Name..... Centre/Index No. .....

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P530/1
BIOLOGY
PAPER 1
July/August 2025
2 1/2 hours

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Advanced Certificate of Education
BIOLOGY
(Theory)

Paper 1

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

This paper consists of **40** questions in section **A** and **6** questions in section **B.**

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

Section A: Answers to this section must be written in the boxes provided.

Section B: Answers to this section should be written in the spaces provided and not anywhere else.
No additional sheet(s) of paper should be inserted in this booklet.

FOR EXAMINERS' USE ONLY			
SECTION	**QUESTIONS**	**MARKS**	**Examiners' initials & No.**
Section A:	1- 40		
Section B:	41		
	42		
	43		
	44		
	45		
	46		
TOTAL			

SECTION A (40 MARKS)

Write the letter corresponding to the **most** correct answer in the box provided on the right hand side of each question.

1. Which one of the following is true of Gibberellins?
They:
A. are responsible for photo tropism and geotropism.
B. are gases at room temperature.
C. are produced only by fungi.
D. cause bolting in some biennial plants.

2. Small seedlings may fail to emerge when sown deep into the soil because they
A. are suppressed by soil during upward growth.
B. do not get enough water.
C. exhaust their food reserves before emerging.
D. do not get enough air.

3. Crossing over occurs between
A. non sister chromatids of a bivalent.
B. sister chromatids of the same chromosome.
C. two different kinds of chromosomes.
D. two different kinds of bivalents.

4. Which of the following is a physiological adaptation of terrestrial plants to minimize water loss?
A. leaf orientation.
B. folding of leaves.
C. periodic shedding of leaves.
D. reversal of stomatal rhythm.

5. A carrying capacity is,
A. the population size that can be supported by available resources.
B. the number of individuals in that population.
C. reached when the number of deaths exceeds the number of births.
D. inversely related to maximum rate of increase.

6. A long refractory period in cardiac muscle prevent it from,
A. contracting strongly.
B. pumping too much blood to the tissues.
C. developing tetanus.
D. developing an oxygen debt.

7. Which one of the following plant growth substances exhibit synergism?
A. Gibberellins and auxins
B. Ethene and Abscissic acid
C. Cytokinins and ethene
D. Abscissic acid and cytokinins

8. Which of the following is a characteristic of animals that feed discontinuously?
A. Exhibit extremely rapid digestion.
B. Have a non-specialized digestive tract.
C. Have a digestive tract that permit storage.
D. Usually eat only meat.

9. Osmotic pressure across a cell membrane will be reversed if
A. temperature of cell's environment is increased.
B. external solute concentration decreases.
C. size of membrane pores increases.
D. active transport of solutes is inhibited.

10. A certain gene in a bacterium codes for a polypeptide is 120 amino acids long. How many nucleotides are needed in the mRNA to code for this polypeptide?
A. 30
B. 40
C. 360
D. 480

11. The role of a reflex arc in the nervous system is to allow quick transmission of impulses between
A. effectors and spinal cord.
B. effector and CNS.
C. receptors and CNS.
D. receptors and effectors.

12. During water stress, photosynthesis reduces mainly due to the shortage of
A. carbon dioxide.
B. mineral salts.
C. water.
D. sunlight.

13. Which of the following sequence of events in guard cells results in the opening of stomata?
A. light → low CO_2 → High pH → starch → sugar → endosmosis.
B. light → low CO_2 → low pH → starch → sugar → exosmosis.
C. light → low CO_2 → High pH → sugar → starch → endosmosis.
D. light → High CO_2 → low pH → starch → sugar → endosmosis.

14. An enzymatic reaction of the type $(glucose)_n + n\ H_20 \rightarrow$ starch is catalyzed by
A. condensases.
B. isomerass.
C. hydrolases.
D. synthases.

15. A person has a tidal volume of 0.36 dm^3 and breathing rate of 18 breaths per minute. The person's ventilation rate is.
A. 6.48 $dm^3\ min^{-1}$
B. 0.02 $dm^3\ min^{-1}$
C. 64.8 $dm^3\ min^{-1}$
D. 2.0 $dm^3\ min^{-1}$

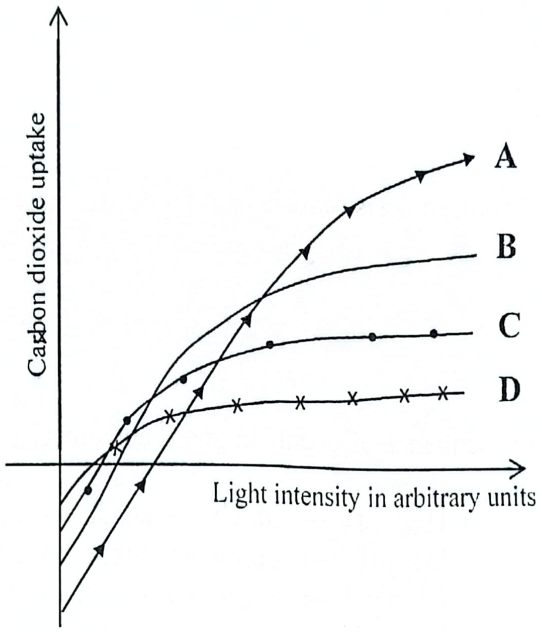
16. In a life cycle that involves alternation of generations:
A. Sporophyte generation is always dominant.
B. Gametophyte generation produces the spores.
C. Spores develop into the sporophyte generation.
D. Gametophyte generation is haploid.

17. The most important form of learning in the early stages of an animal's life is
A. exploratory.
B. insight.
C. habituation.
D. imprinting.

18. The following are all plasma proteins except
A. elastin.
B. fibrinogen.
C. globulins.
D. albumin.

19. Figure 1 below shows the rate of uptake and release of carbon dioxide by four plants at different light intensities. Study it carefully and answer the question that follows.
Which of them would survive better under a forest canopy?

Fig. 1



20. Green leaves in the light appear not to respire. This is because respiratory carbondioxide is
A. stored in mesophyll cells.
B. is immediately fixed by RuBP.
C. is used in stomatal opening.
D. not produced during the day.

21. Which of the following is not a major function of lipids in the body?
A. Insulation.
B. Synthesis of hormones.
C. Short term energy store.
D. Long term energy store.

22. Conversion of glycogen to glucose during stress is stimulated by
A. thyroxine.
B. Insulin.
C. adrenaline.
D. glucagon.

23. Contraction of muscles in both uterine wall and breasts is stimulated by
A. oxytocin.
B. progesterone.
C. oestrogen.
D. prolactin.

24. Which of the following contains cartilage?
A. Trachea only.
B. Bronchi only.
C. Bronchioles and trachea.
D. Bronchi and trachea.

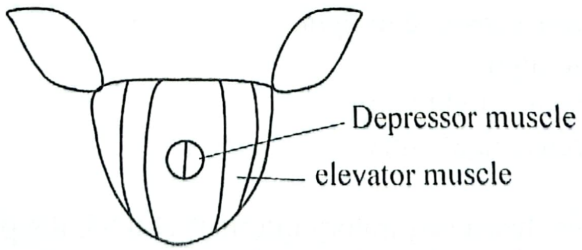
25. Which of the following best describes active immunity?
A. Acquired by receiving antibodies from another organism.
B. That occurs after infection.
C. Provided by maternal antibodies.
D. Produced by antibodies acting on pathogens.

26. Which one of these would describe a heterozygous individual?
A. one with completely different sets of genes.
B. one with identical alleles for a particular gene.
C. one with only one functional allele.
D. one with two different alleles for a given gene.

27. In Drosophila melanogaster, the gene for red eye (R) and normal wings (W) are dominant to alleles (r) for purple eyes and (w) for vestigial wing. Crosses between a fly of genotype Rr Ww and rr ww yielded offspring as follows;
Red eyes, normal wings 40%
Red eyes, vestigial wings 10%
Purple eyes, vestigial wings 40%
Purple eyes, normal wings 10%
These results illustrate
A. Crossing over
B. Hybridization
C. Sex linkage
D. Mutation

28. Figure 2. below shows the action of indirect flight muscles during locomotion in insects.

Fig. 2



Which of the following statements is true about the action of muscles?
A. Elevator muscle relaxed depressor muscle contracted.
B. Elevator muscle contracted depressor muscle relaxed.
C. Elevator muscle contracted depressor muscle contracted.
D. Elevator muscle relaxed depressor muscle relaxed.

29. The survival of the sickle-cell allele in populations due to heterozygote advantage to individuals carrying it is termed as
A. Differential mortality.
B. Genetic death.
C. Genetic mosaic.
D. Genetic load.

30. The capacity of the human eye to resolve two stimuli separated spatially is referred to as
A. Summation.
B. Retinal convergence.
C. Visual acuity.
D. Mutual inhibition.

31. Which of the following organisms belongs to a different phylum?
A. Liver fluke
B. Planaria
C. Tape worm
D. Leech

32. Primary tissues in plants arise from
A. division of the cork cambium.
B. division of the vascular cambium.
C. division of the apical meristems.
D. within vascular cambium.

33. The role of follicle cells in the human ovary is to
A. produce progesterone.
B. nourish the egg.
C. transport egg through fallopian tube.
D. form the placenta after fertilization.

34. Which of the following describe how digestion is controlled in humans?
A. Only hormones regulate release of enzymes.
B. Digestion is controlled by nerve signals.
C. Both hormones and nervous system regulate digestion.
D. Digestive control is only active when food reaches stomach.

35. During dark adaptation
A. Rod cells become less sensitive to light.
B. Rhodopsin is regenerated.
C. Pupil contracts to reduce light entry.
D. Pupil dilates to increase light entry.

36. If a normal person at rest has a respiratory quotient of 0.85, the person is likely to be respiring on
A. Carbohydrates only.
B. Proteins only.
C. Fats and carbohydrates.
D. Proteins and carbohydrates.

37. Which of the cells of areolar tissues secrete anti-coagulant?
A. Mast cells.
B. Fat cells.
C. Fibroblasts.
D. Macrophages.

38. Table 1 below shows a comparison of some of the characteristics of four mammalian skeletal tissues. Study it carefully, answer the questions below.

Table 1

	characteristic		
Tissue	Relative density	Stiffness	Strength
Tendon	1.3	190	100
Ligament	1.3	20	110
Cartilage	1.0	15	1
Bone	2.0	14000	180

The best logical conclusion from the data above is that
A. density contributes more to strength than stiffness.
B. density contributes more to stiffness than strength.
C. stiffness depends on strength.
D. strength and stiffness are not related at all.

39. The first heart beat sound is produced at the
A. beginning of diastole.
B. end of diastole.
C. beginning of systole.
D. end of systole.

40. Which of the following is not a structural component of the ecosystem?
A. Green plants.
B. Decomposers.
C. Consumers.
D. Energy.

SECTION B (60 MARKS)

Answers to this section should be written in the spaces provided and not anywhere else.

41. (a) (i) What is meant by the term acclimatisation to high altitude. (01 mark)

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(ii) State three adaptations in mammals in relation to lowered amounts of respiratory gases. (03 marks)

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(b) Explain why;

(i) Expansion of the lungs causes cessation of inspiration. (03 marks)

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(ii) Cells are more susceptible to changes in the level of carbon dioxide. (03 marks)

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42. (a) Explain;

(i) the role of mitosis in a mature testis. (03 marks)

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(ii) How cell divisions produce sperms different from each other. (04 marks)

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(b) State three similarities between eggs and sperms. (03 marks)

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43. (a) Differentiate between a gene and an allele (02 marks)

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(b) A couple both heterozygous for sickle cell anaemia produced children. Their first born had sickle cell anaemia.
Use a genetic diagram to show what the probability of their second child having anaemia will be. (05 marks)

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(c) Explain why there are so many numbers of heterozygotes compared to homozygous individual for sickle cell anaemia in Uganda. (03 marks)

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44. (a) Define genetic diversity. (01 mark)

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(b) State two ways through which genetic diversity within a population can increase. (02 marks)

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(c) Explain how natural selection can lead to;

(i) an increase in advantageous alleles in a population. (04 marks)

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(ii) State the harmful genetic effects of inbreeding. (03 marks)

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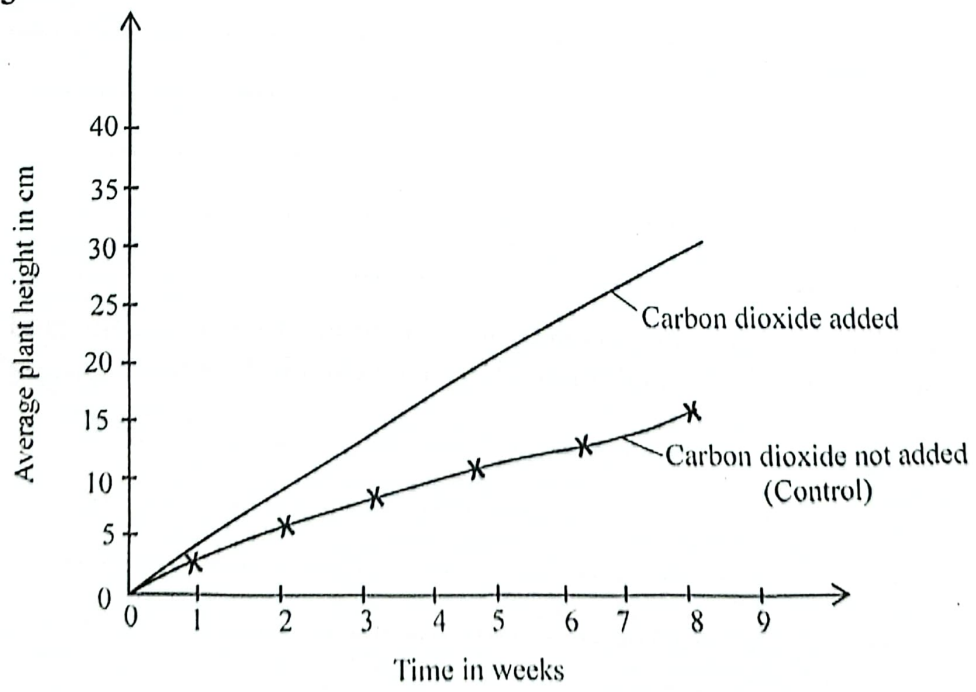
45. Figure 3 below shows the effect on plant growth of adding carbondioxide to a greenhouse with time by a farmer.

Fig. 3



(a) (i) What conclusion can be drawn from the graph? (01 mark)

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(ii) Explain how adding CO_2 affect the rate of plant growth. (04 marks)

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(b) Explain

(i) why the action of adding CO_2 by the farmer is beneficial. (02 marks)

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(ii) the advantage of conducting the experiment in a green house. (02 marks)

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(c) Suggest one other factor that affects plant growth in a green house. (01 mark)

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46. The table 2 shows the filtrate / plasma ratio of a range of substances.

Table 2

Substance	Filtrate / Plasma ratio
Glucose	1
Amino acids	1
Small proteins	0.0002
Medium sized proteins	0.0003
Urea	1

(a) (i) Explain the ratios in the table. (04 marks)

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(ii) Explain how glucose in the proximal tubule returns to blood. (03 marks)

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(b) Explain the link between a more negative blood solute potential and osmoregulation in the kidney. (03 marks)

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END