NAME: ……Class/stream…….

Random/Candidate No: ……/…… School…...……..

S.4 PRE-UNEB EXAMINATIONS 2022

553/1 BIOLOGY

(Theory)

Paper 1

2 hours 30 minutes

For Examiners' Use Only	
SECTION	**MARKS**
A	
B	
C	
TOTAL	

INSTRUCTIONS TO CANDIDATES:

- *This paper consists of sections **A, B,** and **C.***
- *Answer **all** questions in Sections **A** and **B,** plus **two** questions in Section **C.***
- *Write the answers to Section **A** in the **grid** below, answers to Section **B** in the spaces provided, and answers to Section **C** in the answer booklets provided.*

SECTION A

*Write the answers to Section **A** in the **grid** below*

1.		**11.**		**21.**	
2.		**12.**		**22.**	
3.		**13.**		**23.**	
4.		**14.**		**24.**	
5.		**15.**		**25.**	
6.		**16.**		**26.**	
7.		**17.**		**27.**	
8.		**18.**		**28.**	
9.		**19.**		**29.**	
10.		**20.**		**30.**	

1. Which one of the following is responsible for a decrease in dry weight of a seed during germination?

A. The seed loses more water than it absorbs
B. Soluble food materials are converted to starch
C. Stored food is used up
D. Soluble food materials are lost into the soil

2. In an experiment to determine the percentage of air in a soil sample, the following results were obtained.

- Volume of soil added to measuring cylinder = 40 cm3.
- Volume of water added to measuring cylinder = 40 cm3.
- Volume of soil and water after stirring = 75 cm3.

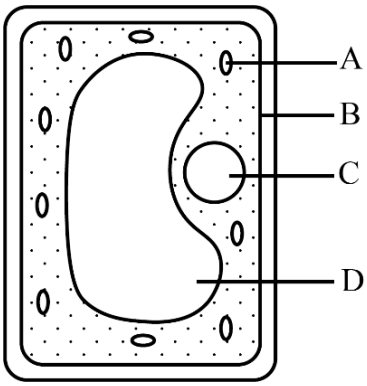
The percentage of air in the soil was?

A. 6.7.
B. 5.0.
C. 12.5.
D. 53.3.

3. Which of the following hormones is responsible for ovulation in mammals?

A. Oestrogen
B. Progesterone
C. Follicle stimulating hormone (FSH)
D. Luteinizing hormone (LH)

4. The figure below shows a palisade cell. Which part is a site for manufacturing food?



5. To which phylum do mosses below to?

A. Pteridophyta
B. Bryophyta
C. Angiospermophyta
D. Coniferophyta

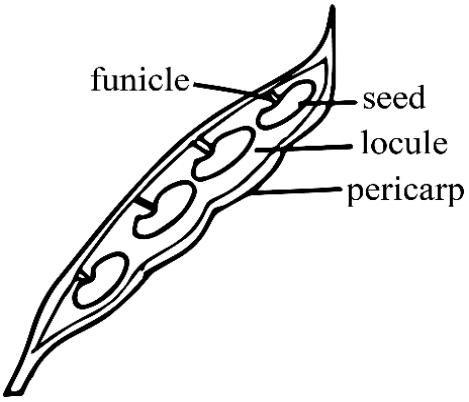
6. A homozygous red flowered plant is crossed with a heterozygous red flower. If red is dominant over white, what will be the phenotype of the offspring?

A. All white
B. ½ red and ½ white
C. ¾ red and ¼ white
D. All red

7. Ammonia compounds are changed to nitrates by

A. Nitrobacter B. Nitrosomonas C. Azobacter D. Lightening

8. The figure below is a longitudinal section of a bean pod. Which of the following is the type of placentation is shown in the figure?

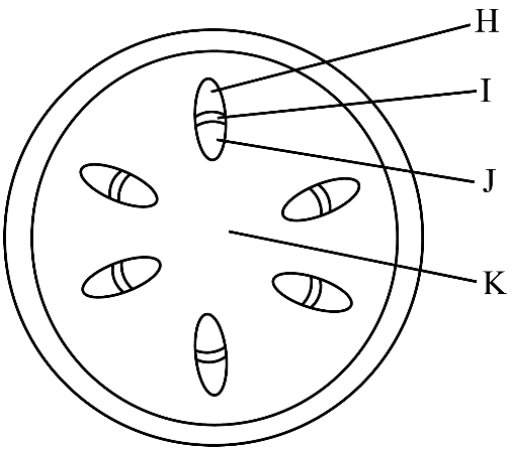


A. Free central placentation
B. Apical placentation
C. Basal placentation
D. Marginal placentation

9. Which of the following processes reduces carbon dioxide in the atmosphere?

A. Respiration
B. Decay
C. Photosynthesis
D. Cement production

10. The figure below is a transverse section of a dicotyledonous stem.



Which part is used for transportation of water and mineral salts?

A. H
B. I
C. J
D. K

11. Which type of skeleton do annelids have?

A. Exoskeleton
B. Endoskeleton
C. Cartilaginous skeleton
D. Hydrostatic skeleton

12. Which of the following activities can take place together in the skin?

A. Vasodilation, increase in sweating, contraction of erector pili muscles.
B. Vasodilation, increase in sweating, shivering.
C. Increase in sweating, vasodilation, and relaxation of erector pili muscles.
D. Vasoconstriction, increase in sweating, shivering.

13. Which of the following changes occurs when an individual walk out of bright sunshine into a poorly lit room?

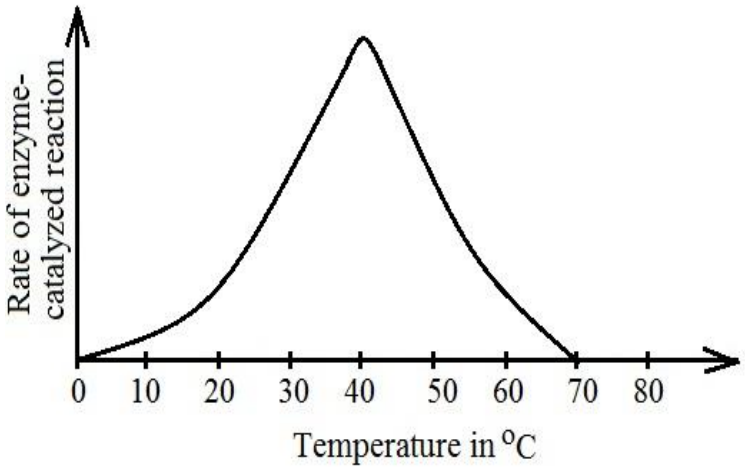
A. The pupil becomes larger
B. The lens becomes thicker
C. The ciliary muscle relaxes
D. The eyes become blind

14. The advantage of internal fertilization has over external fertilization is that in internal fertilization:

A. New offspring are exactly like the parent
B. Production of large numbers of gametes is unnecessary
C. Copulation and the fusion of gametes is passive
D. Fewer individuals are produced.

15. The graph below shows the effect of temperature on the rate of enzyme-catalyzed reaction. Which of the following is the correct explanation for the observed changes in rate of reaction between 40℃ and 70℃?

A. Very low temperatures denature enzymes.
B. Very high temperatures denature enzymes.
C. Increasing temperature up to optimum activate enzymes.
D. Very low temperatures inactivate enzymes.

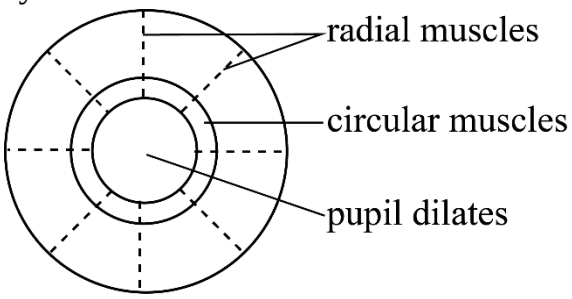


16. In a mammalian heart, the left ventricle is more muscular than the right because it

A. Pumps a lot of blood to the lungs.
B. Pumps blood to all parts of the body.
C. Receives blood from all parts of the body.
D. Receives more blood.

17. The figure below shows arrangement of muscles in the eye iris. Which of the following events will occur when an individual is in a poorly lit room?

A. Circular muscles contract and radial muscles relax.
B. Circular muscles relax and radial muscles contract.
C. Less light enters the eye.
D. The pupil becomes constricts.



18. The first step in the test for starch in a leaf, is to place the leaf in boiling water for about 5 minutes. What is the rationale for this step?

A. To denature all enzymes in the leaf
B. To make the leaf softer so that it is easier to test for starch
C. To remove air in the leaf
D. To remove chlorophyll from the leaf

19. Which of the following is characteristic of wind pollinated flowers?

A. Nectar is present
B. Pollen grains have rough spiny surfaces
C. Stigmas are usually large and feathery
D. The flowers are scented

20. Which one of the following statements about fertilization in a flower is not correct?

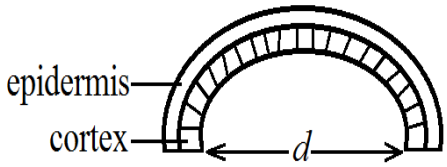
A. First male nucleus fuses with egg nucleus to form zygote.
B. Second male nucleus fuses with polar nuclei to form endosperm.

C. First male nucleus fuses with polar nuclei to form endosperm.
D. Second male nucleus does not fuse with egg nucleus to form zygote.

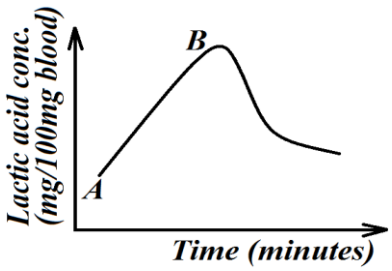
21. Which one of the following is true about a person of blood group O?
A. Receives blood from people of all other blood groups.
B. Donates blood to people of all other blood groups.
C. Receives blood from only people of blood groups AB and O.
D. Donates blood to only people of blood group AB.

22. Which one of the following occurs when internal intercostal muscle contract during breathing?
A. Thoracic volume increases.
B. Ribs are raised.
C. Inhalation occurs.
D. Thoracic pressure increases.

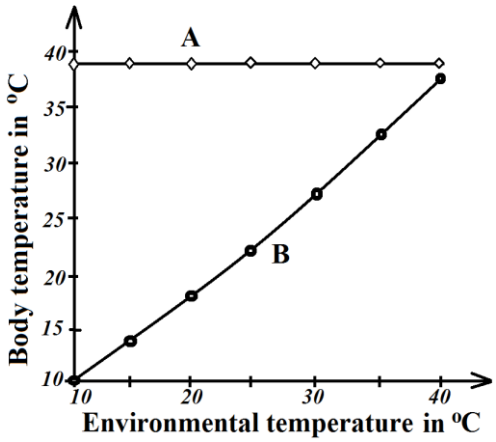
23. The figure below shows a strip after immersing it in a strong sugar solution. Which of the following is the correct explanation for the observation in the figure?
A. Epidermis lost water by osmosis.
B. Cortex absorbed water by osmosis.
C. Epidermis absorbed water by osmosis.
D. Cortex lost water by osmosis.



24. The figure below shows the changes in the lactic acid concentration in the blood during and after exercise. The correct explanation for what is occurring between points **A** and **B** is that
A. Breathing rate has increased.
B. Blood flow to the muscles has increased.
C. Oxygen supply to muscles is less than the demand.
D. Oxygen supplies to the muscles is in excess



25. The figure on the right shows how the body temperature of animals **A** and **B** vary with environmental temperature. Which one of the following is demonstrated in the figure?
A. Body temperature of **A** is dependent on environmental.
B. Body temperature of **B** is dependent on environmental temperature.
C. A has a higher body temperature than **B**.
D. B loses more heat that **A**.

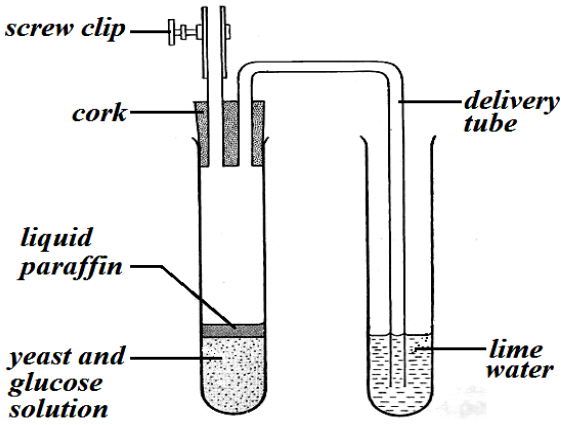


26. A man's urine gave a positive test with Benedict's solution. What is the best deduction about this man?

A. He has been eating a lot of sugar
B. There was too much glycogen in his blood
C. There was too much insulin in his blood
D. He is suffering from diabetes

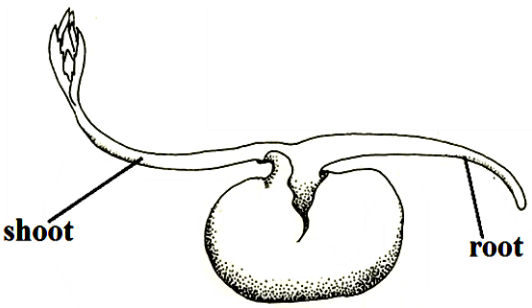
27. The figure below is an experimental set up to demonstrate anaerobic respiration in yeast. The importance of liquid paraffin in the experiment is to

A. React with yeast and glucose.
B. Speed up the reaction between yeast and glucose.
C. Exclude atmospheric oxygen from the mixture.
D. Expel all the oxygen in the solution.



28. The figure below shows a seedling growing from a dark card board box. Which of the following reason is correct for the observed growth in the shoot?

A. High concentration of auxins on the lower side stimulates cell elongation.
B. Low concentration of auxins on the lower side stimulates cell elongation.
C. High concentration of auxins on the upper side inhibits cell elongation.
D. Low concentration of auxins on the upper side stimulates cell elongation.



29. Which of the following is the correct sequence for the successful completion of a reflex action?

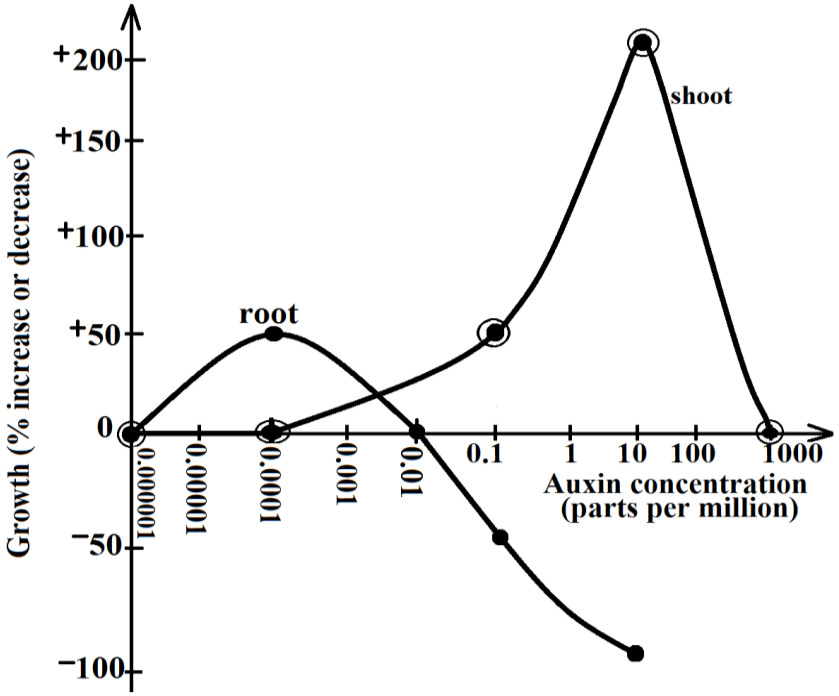
A. Stimulus → receptor → impulse → motor neurone → central nervous system → sensory nerve → effectors
B. Impulse → receptor → Stimulus → motor neurone → central nervous system → sensory nerve → effectors
C. Impulse → receptor → Stimulus → sensory neurone → central nervous system → motor neurone → effectors
D. Stimulus → receptor → impulse → sensory neurone → central nervous system → motor neurone → effectors

30. What relationship exists between algae and fungus in Lichens?

A. Parasitism
B. Saprophytism
C. Symbiosis
D. Commensalisms

SECTION B

31. The graph below shows the effect of applying different concentrations of auxins to the shoots and roots of cereal seedlings.



(a) Describe the trend of the curve for:

(i). Root (03 marks)

(ii). Shoot (04 marks)

(b) Explain the trend of the curve for:

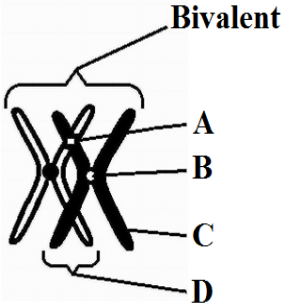
(i). Root (02 marks)

(ii). Shoot (03 marks)

(c) From the graph, state the differences between growth in shoots and in roots in relation to auxins concentration. (04 marks)

(d) Besides growth regulation, state **four** importance of auxins to plants. (04 marks)

32. The figure below shows a bivalent at a particular stage of meiosis.



(a) (i) What is a bivalent? (01 mark)

(ii) Name the parts labelled **A** to **D** (02 marks)

A_____

B_____

C_____

D_____

(b) At what stage of meiosis is the bivalent formed? Give a reason for your answer. (02 marks)

Stage: _____

Reason: _____

_____

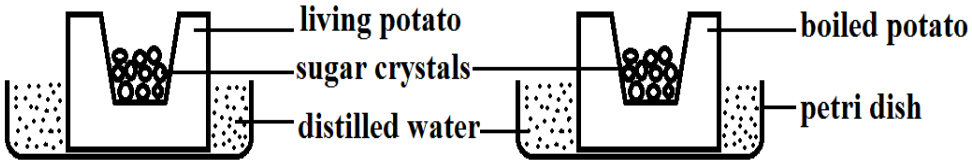
(c) What is the role played by part **A**. (01 marks)

_____

_____

(d) In man, the gene for brown eyes is dominant over the gene for blue eyes. Using suitable genetic symbols, carryout a cross between a blue-eyed man and a heterozygous brown-eyed woman. State the phenotypic ratio of the offspring. (04 marks)

33. Figure below shows the set-up of an experiment that was carried out by a senior three student to demonstrate a process in a plant tissue. Study it carefully and answer the following questions.



(a) State the aim of the experiment. (01 mark)

_____

_____

(b) Describe what would be observed after 30 minutes. (02 marks)

_____

(c) Explain the observations made in (b) above. (03 marks)

(d) Outline the importance of the process demonstrated in this experiment. (03 marks)

(e) State one application of the process taking place in the experiment (01 mark)

SECTION C: (30 MARKS)

Answer two questions only. Additional question answered will not be marked.

34. (a). What is meant by **double fertilization** as used in plant reproduction? (02 marks)

(b). Describe the events that lead to double fertilization in flowering plants. (09 marks)

(c). Outline the changes that follow successful fertilization in flowering plants. (04 marks)

35. (a). Describe the process of digestion of cooked cassava and beans in man. (08 marks)

(b). Describe what may happen to the products of digestion in (a) above. (07 marks)

36. (a) What is a **reflex arc**? (02 marks)

(b) Kajubi was collecting rubbish and suddenly a thorn pricked his foot, his response was quick as was seen by fast withdrawal of his leg. Describe the process that led to the quick withdrawal of his leg after being pricked by a thorn. (10 marks)

(c) State **three** advantages of reflex actions to animals. (03 marks)

37. Describe the role of the following:

a) Pancreas and the liver in sugar regulation in man (08 marks)

b) Pituitary glands and kidney nephron in water balance in man (07 marks)

END