STUDENT'S NAME: ……

SCHOOL NAME: …… INDEX NUMBER ……

553/1
BIOLOGY
(THEORY)
Paper 1
July/Aug. 2022
2 ½ hours

AITEL JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

BIOLOGY

(**THEORY**)

Paper 1

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

This paper consists of **three** *sections,* **A**,**B** *and* **C**, *answer* **all** *questions in sections* **A** *and* **B** *and only* **two** *questions in section* **C**.
Write the answers for section **A** *in the boxes provided.*
Write the answers for section **B** *in the* **spaces** *provided.*
Answers for section **C** *should be written on the answer sheets provided.*
Drawings and illustrations are to be drawn neatly using a sharp HB pencil.

FOR EXAMINER'S USE ONLY			
Section	**Number**	**Scores**	**Examiner's Initials**
A			
B	31		
	32		
	33		
C:			
TOTAL			

SECTION A (40MARKS)

1. The magnification of a biological drawing is given as $^{X}5$. This means that the
   A. Specimen is five times larger than the drawing
   B. Specimen is five times smaller than the drawing
   C. Drawing is five times larger than the specimen
   D. Drawing is five times smaller than the specimen

2. To which one of the following groups of plants do ferns belong?
   A. Angiosperms
   B. Conifers
   C. Pteridophytes
   D. Bryophytes

3. Which of the following is the correct order of cell organization?
   A. Cell → organ → tissue → system
   B. Tissue → cell → organ → system
   C. Organ → cell → tissue → system
   D. Cell → tissue → organ → system

4. The following is a dichotomous key of invertebrates;
   1) (a) Has 8 legs……..W
      (b) Has 6 legs……...2
   2) (a) Has long antennae……..X
      (b) Has short antennae …….3
   3) (a) Has proboscis ……Y
      (b) Has mandibles……Z

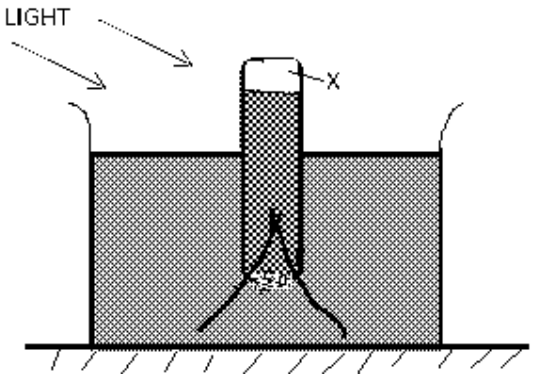
   Which one of the following organisms is a spider?
   A. W
   B. X
   C. Y
   D. Z

5. Which one of the following is a modified tap root?
   A. Onion bulb
   B. Cassava tuber
   C. Irish potato
   D. Carrot tuber

6. To which one of the following types of fruits does desmodium belong?
   A. Indehiscent fruit
   B. Dehiscent fruit
   C. Berry
   D. Drupe

7. In the Benedict's test, the yellow colour indicates that the concentration of reducing sugars is;
   A. little
   B. moderate
   C. much
   D. excess

8. Figure 1 below is an experimental set up to demonstrate photosynthesis.



Gas X produced in the experiment is

   A. Carbon dioxide
   B. Carbon monoxide
   C. Oxygen
   D. Nitrogen

9. Which one of the following modes of nutrition is used by a bread mould?
   A. Heterotrophism
   B. Autotrophism
   C. Parasitism
   D. Saprophytism

Turn Over

10. Which one of the following events occurs during osmosis?
   A. Solvent molecules move from more to less concentrated solution
   B. Solute molecules move from more to less concentrated solution
   C. Solvent molecules move from less to more concentrated solution
   D. Solute molecules move from less to more concentrated solution

11. In an attempt to determine the percentage of air in a soil sample, a student obtained the following results;
   Volume of dry soil = 250cm^3
   Volume of mixture of soil + water = 380cm^3
   Percentage of air in the soil sample = 12%
   What volume of water was added to the dry soil?
   A. 130cm^3
   B. 160cm^3
   C. 262cm^3
   D. 268cm^3

12. Which one of the following is most effective method of controlling soil erosion?
   A. Planting trees
   B. Bush fallowing
   C. Terracing
   D. Mulching

13. A senior four student visited a meteorological station and obtained the following results record for four days of the week in the table 1 below.

Day of the week	Environmental condition
Monday	Hot and windy
Tuesday	Hot and still air
Wednesday	Shinny and cloudy
Thursday	Cloudy an still air

   On which day of the week was the transpiration rate greatest?
   A. Monday
   B. Tuesday
   C. Wednesday

D. Thursday

14. The following is true about a person of blood group AB except?
A. Receives blood from people of all blood groups
B. Donates blood to people of all other groups
C. The person's blood has no antibodies
D. The person's blood has both antigens A and B

15. The main purpose of sweating in humans is that during the process
A. Excess water is lost
B. Excess salts are got rid of
C. Excess nitrogenous waste is got rid of
D. The body is cooled

16. The following are temporary adjustments of mammals to cold environments except?
A. Raising of hair
B. Increase in metabolic rate
C. Deposition of fats under the skin
D. Reduction of blood flow to the skin

17. Which of the following best explains why athletes breathe deeply during a race?
A. Restore the used-up energy
B. Take in more oxygen
C. Allow fast blood flow to the lungs
D. Allow fast blood flow from the muscles

18. A good mammalian respiratory surface should be
A. Dry with large surface area
B. Moist with reduced surface area
C. Dry with many vessels
D. Moist with many blood vessels

Turn Over

19. Which one of the following differences between aerobic and anaerobic respiration are not correctly matched?

	Aerobic respiration	**Anaerobic respiration**
A	Complete oxidation of food	Incomplete oxidation of food
B	Less energy produced	Much energy produced
C	Uses oxygen	Occurs without using oxygen
D	Produces water	Water is not produced

20. Which of the following is true about mitosis?

A. Produces gametes
B. Brings about variation
C. Maintains uniformly among generations
D. Produces two daughter cells with same number of chromosomes but different from those of the parents

21. When white flowered snapdragon plants and red flowered snapdragon plants were crossed, all the offspring were pink flowered plants. This is an example of;

A. Incomplete dominance
B. Complete dominance
C. Codominance
D. Recessive dominance

22. The ability to taste a certain chemical is due to a dominant gene among humans. If both parents are heterozygous, the percentage of children likely to be non- tasters is?

A. 100
B. 75
C. 50
D. 25

23. Which one of the following would occur if the number of predatory bugs was increased in the food chain below?

Plants $\rightarrow$ catepillars $\rightarrow$ predatory bugs $\rightarrow$ birds

A. Decrease in number of birds
B. Increase in number of caterpillars
C. Increase in number of plants
D. Decrease in number of plants

24. An ecologist carried out an experimental survey to estimate the number of

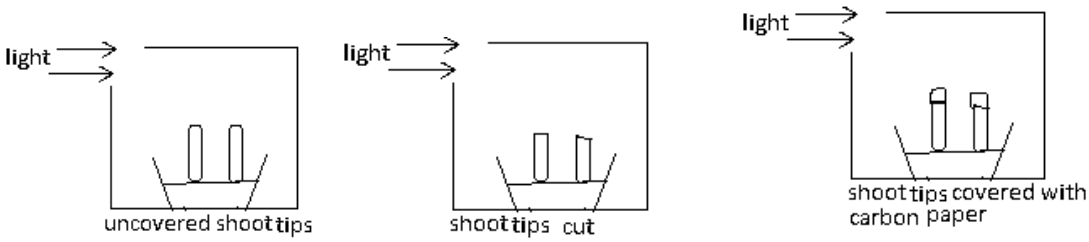
cockroaches inside a cardboard in his house. In his first attempt, he captured, marked and released 100 cockroaches back into the cardboard. A few days later, he repeated the experiment in the same area and captured 80 cockroaches. His population estimate of cockroaches in the cardboard was 250. What was the number of cockroaches without a mark in the second capture?

A. 20
B. 32
C. 48
D. 70

25. Which one of the following is a possible sequence of plant succession on an area after a wild fire.

A. Fungi → ferns → shrubs → trees
B. Fungi → mosses → shrubs → trees
C. Mosses → trees → fungi → ferns
D. Mosses → herbs → shrubs → trees

26. Figure 2 below represents a setup of experiments to show the effect of unilateral lighting on plant shoots.



In which experiment(s) would the shoots respond positively to unilateral light?

A. I only
B. I and II
C. II and III
D. III only

27. Which one of the following best describes the cause and corrective measure respectively for myopia?

	Cause	**Corrective measure**
A	Small eyeball	Convex lens
B	Large eyeball	Concave lens
C	Small eye ball	Convex lens
D	Large eyeball	Convex lens

28. What happens to insect wings when depressor muscles are relaxed? The wings
A. Move downwards
B. Move upwards
C. Rotate freely
D. Move in three directions

29. A student noted the following characteristics on a vertebra during a practical lesson;
(i) Short neural spine
(ii) Large neural canal
(iii) Divided transverse process
The vertebra was
A. Atlas
B. Lumber
C. Thoracic
D. cervical

30. Which one of the following is the most likely effect of progesterone hormone deficiency in a woman?
A. Implantation may not occur
B. Miscarriage may occur
C. Menstruation may not occur
D. Ovulation may not occur

SECTON B (40 MARKS)

31. A farmer carried out an experiment to determine the growth rate of maize seedlings. He planted viable maize seeds in a nursery bed and monitored their growth by measuring the length of the main root for a period of one week. The results are shown in the table below.

Day of the week	1	4	6	7
Length of main root (cm)	0.0	1.4	10.2	16.2
Growth rate of main root (cm/ day)				

(a) Calculate the growth rate values and record the results in the table. (04 marks)

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(b) Using same axes, plot a graph of growth a rate against time of the seedlings.

(06 marks)

(c) Describe the shape of the graph in (b) above. (03 marks)

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(d) Explain the shape of the graph plotted in (b) above. (05 marks)

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(e) State any two conditions necessary for viable maize seeds to germinate.

(02 marks)

(i)……

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(ii)……

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32. (a) What is an enzyme?

(01 mark)

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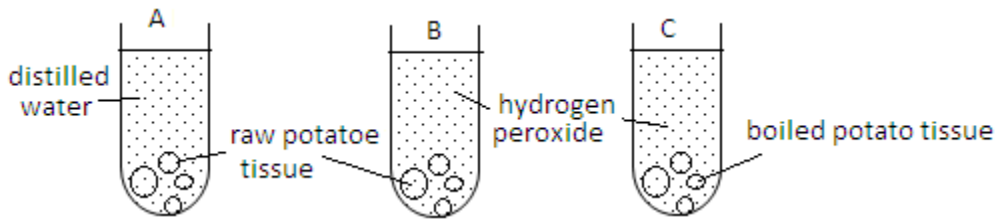
(b) Study the experimental set up in the figure 3 below and answer the questions that follow



(i) What is being investigated? (01 mark)

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(ii) Suggest what was observed in each of the test tubes. (03 marks)

A. ……

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A. ……

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A. ……

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(iii) Explain the observations suggested in (b) (ii) above. (03 marks)

A. ……

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B. ……

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C. ……

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(c) State any other two factors that affect enzyme activity besides those in the experiment in (b) above. (02 marks)

(i) ……

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(ii) ……

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33. (a) Distinguish between a population and a community. (02 marks)

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b) Considering the food chain given; Cereal $\rightarrow$ Grasshopper $\rightarrow$ Man

Explain how the energy from the sun;

(i) Is made available to man. (05 marks)

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(ii) Is lost between grasshoppers and man. (03 marks)

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SECTION C (30MARKS)

34. (a) Explain the methods through which new plants are produced without using a seed. (10 marks)

(b) Outline the advantages of vegetative propagation in plants (05 marks)

35. (a) Distinguish between sex limited character and sex-linked character. (02 marks)

(b) Using appropriate symbols show how sex is determined in humans. (06 marks)

(c) Red- green colour blindness is a defect caused by a recessive gene carried on the X chromosome. What would be the offspring phenotypes of a cross between a normal woman and a colour blind man? Show your working. (07 marks)

36. (a) How are birds adapted for light? (05 marks)

(b) Describe how an up thrust is achieved during flight in a bird. (05 marks)

(c) Compare flight in birds and insects. (05 marks)

37. (a) What is long- sightedness? (01 mark)

(b) State two causes of long sightedness. (02 marks)

(c) Draw light rays from an object into the eye to show;

(i) Long sightedness occurs. (03 marks)

(ii) Long sightedness can be corrected (03 marks)

(d) Briefly describe the process of hearing in humans. (06 marks)

END