Digital Teachers

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# SENIOR SIX

P530/1

# BIOLOGY

# PAPER 1

# EXAM 1

## FOR CONSULTATION CALL 0776802709

**INSTRUCTIONS TO CANDIDATES:**

- *Answer all questions in both sections A and B*
- *Answers to Section A questions must be written in the boxes provided*
- *Answers to Section B should be written in spaces provided.*
- *No additional sheets of paper should be inserted in this booklet.*

**FOR EXAMINERS USE ONLY**

| Section | Marks |
|---|---|
| A (1 – 40 ) | |
| B 41 | |
| 42 | |
| 43 | |
| 44 | |
| 45 | |
| 46 | |
| **Total** | |

## SECTION A (40 Marks)

1. Which of the following are not likely to be found in the structure of a virus at the same time?
   **A.** Proteins and DNA
   **B.** RNA and DNA
   **C.** RNA and proteins
   **D.** Lipids and proteins

2. The primary reason of stratification in epithelial tissue is to increase its function in:
   **A.** Protection
   **B.** Absorption
   **C.** Secretion
   **D.** Thickening of the basement

3. In animal cells, permeability of the plasma membrane to most biological molecules is reduced by:
   **A.** Proteins
   **B.** Phospholipids
   **C.** Glycolipids
   **D.** Cholesterol

4. Which one of the following does not involve a positive feedback mechanism?
   **A.** Birth
   **B.** Blood clotting
   **C.** Propagation of a nerve impulse
   **D.** Ovulation

5. Which one of the following is does not take part in physical methods of body temperature regulation in mammals?
   **A.** Sweat glands
   **B.** White fat
   **C.** Brown fat
   **D.** Arterioles

6. During depolarization of the membrane of an axon,
   **A.** Sodium ions diffuse out of the neuron
   **B.** Potassium ions diffuse out of the neuron
   **C.** Sodium ions diffuse into the neuron
   **D.** Organic ions diffuse into the neuron

7. In short day plants, flowering can be
   **A.** stimulated by Pfr
   **B.** suppressed by Pfr
   **C.** stimulated by Pr
   **D.** suppressed by Pr

8. During germination of a broad bean, the plumule thrusts upward, leaving cotyledons below the ground. This is due to:
   **A.** elongation of the hypocotyl
   **B.** Elongation of epicocotyl
   **C.** Rupturing of the seed coat
   **D.** Small cotyledons of the broad bean

9. The total number of chromosomes in a diploid plant species is 12. What would be the number of chromosomes in its endosperm after fertilisation?

**A.** 6 **C.** 18
**B.** 12 **D.** 24

10. A forest was cut down and was replaced by a sugar cane plantation. Which one of the following is the most likely negative consequence of this practice?

**A.** Increase in carbon dioxide level in the atmosphere
**B.** Increase in soil erosion
**C.** Decrease in biodiversity
**D.** Loss of nutrients by leaching

11. A man with an allele for normal colour vision marries a woman whose father was colour-blind. What proportion of offspring produced by the couple will be normal boys?

**A.** 25% **C.** 33%
**B.** 50% **D.** 75%

12. In teleosts, gaseous exchange is very efficient because

**A.** Blood meets water with a higher concentration of oxygen
**B.** Blood and water flow in the same direction
**C.** Blood and water move at the same speed
**D.** Blood and water move at different speed

13. Which one of the following is not formed during anaerobic break down of glucose by yeast?

**A.** ATP **C.** Carbon dioxide
**B.** Water **D.** Ethanol

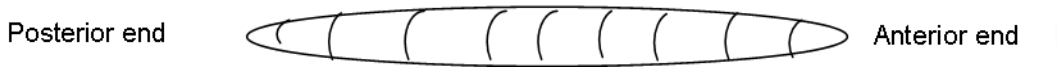
14. Which one of the following is done by marine bony fish during osmoregulation to survive in the sea?

**A.** Loose water by osmosis
**B.** Swallow water and absorb the salts
**C.** Swallow water and extrude salts
**D.** Gain water by osmosis and extrude salts

15. Young mallard reared by foster parents of another species subsequently courts with female members of that that species rather than its own species. The form of behavior exhibited is

**A.** Insight learning **C.** Imprinting
**B.** Habituation **D.** Exploratory learning

16. The figure below shows an earthworm in stationary phase.




What happens at the anterior end when the earth worm moves forward?

**A.** Circular muscles contract and chaetae retract
**B.** Longitudinal muscles contract and chaetae retract
**C.** Circular muscles contract and chaetae extent
**D.** Longitudinal muscles contract and chaetae extend

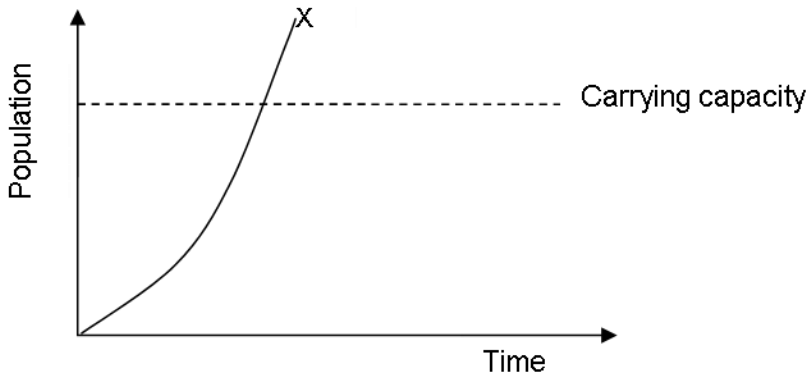
17. Which one of the following is the best way of increasing chances of preserving species diversity?

**A.** Increasing the size of conservation area
**B.** Introducing new species in the conservation area
**C.** Reducing human interference in the conservation area.
**D.** Removing patches from the conservation area.

18. The pentadactyl limb of mammals modified to become adapted to different modes of life is an illustration of

**A.** Homologous structures
**B.** Convergent evolution
**C.** Analogous structures
**D.** Comparative anatomy

19. The figure below shows changes in population of animal species.




Which one of the following is most likely to occur after point X? The population

**A.** Increases exponentially
**B.** Drops to carrying capacity
**C.** Becomes constant
**D.** Decreases below carrying capacity

20. Which one of the following groups of plants does not contain phloem tissues?

**A.** tracheophytes
**B.** bryophytes
**C.** angiosperms
**D.** pteridophytes

21. Which one of the following processes in plants would be most affected if it takes up a metabolic poison?
**A.** Movement of water through the xylem
**B.** Evaporation of water from the leaf
**C.** Movement of water with in the leaf
**D.** Movement of food from leaves to roots

22. The chemical reaction that converts carbon dioxide to bicarbonate ions takes place in the:
**A.** Blood plasma
**B.** Red blood cells
**C.** Alveolus
**D.** Heamoglobin molecule

23. The common method of reproduction in organisms which have a large number of undifferentiated cells is:
**A.** Conjugation
**B.** Fragmentation
**C.** Sporulation
**D.** Fission

24. Miscarriage due to premature birth can be caused by insufficient levels of
**A.** Progesterone
**B.** Oestrogen
**C.** Oxocytocin
**D.** Prolactin

25. Which one of the following events occur when a striated muscle fibre contracts?
**A.** I-bands and H-zone shorten
**B.** A-bands and I-bands shorten
**C.** A-bands and H-zone shorten
**D.** I-band, H-zone and A-band shorten

26. Which one of the following statements is true only for the sympathetic nervous system?
**A.** Nerve endings produce noradrenalin
**B.** Preganglionic fibres are short
**C.** Nerve endings produce acetylcholine
**D.** Preganglionic fibres are long

27. Stomatal closure occurs in plant leaves when ……
**A.** Turgor in guard cells rises
**B.** PH in guard cells rises

**C.** Water potential in guard cells is more than surrounding cells
**D.** Starch in guard cells is converted to sugar

28. Which one of the following conditions is most likely to increase the risk of the fetus being harmed by the mother's immune system?

| | **Pregnancy** | **Blood type of mother** | **Blood type of fetus** |
|---|---|---|---|
| **A.** | First | Rhesus negative | Rhesus positive |
| **B.** | Second | Rhesus positive | Rhesus negative |
| **C.** | First | Rhesus positive | Rhesus negative |
| **D.** | Second | Rhesus negative | Rhesus positive |

29. Members of a plant species suddenly begin to flower earlier than the average and fail to attract pollinating insects leaving fewer of their offspring in the next generation. This is an example of,

**A.** Stabilizing selection
**B.** Directional selection
**C.** Disruptive selection
**D.** Polymorphism

30. Which one of the following is most likely to occur when a plant is allowed to photosynthesize under very low carbon dioxide levels?

**A.** glycerate-3-phosphate accumulates
**B.** Rubulose biphoshate acccumulates
**C.** Both rubulose biphosphate and glycerate-3-phosphate accumulate
**D.** Both rubulose bi-phosphate and glycerate-3-phosphate reduce

31. By which one of the following processes are hormones and enzymes released from glands which produce them?

**A.** Exocytosis
**B.** Endocytosis
**C.** Osmosis
**D.** Phagocytosis

32. Which one of the following characteristics is not suitable for use in classification of insects?

**A.** Number of segments
**B.** Length of wings
**C.** Number of hairs
**D.** Body colour

33. Worker bee and queen bee are polymorphic forms of in a bee colony. The difference in their fertility is due to:

**A.** Mutation
**B.** Environment
**C.** Fertilization
**D.** Meiosis

34. The purpose of intercalated discs in cardiac muscles into cells is to:
**A.** Separate individual muscle cells
**B.** Stop diffusion of ions from one cell to another
**C.** Facilitate rapid spread of action potential
**D.** Prevent the muscle from fatigue

35. The oxygen dissociation curve of the fetus lies to left of that of its mother because:
**A.** The fetus is less active
**B.** The fetus uses less oxygen
**C.** Fetal hemoglobin has higher affinity for oxygen
**D.** Mothers hemoglobin has higher affinity for oxygen

36. Which one of the following forms of non disjunction occurs in non sex chromosomes?
**A.** Klinefelters syndrome
**B.** Turners syndrome
**C.** Down's syndrome
**D.** Jacob's syndrome

37. Three counts of 103, 46, 20 of a plant species were made using quadrant of $25cm^2$.The density of plants per $m^2$ is.
**A.** 169
**B.** 56.3
**C.** 2253
**D.** 676

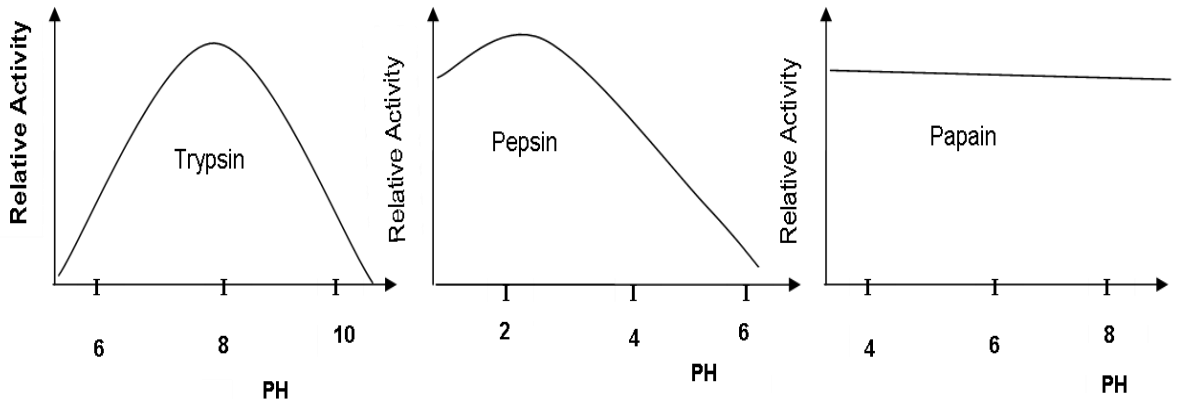
38. If 10% of bases in DNA are adenine. What is the ratio of adenine to guanine in the same molecule?
**A.** 1:1
**B.** 1:2
**C.** 1:3
**D.** 1:4

39. Which one of the following is not true during hormonal control of breathing?
A. Cerebral cortex allows voluntary control over breathing
B. Impulses move from the respiratory centre to stretch receptors via Vegas nerve
C. Stretch receptors in bronchioles and bronchi monitor the amount of inflation.
D. Impulses from aortic and carotid bodies stimulate increased inspiration rate

40. A non-competitive inhibitor affects the rate of enzyme action by
**A.** Binding to the active site
**B.** Altering the active site
**C.** Altering the substrate
**D.** Acting as coenzymes

## SECTION B (60MARKS)

41. The figure below shows the relationship between PH and relative activity of three proteases.




a) Explain why changes in PH usually affect enzyme activity? (03marks)

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b) Comment on the effect of changes in PH on the three proteases (04marks)

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c) Which one of these proteases would be most suitable for as meat tenderizer? Give a reason for your answer. (02marks)

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d) Suggest one factor other than PH which affects the activity of proteases (01marks)

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42. a)Describe the effect following on short day plants

i) Far red light (02mark)

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ii) Gibberellins (01mark)

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b) Explain the role played by gibberellins in seed germination. (03marks)

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c) How can plant growth substances be used to improve agriculture. (04marks)

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43. a) Give the meaning of the following terms

i) Epistasis (01mark)

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ii) Dihybrid inheritance (01mark)

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(b) In oats, the grain is enclosed by a hull (remains of the flower). The colour of the hull is controlled by two pairs of alleles which interact. In a cross between two pure breeding varieties of oats, one with black hulled grains the other with white hulled grains, the offspring (F1) all had black hulled grains. Allowing F1 to self-fertilize gave F2 with the phenotypes below

| | |
|---|---|
| Black hulled grain | 418 |
| Grey hulled grains | 106 |
| White hulled grains | 36 |

i) What genetic ratio is suggested from the figures given (01marks)

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ii) Use suitable genetic symbols to work out the genotypes and phenotypes of each generation. (07marks)

44. a) State any two human activities which cause eutrophication. (2mark)

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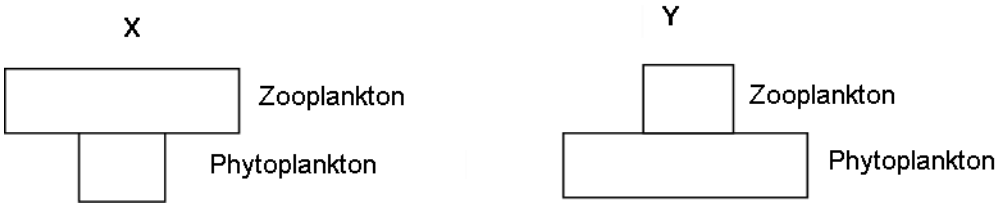
b) The figure below shows plankton biomass of a lake measured during onset of eutrophicalation and before. The results are represented in pyramid of biomass X and Y.




i) Identify which of the pyramid represents the lake:
During onset of eutrophication (½ mark)

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Before eutrophication (½ mark)

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ii) Suggest the explanation for the difference in the pyramids X and Y. (3 marks)

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iii) Explain how the phytoplanktons in X are able to support the zooplanktons.
(2marks)

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c) State two ways of reducing water pollution. (2marks)

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45. a) Distinguish between genetic drift and genetic load. (2marks)

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b) Explain how natural selection maintains recessive alleles in a population. (04marks)

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c) How does geographical isolation lead to changes in the gene pool? (04marks)

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46. a) Describe the role of each of the following in excretion in mammals.

i) Skin (02marks)

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ii) Liver (02marks)

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b) Explain why plants do not need special organs for excretion? (06marks)

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***END ****