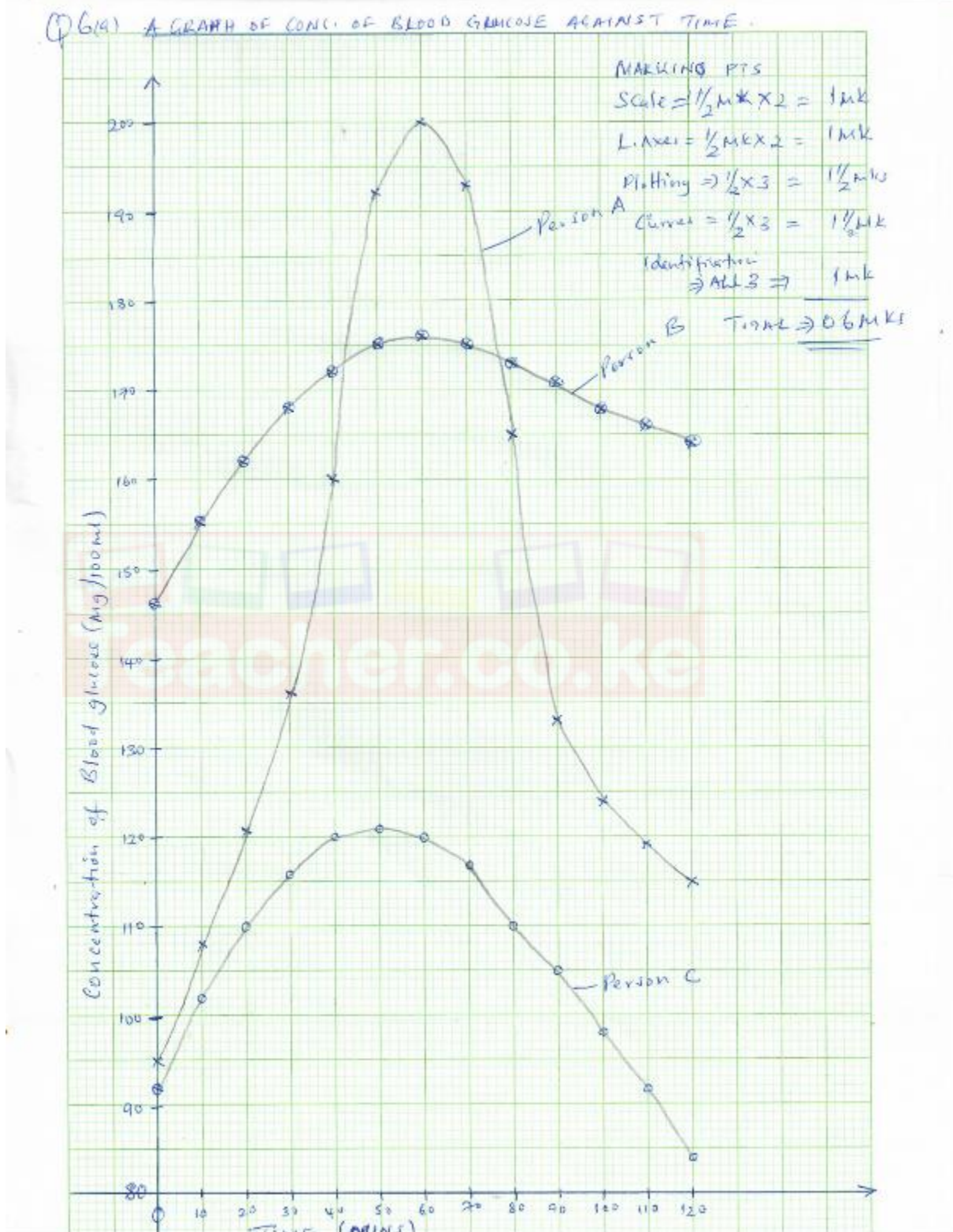
5.

- a)
 - Air is warmed up in nostrils;
 - Controlled amount of air is taken in through nose
 - Individual is able to detect the smell of air breathed in;
 - Air is filtered by hairs and mucus;
 NB. MARK THE FIRST 3. (3 mks)
 b)
 (i) Pneumococcus;
 (ii) *Bordetella pertussis*; rej. If rules of binomial system not followed
 (iii) Allergens; acc. An example of any allergen e.g. dust/ pollen grains. (3 mks)
 c) During the night no photosynthesis by plants hence carbon (IV) oxide not utilized; only respiration takes place leading to competition for oxygen between the plants and man for respiration thus accumulation of carbon (IV) oxide to dangerous levels. (2 mks)

6.

a) On the graph paper

(6 mks)



- b) Regulation of sugar; (1 mk)
- c)
- (i) Gradual increase in sugar level/ glucose level; due to further absorption from the gut into the blood stream, than the rate of assimilation /rate of assimilation is lower than rate of absorption; (2 mks)
 - (ii) Gradual decrease; (in the level of sugar/ glucose) due to high insulin secretion by the islets of Langerhans/ pancreas; which stimulates the conversion of excess glucose to glycogen; (3 mks)
- d) Low glucose level in the blood stream than the normal level stimulates the islets of Langerhans/ pancreases; to secrete glucagon hormone which induce conversion of glycogen/ fats / reduced respiration to increase level of glucose in the blood stream; (2 mks)
- e)
- (i) The person is suffering from Diabetes mellitus (due to less insulin production to lower blood glucose in the blood stream) (1 mk)
 - (ii) Regular injection with synthetic/ artificial insulin; (1 mk)
 - (iii) Food rich in proteins;
Avoid carbohydrates which provide glucose in the blood stream; (2 mks)
- f)
- Osmotic pressure regulation/osmoregulation
 - Temperature regulation/ thermoregulation
 - Ionic balance
 - Regulation of pH (2 mks)

7.

- a) Excretion is the elimination of waste products that arise as a result of metabolic reactions in an organism; while egestion is the removal of undigested materials from the gut through the anus; (2MKS)
- b) Ultrafiltration
- Takes place at the Bowman's capsule;
 - The efferent vessel is narrower than the afferent vessel; making pressure at the Bowman's capsule high; this high pressure causes ultrafiltration; to occur within the glomerulus; the filtrate gets into the capsular space; the filtrate is now called glomerular filtrate;
 - The filtrate consists of urea, glucose, mineral salts' water and vitamins;
 - Large particles like plasma proteins and blood cells are not filtered.
- Selective reabsorption
- The GF gets into the proximal convoluted tubule; where useful substances such as ALL glucose;, amino acids, salts, some water and vitamins are selectively reabsorbed; into the blood capillaries by active transport;
 - Selective reabsorption uses energy provided by the numerous mitochondria found in cells lining the tubules;
 - The GF gets into the loop of Henle; where water is reabsorbed into the bloodstream by osmosis;

- The GF then flows into the distal convoluted tubule; hydrogen ions are absorbed from the blood into the GF for excretion; This happens when there is a high concentration of the ions in the blood;
 - More water and mineral salts are reabsorbed back into the blood stream;
 - Reabsorption of salts is under the influence of aldosterone; and reabsorption of water is under the influence of antidiuretic hormone; Reabsorption of water also takes place at the collecting duct by osmosis as the renal fluid passes down;
 - The glomerular filtrate that remains passes into the collecting duct; which leads to the pelvis; then to the ureter; the GF now referred to as urine flows to the urinary bladder; (Urea is not reabsorbed into the blood.)
- Urine is then passed out of the body through the urethra; (27 MAX 14 MARKS)
- c) Glomerular capillaries have numerous pores large enough just to let through urea, water, amino acids, glucose, but not plasma proteins and blood cells;
- The kidney has numerous nephrons for efficient excretion;
 - Proximal and distal convoluted tubules are folded to increase the surface area for reabsorption;
 - Cells lining the tubules contain numerous mitochondria to provide energy for active transport during selective reabsorption;
 - The inner surfaces of the epithelium cells of the kidney tubules have numerous microvilli increasing the surface area for reabsorption;
 - The kidney tubule is well supplied with blood capillaries for transport;
 - The coiling of the tubule reduces the speed of the flow of the filtrate; giving more time for efficient reabsorption;
8. Follicle stimulating hormone (FSH);
- Stimulates the development of a Graafian follicle from a primary follicle;
 - Stimulates the follicular cells to start secreting oestrogen;
- Luteinizing hormone (LH);
- Brings about ovulation;
 - Induces the remains of the Graafian follicle to form the corpus luteum which produces progesterone;
- Oestrogen;
- Stimulates the repair and healing of the uterine wall following menstruation;
 - Stimulates the production of LH by the anterior pituitary gland;
 - Stimulates the thickening of the uterine wall to maintain pregnancy;
- Progesterone;
- Slows down the production of FSH and LH;
 - Cause increased thickening of uterine wall;
 - Stimulates the preparation of the uterus for implantation ;and maintain pregnancy;
- Testosterone;
- Stimulates the development of the sperms; and responsible for male secondary sexual characteristics;
- Prolactin;
- Stimulates the secretion of milk by the mammary glands;
- Oxytocin;
- Causes the contraction of the muscles of the uterus during birth;
- Androgens;

- (Male sex hormones such as testosterone that) stimulate the development of testes; and male secondary sexual characteristics;

(NB:21 MAX 20MKS)

