**Candidates' Name: …….....……..……..**

**Signature: ……..….....……**

| Random No. | | | | | Personal No. | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

***(Do not write your school / Center name or Number anywhere on this booklet)***

**553/2**

**BIOLOGY**

**THEORY**

**July / Aug**

**2 ½ HOURS**

KAMTEC EXAMINATIONS BOARD

**Uganda Certificate Of Education**

**BIOLOGY THEORY**

**TIME: 2 HOURS 30 MINUTES**

**INSTRUCTIONS TO CANDIDATES**

*Answer all questions in sections **A** and **B***

*Write the answer to section **A** in the boxes in the margin of each question*

*Write answers to section **B** in the space provided*

*Answer only two questions from section **C***

*Write the answers to section **C** on the answer sheets provided*

**FOR EXAMINERS USE ONLY**

| SECTION | MARKS |
|---|---|
| A | |
| B 31 | |
| B 32 | |
| B 33 | |
| C | |
| C | |
| TOTAL | |

 **TURN OVER**

1. Which of the following organisms is an autotroph?
   A. Virus
   B. Euglena
   C. Amoeba
   D. Paramecium

2. Hemolysis will occur when
   A. Red blood cells are placed in distilled water
   B. Plant cells are placed in distilled water
   C. Red blood cells are placed in conc. Sugar solution
   D. Plant cells are placed is conc. Sugar solution

3. At compensation point
   A. More oxygen is released due to higher photosynthesis than respiration
   B. More carbon dioxide is released due to higher respiration than photosynthesis
   C. More food is manufactured than what is broken down
   D. Both respiration and photosynthesis occur at the same rate.

4. When humans are exposed to cold conditions their
   A. Oxygen consumption increases
   B. Rate of urine formation decreases
   C. Feeling of thirst increase
   D. Metabolic rate decreases.

5. When developed carnassial teeth are a major adaption for
   A. Chewing curd
   B. Grasping prey
   C. Shearing flesh
   D. Defence against predators.

6. Which pair of blood vessels below contains de- oxygenated blood?
   A. Pulmonary artery and umbilical artery
   B. Pulmonary vein and umbilical vein
   C. Pulmonary vein and umbilical artery
   D. Pulmonary artery and umbilical vein

7. For fraternal twins to be born
   A. Two ova are fertilized by two different sperms
   B. One ovum is fertilized by two different sperms
   C. One ovum is fertilized by one sperm then

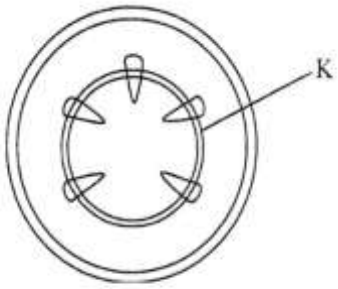
D. Two ova are fertilized by one sperm

8. Which of the following processes occur together during accommodation?
   (i) Circular ciliary muscles contract
   (ii) Circular ciliary muscles relax
   (iii)Radical ciliary muscles contract
   (iv)Radical ciliary muscles relax
   (v) Leans shrinks
   (vi)Lens widens

   A. i, iii and vi
   B. ii,iv and v
   C. i, iii and v
   D. ii, iii and vi

9. For inhaled air to reach the cells of insects, it passes through the following respective organs.
   A. Spiracles, tracheoles, Trachea
   B. Tracheoles, Tracheae, spiracles
   C. Spiracles, Tracheae, Tracheoles
   D. Trachea, Tracheoles, spiracles

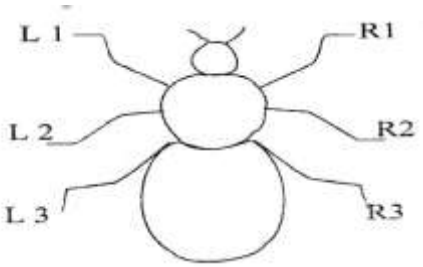
10. The diagram below show a cross section of a stem




Part labeled K is responsible for

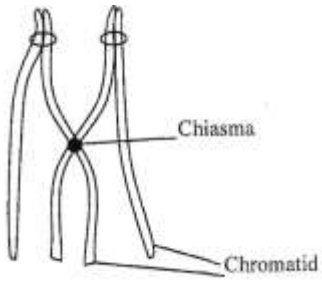
A. Transport sugars
B. Secondary growth
C. Transport water
D. Protection

11. L1,L2,L3 represent insect legs on the left side while R1, R2 and R3 represent legs on the right. Which one of the following represents the correct set of legs moved together during locomotion?




A. L1, L2, R1
B. L1, L3, R2
C. L2, L3, R2
D. L3, L2, R3

12. The stage of cell diversion shown in the diagram is for




A. Maintain the chromosome number
B. Halving the chromosome number
C. Increasing variability
D. Doubling the chromosome number

13. The type of skeleton where muscles are attached inside the skeleton is common in
A. Earthworms
B. Birds
C. Mammmals
D. Insects

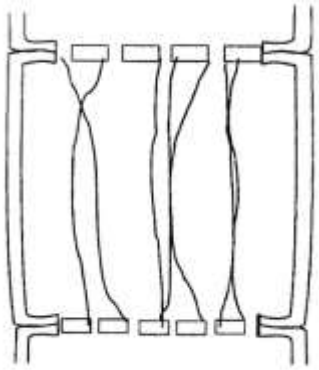
14. Which one of the following soil samples will have the least percentage decrease in mass when heated to red hot?
A. Clay
B. Loam
C. Loam- sand
D. Sand

15. Which one of the following is an example of detritivores
A. Plants

B. Bacteria
C. Carnivores
D. Earthworms

16. One advantage of legumes over berries is that legumes
A. Have few seeds while berries have many seeds
B. Have large seeds while berries have all seeds
C. Are fry while berries are succulent
D. Do not need dispersal agent while barriers need agents

17. They type of plant cell shown is modified for



A. Protection
B. Photosynthesis
C. Translocation
D. Storage.

18. Which one of the following is the correct direction of impulses in the central nervous system?
A. Sensory neurone synapse, relay neurone, synapse, motor neurone
B. Motor neurone, synapse, relay neurone, synapse, sensory neurone
C. Relay neurone, synapse, motor neurone, synapse, sensory neurone
D. Synapse, motor neurone, synapse, sensory neurone, relay neurone

19. Disecious condition is an attempt by plants to increase chances of
A. Self-pollination
B. Pollination by insects
C. Cross pollination
D. Pollination by wind

20. Reversal of stomatal rhythm by plants is an adaption for
A. Increase in carbon dioxide up take
B. Decrease in transpiration rate
C. Increase in photosynthesis
D. Temperature regulation

21. The following are abiotic factors, which affect population size except

A. Temperature
B. Diseases
C. Humidity
D. Light

22. Part of the ear concerned with conversion of mechanical sound waves into electrical nerve impulses is the
    A. Organ of corti
    B. Pinna
    C. Vestibula apparatus
    D. Tympanum

23. Failure of development of secondary sexual characteristics in females may be caused by inadequate secretion of
    A. Adrenaline
    B. Testosterone
    C. Oestrogen
    D. Insulin

24. The response to touch by folding of leaves of Mimosa pudica is called
    A. Simple reflex
    B. Nastic
    C. Tropism
    D. Kinesis

25. Which one of the following blood vessels contains the highest concentration of urea?
    A. Haptic vein
    B. Renal vein
    C. Heptaic artery
    D. Renal artery

26. Double fertilization in flowers involve fusion of
    A. One made nucleus with two polar nuclei
    B. One made nucleus with egg nucleus
    C. One male nucleus with synergies
    D. One made nucleus with egg nucleus plus another male nucleus with the polar nuclei.

27. The major purpose of hibernation by animals is to
    A. Regulate the body temperature
    B. Regulate the osmotic pressure
    C. Slow down the breathing
    D. Conserve food reserves.

28. When a person catches a disease and recovers, he may gain a type of immunity called
    A. Active

B. Passive
C. Artificial
D. Temporary

29. Counter current flows between blood and water over the fish gills serves the purposes of
A. Increasing the surface area
B. Reducing the diffusion distance
C. Increasing the diffusion gradient
D. Protecting the gill filaments.

30. Which one of the following is expected to be higher in people living at high altitude than those at low altitude? The number of
A. Thrombocytes
B. Pohagocytes
C. Erthrocytes
D. Lymphocytes

## SECTION B

31. An experiment was carried out using two enzyme extracts A and B from a mammal to find out the time taken for each enzyme to break down a fixed mass of its substrate at different pH values. The results are shown in the table below.

| | ***Time taken by enzyme to break down a fixed mass of substrate ( Min*)** | |
|---|---|---|
| **pH values** | **Enzyme A** | **Enzyme B** |
| 2 | 10 | 35 |
| 6 | 10 | 35 |
| 8 | 18 | 32 |
| 9 | 25 | 10 |
| 10 | 35 | 08 |
| 11 | 45 | 07 |

(a) Represent the above information on a suitable graph (09 marks)

(Graph paper on next page)

(b) Explain what occurs at the following pH ranges for each enzyme
(i) From pH value 2 to 6 (4 marks)
In Enzyme A

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……

……

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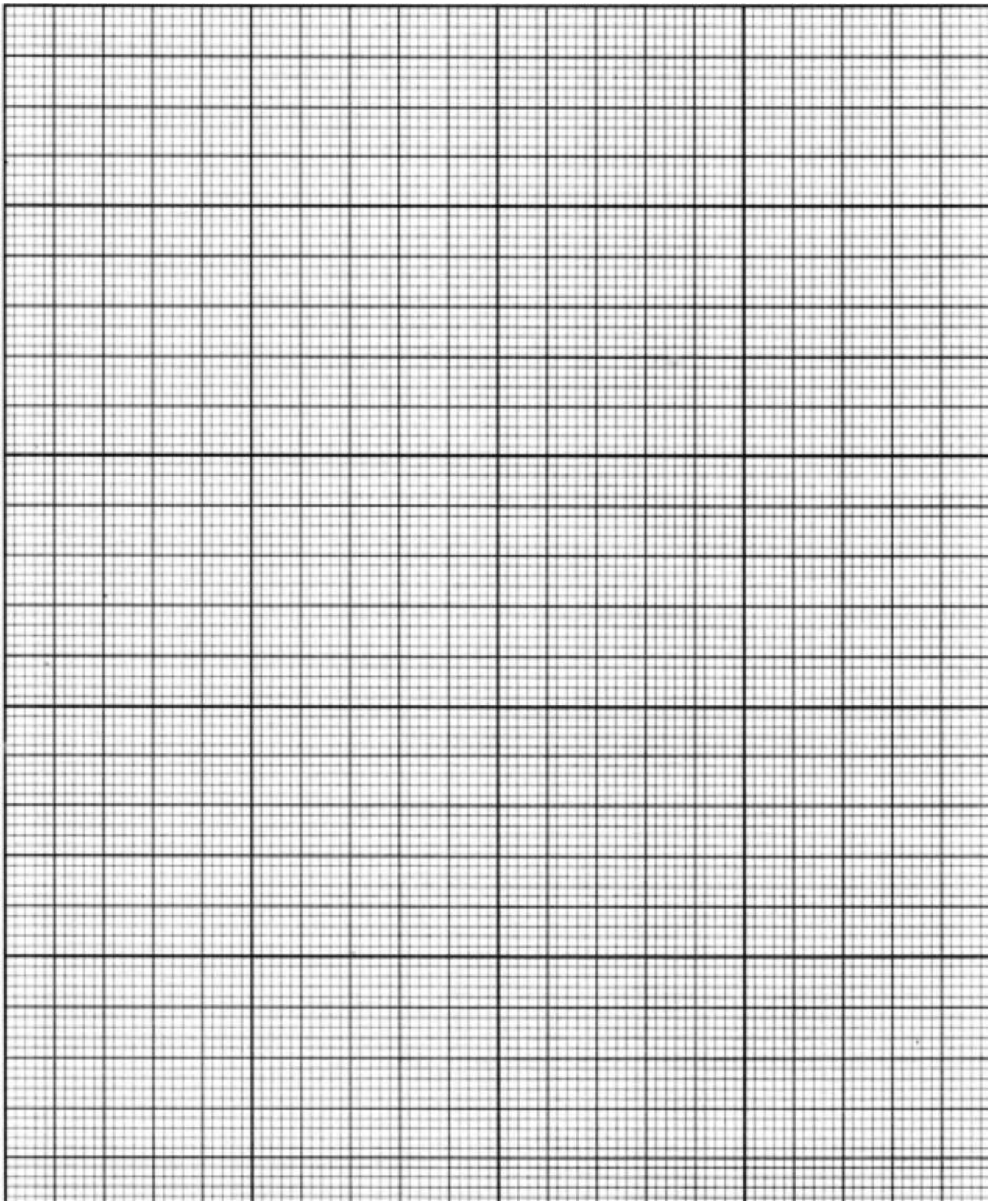

In Enzyme B

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(ii) From pH value 8 to 11 (4 marks)

In Enzyme A

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In Enzyme B

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……..……

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(c) From your graph, state one major similarity between Enzyme A and Enzyme B
( 1 mark)

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(d) With reasons, suggest one named example of each enzyme

i) Name of Enzyme A (2 marks)

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Reasons

……..……....

……..

ii) Name of Enzyme B (2 marks)

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Reasons

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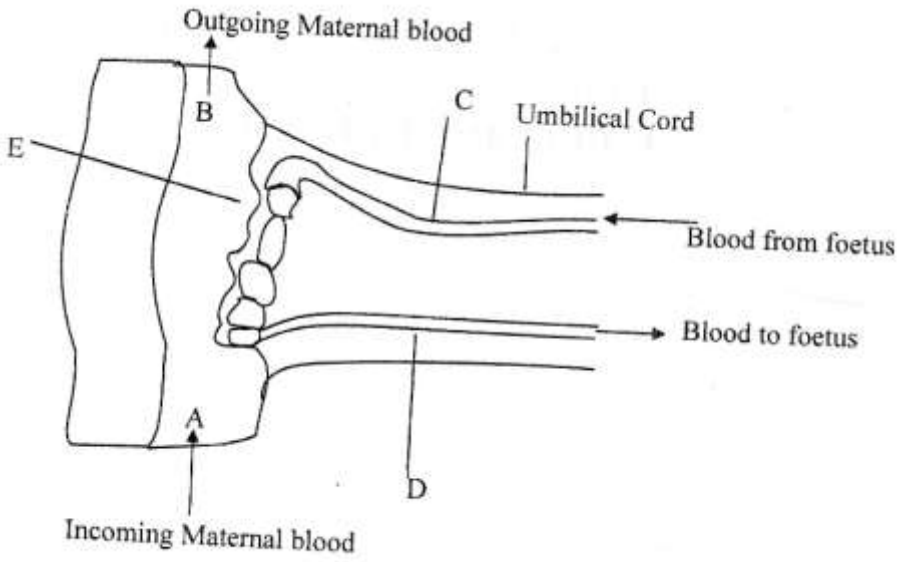
32. The diagram below shows parts of the human female reproductive system during gestation period.




a) What is gestation period? (1 mark)

……

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b) What name is given to the main organ shown

……

c) Name the parts labeled? (2mks)

C……

D……

d) (i) State four differences in composition of blood in vessels C and D

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(4 marks)

(iii) Give reasons for the differences in d(i) above (2 marks)

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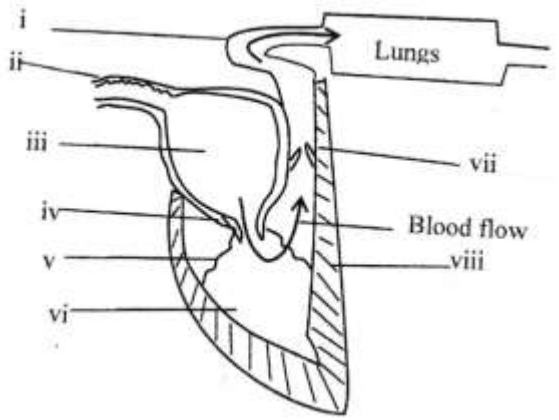
33. The diagram below shows part of the human heart.




a) Name the labelled parts (3 marks)

i)…… iv)……

ii)…… v)……

iii)…… Vi)……

b) State the functions of parts iv, v and viii (3 marks)

Part iv……

……

Part v……

……

Part viii……

c) Explain how part vi carries out its function (3 marks)

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**SECTION C (Answer any two questions)**

34. a) Explain how plants get rid of their excretory products (7 marks)

b) Describe the adaptations of the following organs for their functions;

(i) The glomerulus. (03 marks)

(ii) The proximal convolute tubule. (02 marks)

(iii)The loop of Henle. (03 marks)

35. a) describe the adjustment that occur in the human eye when;

i) A person moves from very bright light to a dimly lit room. (04 marks)

ii) A person moves from a dimly lit room to bright light (04 marks)

b) What is the importance of the changes in (a) above (01 marks)

c) Explain how each one of the following parts of eyes is adapted for its functions;

i) The retina (02 marks)

ii) The Choroid (02 marks)

ii) The lens (02 marks)

36. Describe an experiment to show that soil contains living organisms (12 marks)

b) Outline the role of living organism in the soil. (03 marks)

37. a).What are tropism? (01 mark)

b) State the differences between phototropism and simple reflex action of rem oval of hand from a hot object (04 marks)

c) State the importance of the following responses.

i) Geotropism (05 marks)

ii) Phototropism (05 marks)

**END**