

SECTION B (30 MARKS)

Answer all questions in this section.

Write the letter representing the most correct answer to each question, in the box provided.

1. Small sized plants with under developed yellow leaves is due to deficiency of .

- A. Zinc.
- B. Calcium.
- C. Nitrogen.
- D. Potassium.

2. Birds with long pointed beaks have evolved to feed on.

- A. Nectar.
- B. Seeds.
- C. Nuts.
- D. Fresh.

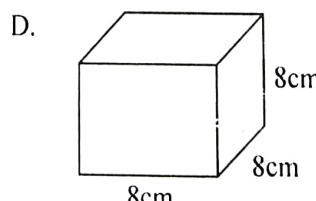
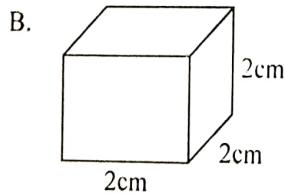
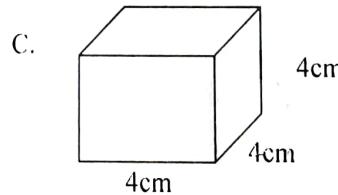
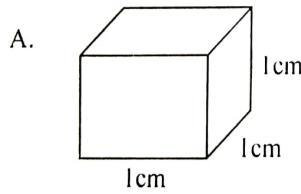
3. Which of the following shows the correct flow of deoxygenated blood to lungs?

- A. Posterior venacava → Aorta → Pulmonary vein.
- B. Hepatic vein → Posterior venacava → Pulmonary artery.
- C. Aorta → Posterior venacava → Pulmonary artery.
- D. Aorta → Hepatic vein → pulmonary vein.

4. Succus entericus is secreted by

- A. Salivary gland.
- B. Pancreas.
- C. Stomach walls.
- D. Walls of small intestines.

5. Which of the following cubes would take in the highest quantity of dye, when all are immersed at the same time?



6. Which one of the following human blood groups lacks antibodies in its serum?

- A. O
- B. A
- C. AB
- D. B

7. The associations between fungi and plant roots are called

- A. Parasitic.
- B. Commensalism.
- C. Saprophytism.
- D. Mycorrhizae.

8. In a plant leaf, gaseous exchanges occurs in the
A. Palisade layer.
B. Mesophyll.
C. Upper epidermis.
D. Lower epidermis.

9. Which one of these is located in the dermis of the skin?
A. Sebaceous gland.
B. Malpighian layer.
C. Granular layer.
D. Cornified layer.

10. Organisms in cold areas are characterized by
A. small size.
B. hairless body.
C. small extremities.
D. large ears.

11. Which one of these is the least concentrated in urine than in plasma.

Substance	% in plasma	% in urine
A: Sodium	0.3	0.35
B: Chloride	0.4	0.6
C: Urea	0.03	2.0
D: Uric Acid	0.004	0.05

12. Which one of the following does not directly affect the pH of the soil?
A. Absorption of bases by plant roots.
B. Production of carbon dioxide by plant roots.
C. Leaching.
D. Water logging.

13. Which one of these is an effector?
A. Ear.
B. Eye.
C. Skin.
D. Intestinal wall.

14. Which set of pairs of organisms is endothermic?
A. Mammals and amphibians
B. Mammals and birds.
C. Amphibians and birds.
D. Fish and reptiles.

15. The following results were obtained during an experiment to determine the amount of air in soil. Soil = 20cm^3 , Water = 30cm^3 , Water and soil after stirring = 45cm^3 . What was the percentage of air in the soil?
A. 10%.
B. 20%.
C. 25%.
D. 30%.

16. If a diploid number of chromosomes of a certain species is 20, what would be the number of chromosomes from its skin cell?
A. 40.
B. 20.
C. 5.
D. 10.

17. In which region of the mammalian vertebral canal does the pairing up of homologous chromosome occur?
- A. Neck.
B. Lumber.
C. Thoracic.
D. Sacrum.
18. At what stage of meiosis does the pairing up of homologous chromosome occur?
- A. Prophase II.
B. Prophase I.
C. Metaphase I.
D. Metaphase II.
19. In the colonization of a bare rock, the next most likely groups of plants after the lichens are the;
- A. Trees.
B. Shrubs.
C. Grasses.
D. Mosses.
20. Which one of the following is richest in iron?
- A. Liver.
B. Milk.
C. Butter.
D. Cheese.
21. Which one of these is the functional part of the kidney?
- A. Cortex.
B. Pelvis.
C. Medulla.
D. Nephron.
22. Slow rate of repair of the uterine wall after menstruation in mammals is due to deficiency of;
- A. Luteinizing.
B. Progesterone.
C. Oestrogen.
D. Follicle stimulating hormone.
23. Which one of these is a dry indehiscent fruit?
- A. Berry
B. Caryopsis
C. Legume
D. Capsule
24. Which one of these modes of reproduction is sexual?
- A. Conjugation
B. Spore formation
C. Budding
D. Fragmentation

25. Which one of these farming practices cause soil exhaustion?
 A. Strip cropping.
 B. Crop rotation.
 C. Mono culture.
 D. Mulching.
26. Which one of the following organs excretes urea?
 A. Bladder.
 B. Lungs.
 C. Liver.
 D. Tongue.
27. Which one of the following would not contribute to the accuracy of the capture-recapture method of estimating population size?
 A. Using a stable population.
 B. Using a small mark.
 C. Allowing time before the recapture.
 D. Capturing animals selectively.
28. Which one of the following is NOT an adaptation of a leaf for absorption of carbondioxide.
 A. Presence of air space in mesophyll layer.
 B. Presence of chloroplasts.
 C. Its exposure to air.
 D. Its thinness. .
29. Control of rolling in fish is by
 A. dorsal and anal fins.
 B. pectoral and pelvic.
 C. pectoral and anal fins.
 D. caudal and dorsal fins.
30. A hormone secreted in the body in the event of danger is
 A. Secretin.
 B. Thyroxine.
 C. Adrenaline.
 D. Insulin.

SECTION B

Answer **all** questions in this section.

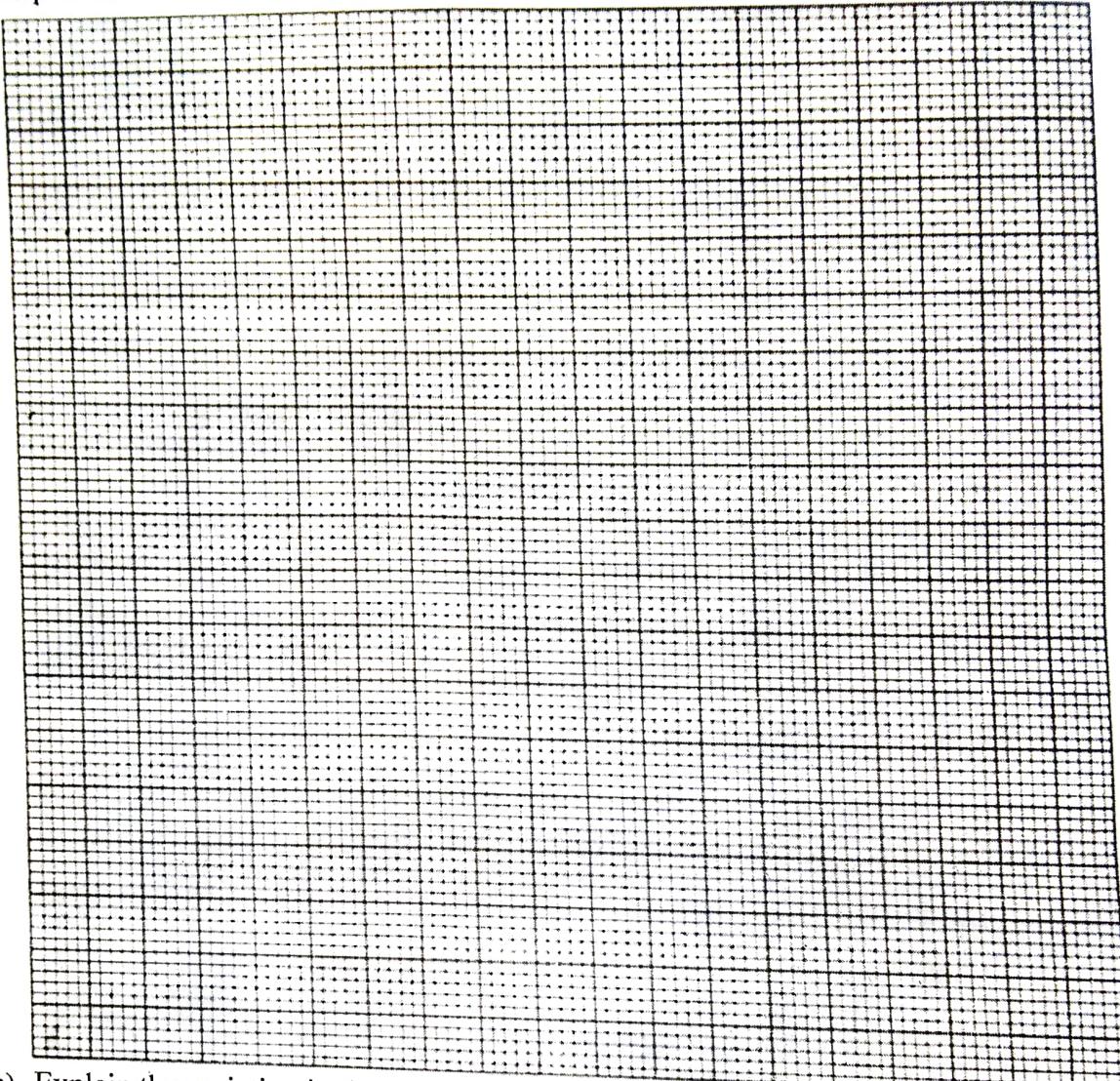
All answers **must** be written in the spaces provided.

31. A hungry person had a meal after which the concentration of glucose in blood was determined.
 This was measured hourly as blood passed through the hepatic portal vein (HPV) and iliac vein (IV) in the legs. The results are shown in the table below.

Time/ hour		0	1	2	3	4	5	6	7
Conc. of glucose (mg/100 cm ³ of blood)	HPV	85	85	140	130	110	90	90	90
	IV	85	85	125	110	90	90	90	90

Turn Over

- a) Represent the above data on a suitable graph. (08½ marks)



- b) Explain the variation in the concentration of glucose in the hepatic portal vein (HPV) between;

(i) 0 – 1 hour

(02 marks)

.....
.....
.....

(ii) 1 – 2 hour.

(01½ mark)

.....
.....
.....

(iii) 2 – 5 hour.

(01½ mark)

.....
.....
.....

(iv) 5 – 7 hour. (01½ mark)

c) Explain the differences in the concentrations of glucose in the hepatic portal vein and iliac vein between 2-4 hours. (05 marks)

32. a) The cell sap of plant cells is usually 0.3M when contracted. Explain what would be observed if such plant cells were placed in
(i) 0.2M solution. (03 marks)

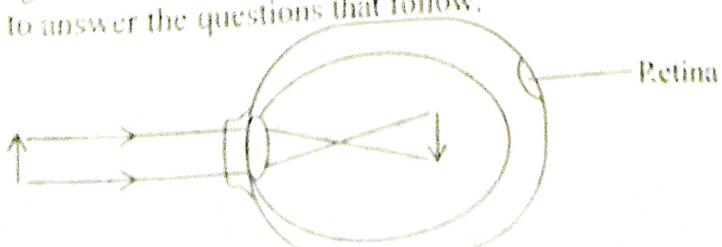
(ii) 0.4M solution (03 marks)

b) Explain the effects of taking sea water at 3% salt concentration by a person whose blood salt concentrate is 1%. (03 marks)

c) Name one area in the human body where the physiological process in 33(b) above applies. (01 mark)

33. a) Describe the changes in a shape of iris muscles as a person looks up from reading a book to see a distant object. (02 marks)

b) The diagram below shows the position of an image formed by a defective eye. Use it to answer the questions that follow.



- (i) Identify the eye defect illustrated in the diagram above. (01 marks)
.....
.....
- (ii) Explain how the defect is brought about. (03 marks)
.....
.....
.....
- (iii) Draw a labelled diagram to show how the defect is corrected. (04 marks)

SECTION C

Answer any **two** questions from this section.

Answers to these questions **must** be written in the answer booklets/sheets provided.

34. Both air and water are respiratory media.
a) Explain why air is a better respiratory medium than water. (06 marks)
b) State how each of the following systems have been modified to increase surface area for gaseous exchange.
(i) Tracheal system. (02 marks)
(ii) Mammalian lungs. (02 marks)
c) Explain why a tilapia fish suffocates immediately when it is removed from water. (05 marks)
35. a) What is meant by pollution? (02 marks)
b) Explain the effects of the different air pollutants on human health. (13 marks)
36. a) Explain how photosynthesis is of value to man. (03 marks)
b) Describe six adaptations of a leaf of a green plant for photosynthesis. (06 marks)
c) State six ways in which the process of photosynthesis differs from respiration. (06 marks)
37. a) Explain the effects of vigorous exercise on the rate of;
i) Heart beat. (05 marks)
ii) Breathing of a person. (03 marks)
b) Describe the adaptations of the heart to its functions. (07 marks)

END

- (i) Identify the eye defect illustrated in the diagram above. (01 marks)
-
.....
.....
.....
.....
- (ii) Explain how the defect is brought about. (03 marks)
-
.....
.....
.....
.....
- (iii) Draw a labelled diagram to show how the defect is corrected. (04 marks)

SECTION C

Answer any two questions from this section.

Answers to these questions must be written in the answer booklets/sheets provided.

34. Both air and water are respiratory media.
- Explain why air is a better respiratory medium than water. (06 marks)
 - State how each of the following systems have been modified to increase surface area for gaseous exchange.
 - Tracheal system. (02 marks)
 - Mammalian lungs. (02 marks)
 - Explain why a tilapia fish suffocates immediately when it is removed from water. (05 marks)
35. a) What is meant by pollution? (02 marks)
b) Explain the effects of the different air pollutants on human health. (13 marks)
36. a) Explain how photosynthesis is of value to man. (03 marks)
b) Describe six adaptations of a leaf of a green plant for photosynthesis. (06 marks)
c) State six ways in which the process of photosynthesis differs from respiration. (07 marks)
37. a) Explain the effects of vigorous exercise on the rate of;
 - Heart beat. (05 marks)
 - Breathing of a person. (03 marks)
b) Describe the adaptations of the heart to its functions. (07 marks)

END

WAKISSHA JOINT MOCK EXAMINATIONS
MARKING GUIDE
Uganda Certificate of Education
BIOLOGY 553/1



- | | | | | |
|------|---------|-------|-------|-------|
| 1. C | 7. D | 13. D | 19. D | 25. C |
| 2. A | 8. B | 14. B | 20. A | 26. C |
| 3. B | 9. A | 15. C | 21. D | 27. D |
| 4. D | 10. C | 16. B | 22. C | 28. B |
| 5. A | 11. D/A | 17. A | 23. B | 29. A |
| 6. C | 12. C | 18. B | 24. A | 30. C |

31. a) *As on the graph at the back*
- b) (i) Conc. Of glucose was low and constant; because digestion had not occurred to form glucose; for absorption; the glucose present was the original one before the meal; $\frac{1}{2} @$
- (ii) Rapid increase in glucose concentration; was due to increased digestion of food to form: glucose; and its absorption at ileum into blood stream; $1 \frac{1}{2} @$
- (iii) Decrease in glucose concentration; was due to decreasing digestion since it was almost complete; hence less glucose was being absorbed at the ileum; $\frac{1}{2} @$
- (iv) Constant level of glucose; because digestion was completed; and therefore no further absorption of glucose at the ileum; $\frac{1}{2} @$
- (c) Lower level of glucose in the ileac vein; because some glucose was removed from blood and used in the tissue respiration in liver cells; Some is converted to glycogen; for storage; some glucose is used by other organs like the heart for energy production. There is higher level of glucose in Hepatic portal vein; because it receives all the digested and absorbed glucose from the ileum directly; and none is yet used for respiration/ stored; $1 \text{ mark } @$
- 04 marks**
32. a) (i) When placed in 0.2M solution the plant cell absorbs/ takes in water; ✓ by osmosis; ✓ because plant cell is hypertonic to solution/ more concentrated to the solution; ✓ $\frac{1}{2} \text{ mark } @$
- 03marks**
- (ii) When placed in 0.4M solution the plant cell loses water; ✓ by osmosis; ✓ because plant cell is hypotonic to the solution / less concentrated to the solution; ✓

- b) The person would die; because his/her blood would drain water from tissues;
causing dehydration of the tissue; ½ mark @
03marks
- c) In kidney where water is re-absorbed/ in the colon where water is absorbed; ✓ ✓
03marks
10marks
33. a) Circular muscles of the iris contract; ✓ while the radial muscles relax; ✓ 02marks
- b) (i) Short sightedness/ myopia.
(ii) The eye ball is long; ✓ so light from distant /far object is focused before the retina; ✓ which makes the image blurred; ✓ 01mark
- (iii)
-
- 03marks
- 04marks
10 marks

SECTION C

34. a) Air is less dense than water; So less energy is needed to move air over the respiratory surface;
It has a higher oxygen content than water; So more oxygen is obtained from the little concentration/ amount of air;
Oxygen diffuses faster in air than water; So a high concentration gradient is easily maintained between air and blood;
- 01mark @
Total 6 marks
Max 5 marks
10mark
- b) (i) Tracheal system is highly branched/ divided into trchioles; to increase area for gaseous exchange;
(ii) Mammalian lungs have numerous alveoli/ highly folded; to increase surface for gaseous exchange; 1 mark @
- (c) Air is less dense than water; so when a fish is in water the gill filaments are wide spread; giving them a large surface area for gaseous exchange; but when it is in air 1 mark @

the gill filaments are closer/ collapse onto each other; reducing surface area for gaseous exchange hence easily suffocates when removed from water;

1 mark @

Total 4 marks

Max 3 marks

35. a) Pollution is the natural/ artificial addition of toxic/ harmful substances /energy to an ecosystem; to such levels that harm part or the whole of it;
- 02 marks**
- b) Effects of air pollutants on human healthy.
- smoke; reduces vision it also blackens the lining of lungs and so reduces area for gaseous exchange;
 - fog; causes respiratory disease which can cause death;
 - Sprays/ insecticides/ pesticides Cause respiratory disorder.
 - Carbon monoxide; combines with hemoglobin and reduces the capacity of blood to carry respiratory gases
 - Carbon dioxide; accumulation in the atmosphere forms a blanket preventing escape of heat to the upper atmosphere hence causing global warming;
 - Lead tetra ethyl from cars contaminates vegetation and if such plants are eaten by man affects his health by damaging brain, loss of weight and causes of anemia;
 - Nitrogen monoxide and nitrogen dioxide cause discomfort to man (like eye irritation)

Pollutant 1mark

Effect 1 mark

Rej. Effect without pollutant

Total 14

Max 13

36. a) - Photosynthesis leads to formation of oxygen needed for respiration by man;
- It maintains the level of carbondioxide in the atmosphere which would otherwise cause global warming, that in turn cause discomfort to man;
 - Provides food to man;

1 mark @

03marks

- b) - It is generally broad to increase surface area for trapping sunlight for photosynthesis;
- It is transparent to allow light penetration to chloroplasts;
 - It has waxy cuticle to prevent water loss;
 - It has phloem to transport away the manufactured food;
 - It has xylem to transport water to photosynthetic tissue;
 - Has numerous stomata to take in carbon dioxide;
 - Has many chloroplasts needed to trap sunlight energy for photosynthesis;

- Has large inter cellular air spaces for gaseous exchange during photosynthesis;

Consider the first correct 6
Description of adaption and relevance paired.
1mark@

c) Differences between respiration and photosynthesis

Respiration	Photosynthesis
Occurs in all living cells of plant animals.	occurs only in plants with chlorophyll pigment;
Occurs at all times	occurs only in presence of light;
Carbon dioxide is produced	carbon dioxide is raw material.
Oxygen is used in aerobic respiration	oxygen is a bi product.
Water is produced	water is majorly raw material
Energy is produced	sunlight energy is absorbed
Slower process in green plants	faster process in green plants.

Any first 6 correct differences

37. a) (i) Heart beat increases; in order to pump more blood; which delivers more oxygen and glucose to muscles to generate more energy; for muscle concentration and to remove the accumulated waste products from muscles;

05 marks

- (ii) Breathing rate increase; so as the person to take in more oxygen for the increased aerobic respiration; and to remove the accumulated carbon dioxide from the body of the person;

- b) Description of adaptation of heart to its functions.

- It has tricuspid and bicuspid valve; to prevent back flow of blood to the atria;
- Possession of intra ventricular septum; to separate deoxygenated blood from oxygenated blood;
- Its left ventricle walls are thick; to pump blood to far parts of the body;
- It has strong Cardiac muscles which are myogenic in nature; to contract and relax continuously as it pumps blood;
- Presence of many mitochondria to generate ATP / energy for continuous contraction of cardiac muscles

**1 mark @ Acc. Correct structure alone.
Rej. Function without structure.**

END

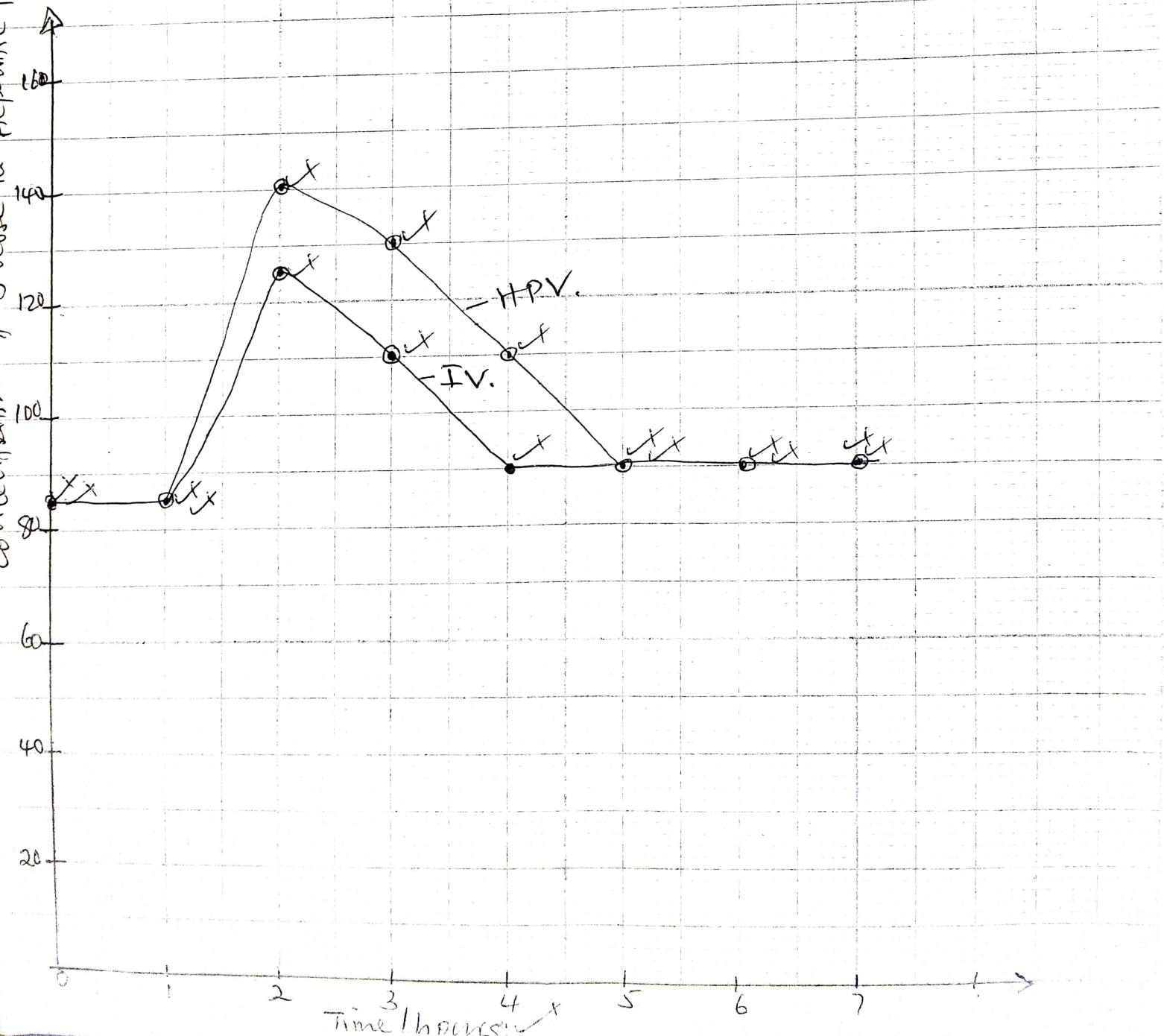
Curve

(a) A graph showing the variation of concentration of glucose in the hepatic portal vein and ileac vein with time;

Scale

T-axis: 1cm represents $10 \text{ mg} \text{ l}^{-1} \text{ blood}$

X-axis: 1cm represents $\frac{1}{2} \text{ hour}$



(Q1)

Ans:

A graph showing the variation of concentration of glucose in the hepatic portal vein and ileac vein with time;

Scale:

Y-axis: 1cm represents $10 \text{ mg} \text{ l}^{-1}$ of blood;

X-axis 1cm represents $\frac{1}{2}$ hour;

