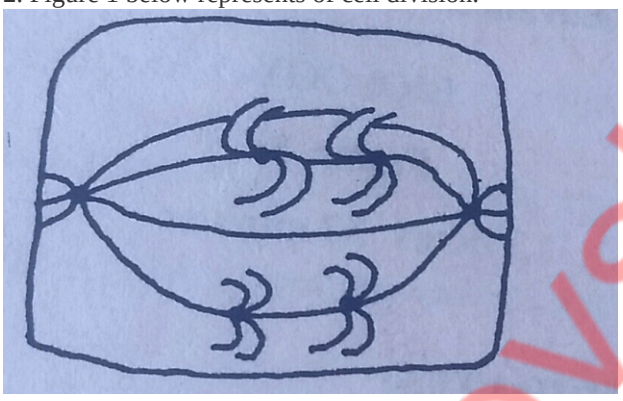
UNEB UACE BIOLOGY 2006

PAPER ONE

Answer all questions in both sections A and B

1. Which one of the following does not contribute to the short reaction times in insects?
a. Large size of omatidia
b. High flicker fusion frequencies
c. Rapid transmission of impulses
d. Large coverage of head by compound eyes

2. Figure 1 below represents of cell division.



Which one of the following stages is represented in the figure?
a. Metaphase of mitosis
b. Interphase
c. Anaphase of mitosis
d. Metaphase I of meiosis.

3. Which of the following structures is found in both xylem and phloem tissues of higher plants?
a. Sieved tracheids
b. Parenchyma cells
c. Companion cells
d. Hollow vessels

4. Which one of the following pairs of events occur together to increase the oxygen concentration in the alveoli of the lungs?
a. Contraction of diaphragm muscles and internal intercostal muscles.
b. Relaxation of diaphragm muscles and internal intercostals muscles
c. Contraction of diaphragm muscles and external external intercostals muscles
d. Relaxation of the diaphragm muscles and external intercostals muscles.

5. Loud and low oitched sound is caused by sound waves of
a. Large amplitude and high frequency
b. Low frequency and large amplitude
c. High frequency and small amplitude
d. Small amplitude and low frequency

6. During flight insects, upstroke is brought about by
a. A contraction of direct flight muscles
b. Relaxation of indirect flight muscles
c. Contraction of indirect flight muscles
d. Sudden upthrust of the body

7. The following are characteristics of amphibians.
(i) Have moist skins
(ii) Carry out external fertilization
(iii) Use gills at early stage of respiration
(iv) Use lungs for respiration

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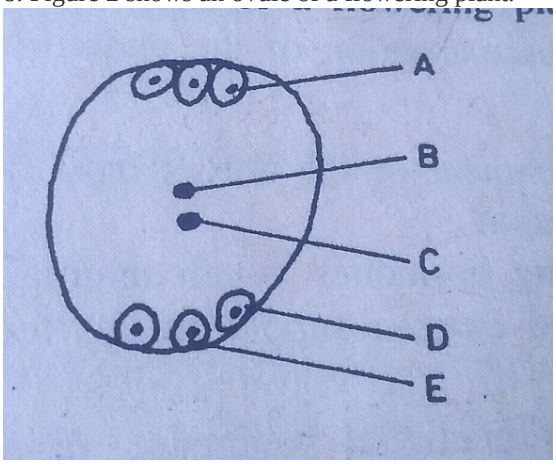
8. Figure 2 shows an ovule of a flowering plant.



A triploid nucleus is formed by fusion of a male nucleus with
a. D and C
b. B and C
c. A and B
d. D and E

9. Which one f the following is not a function of progesterone?
a. Increasing the sensitivity of uterine muscles
b. Inhibiting release of follicle stimulating hormone
c. Inhibiting release of prolactin
d. Promoting growth of mammary glands

10. Which one of the following pairs of adjustments at a respiratory surface would increase its efficiency?
a. Decreasing the rate of ventilation and increasing blood supply
b. Increasing the rate of blood flow and the rate of ventilation
c. Increasing the ventilation rate and the rate of ventilation
d. Decreasing the blood supply and the distance of diffusion of molecules.

11. Which of the following have a sole function of offering support to the plant?
a. Sclerenchyma and vessels elements
b. Vessel elements and tracheids
c. Sclerenchyma and colenchyma
d. Parenchyma and collenchymas

12. The bacteria which converts nitrates to nutrients during the nitrogen cycle are an example of
a. Nitrogen fixing bacteria
b. Nitrifying bacteria
c. Decomposing bacteria
d. Denitrifying bacteria

13. The significance of vascularisation of the endometrium before implantation in mammals is to
a. Ensure firm attachment of the foetus onto the uterine wall
b. Prevent menstruation
c. Assist in producing hormones which maintain pregnancy
d. Facilitate food and oxygen supply to the foetus

14. In a human with a non-functional pancrease, digestion of starch in the intestines would
a. Be possible because of the suitable pH due to bile
b. Not occur for absence of enzymes
c. Would be possible because succus entericus contains the necessary enzymes
d. Would not occur because of the acidic pH of chime.

15. Which one of the following is true about sex linked characters in humans?
a. Females never suffer from the trait
b. Fathers do not pass on their character to their sons
c. Females are either normal or carriers
d. Males are either carriers or nufferers

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16. The similarities of the skeletal structures of moles, monkeys and whales lead to the conclusion that they
a. Belong to the same class
b. Originate from the same environment
c. Descend from a common ancestor
d. Envolved convergingly

17. Which one of the following sets of characteristics is an adaptation in mammals to desert conditions?
a. Uric acid production and short loop of Henle
b. Long loop of Henel and urea production
c. Ammonia production and long loops of Henle
d. Man of blood group AB and woman of blood O.

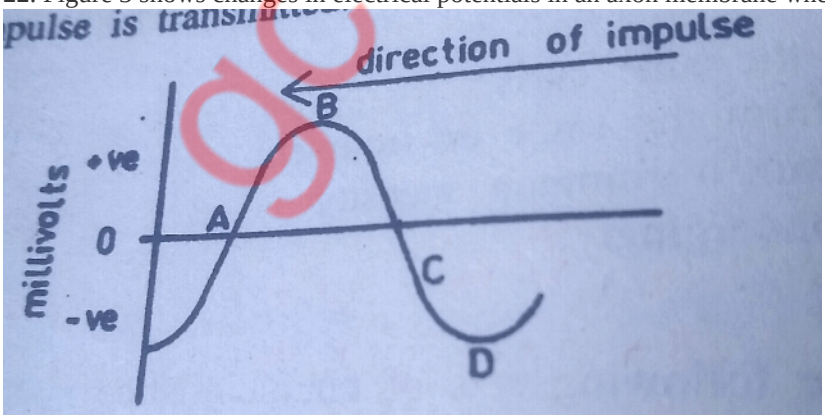
18. Which of the following cannot be parents of a child of blood group O?
a. Man of blood group A and woman of blood group O?
b. Both man and woman of blood group A?
c. Both man and woman of blood group B?
d. Man of blood group AB and woman of blood group O?

19. Which one of the following characteristics is not used in classifying amphibians and reptiles together? Possessions at some stage of,
a. Post-anal tail
b. Two pairs of pentadactyl limbs
c. Notorchord
d. Nerve cord

20. If carbon dioxide containing radio active carbon was added to a suspension of photosynthesis algae, in which one of the following compounds would the radio active carbon show first?
a. Glucose
b. Phosphoglyceric acid
c. Ribulose biphosphate
d. Triose phosphate

21. Etiolation in plants is usually a response to
a. Insufficient nutrients
b. Low temperatures
c. Insufficient light
d. Too much water

22. Figure 3 shows changes in electrical potentials in an axon membrane when an impulse is transmitted.



At what stage of the electrical potentials marked, is axon most permeable to sodium ions?

23. Which one of the following is a disadvantage of a tracheal system for gaseous exchange in insects?
a. Ventilation is limited
b. Tracheales are impermeable
c. Spiracles are too small
d. The system does not supply all bordy parts

24. A climax community is one in which
a. Succession is at its peak
b. A carrying capacity has been reached

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c. Succession has been ceased
d. Death rate of organisms is at its lowes

25. Which one of the following is not a function of the skeleton in insects?
a. Support of body
b. Protection of delicate body parts
c. Prevention of desiccation
d. Secretion of wax

26. Which of the following structures is haploid?
a. Primary oocyte
b. Spermatogonium
c. Secondary oocyle
d. Germinal epithelium

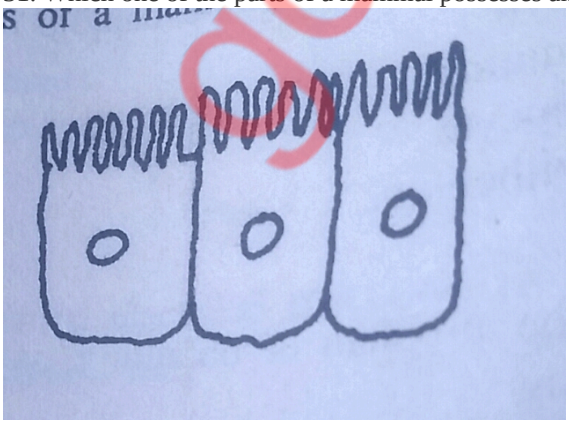
27. In higher plants, the problem of obtaining oxygen for respiration is solved by leaves possessing
a. Large intercellular spaces
b. Compact palisade layer
c. Thin lower epidermis
d. Numerous stomata on a lower epidermis

28. Which one of the following is a method used by marine bony fish to overcome the problem of possessing body fluids that are hypotonic to the sorroundings?
a. Increase in the glemerular filtrate
b. Extensive reabsorption of salts
c. Retension of urea
d. Elimination of non-toxic nitrogenous wastes

29. Good drainage and ploughing of soil reduces the process of
a. Nitrification
b. Decomposition
c. Denitrification
d. Nitrogen fixation

30. If the solute potential of the external solution is higher than that of the cell, the external solution is said to be
a. Hypotonic to the cell solution
b. Hypertonic to the cell solution
c. Isotonic to the cell solution
d. Of lower osmotic pressure than the cell solution

31. Which one of the parts of a mammal possesses an epithelia tissue as shown in figure 4?



a. Oviduct
b. Ileum
c. Respiratory tract
d. Loop of Henle

32. The type of learning that involves the immediate understanding and and responding is?
a. Imprinting
b. Associative learning
c. Insight learning

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d. A deficiency in oestrogen

33. Prolonged menstrual period may be caused by?
a. High levels of progesterone
b. A decrease in production of follicle stimulating hormone
c. High levels of luteinizing hormone
d. A deficiency in oestrogen

34. Auxins are often used as selective weed killers on lawns because
a. Same dosage of auxins affects different plant parts, differently.
b. They can be manufactured artificially
c. Auxins always kill dicotyledonous plants
d. Auxins remain on the vegetation long after application

35. The compounds which act as oxidizing agents during anerobic respiration in plants are?
a. NAD and pyruvic acid
b. Ethanol and NAD
c. NAD and FAD
d. NADp and pyruvic acid

36. In any ecosystem, a continued input of energy is required because
a. Matter is continually used in metabolic process
b. Biological succession occurs very slowly
c. Of the continued increase in population in the ecosystem
d. Energy is lost each time it is transferred between organisms

37. During the heat of the day, control of the stomatal movements to reduce excessive water loss is due to
a. Active accumulation of mineral ions in the guard cells
b. Synthesis of abscisic acid
c. Inter conversion of glucose and starch in the guard cells
d. Synthesis of glucose during photosynthesis

38. Sucrose is a non-reducing sugar because it
a. It is not fully digested
b. Lacks reducing groups
c. Is a disaccharide molecule
d. Is a ketose sugar

39. Which of the following animals have the most efficient system of gaseous exchange?
a. Insects
b. Bony fish
c. Mammals
d. Amphibians

40. Which one of the following activities contributes least to the green house effect?
a. Use of CFC s
b. Deforestation
c. Excessive use of fertilizers
d. Burning fossil fuels

SECTION B.
Answer all questions in this section

41. Figure 5 shows two types of arrangements, A and B, of sensory cells in the mammalian eye.

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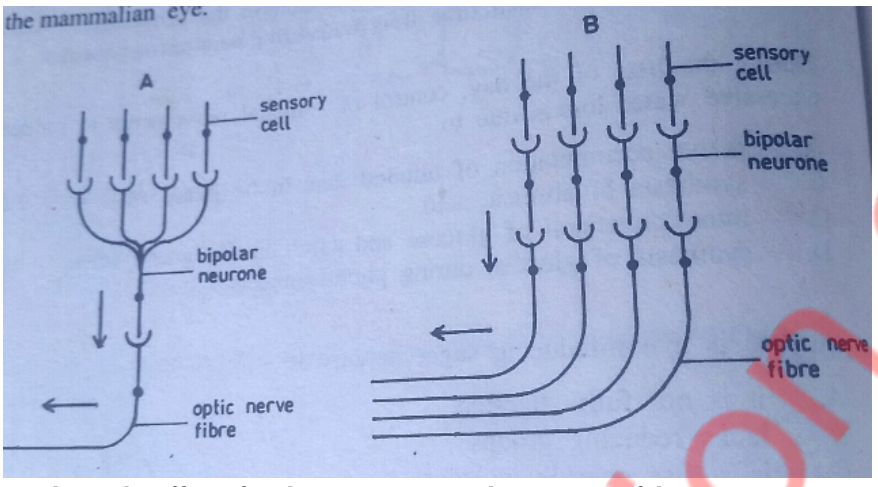

a. What is the effect of each arrangement on the response of the eye
(i) Effect of the arrangement A
(ii) Effect of arrangement B

b. Explain how the effect of each arrangement is brought about.
(i) Effect of arrangement A
(ii) Effect of arrangement B
c. Under which light conditions is each arrangement most effective and why?
(i) Arrangement A
(ii) Arrangement B

42. What is meant by water stress in relation to plants?
a. What is the effect of water stress in green plants?
b. Outline the structural adaptations of the xylem vessel for long distance transport of water and mineral salts.

43. Figure 6 shows the effect of changing the osmotic pressure of the external medium (Ope), on the osmotic pressure of the blood (Opi), of the sea animals A and B.

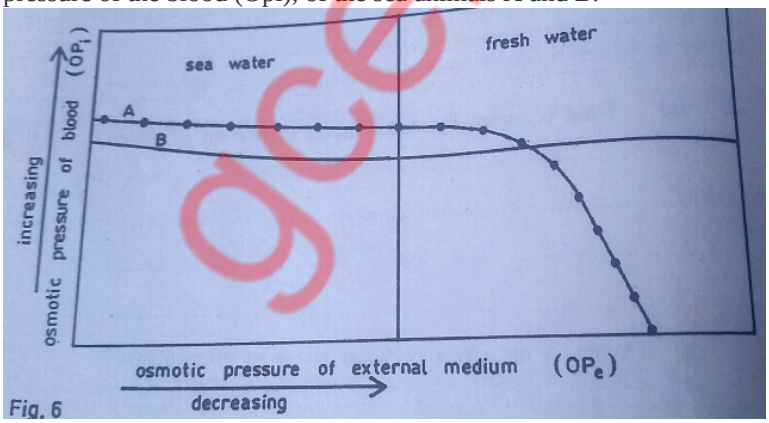

Fig. 6

a. Explain the effect of decreasing the Ope on the Opi of each animal.
(i) Animal A
(ii) Animal B
b. Using the information provided, suggest an ecological advantage animal B has over animal A.
c. What is the main osmotic problem faced by sea animals whose Opi is less than Ope?

44. What is meant by alternation of generation?
a. Ferns and mosses show alternation of generations. State the dominant stage in each case.
(i) Ferns
(ii) Mosses
b. Give the importance of alternation of generations in the life cycle of an organism.
c. Outline the limitations that mosses face in growing in terrestrial habitats.

45. Outline the causes of gene reshuffling

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a. In what way may variation resulting from gene reshuffling differ from that caused by mutation?
b. What is the importance of variation in a population?
c. Explain how constancy of species may be maintained through naturl selection.

46. Table 1 shows the amount of DDT measured in parts per million (ppm) found in a variety of organisms associated with a fresh water lake.

Where the DDT level was measured	Ammount of DDT/ppm
Water	0.0003
Phytoplankton	0.006
Zooplankton	0.39
Herbivorous fish	1.8
Carnivorous fish	14.3
Fish - eating birds	

a. Calculate how many times the DDT is more concerned in carnivorous fish compared with its concentration in water.
(i) What do the results In a show?
b. Explain why the concentration of DDT changes from water to carnivorous fish.
c. State two effects of DDT to organisms.
d. Explain how a pest sprayed with a pesticide may flourish afterwards.

PAPER TWO

1. Figures 1,2 and 3 show the immigration and extinction of species on different categories of virgin islands.

Figure 1 shows the rate of immigration of new species on an island and near by the shore and one that is far from the shore.

Figure 2 shows the rate of extinction of species on a large island and on a small island.

Figure 3 shows the rate of immigration and extinction of species on an island

Study the information and use it to answer the questions that follow.

FIGURE 1

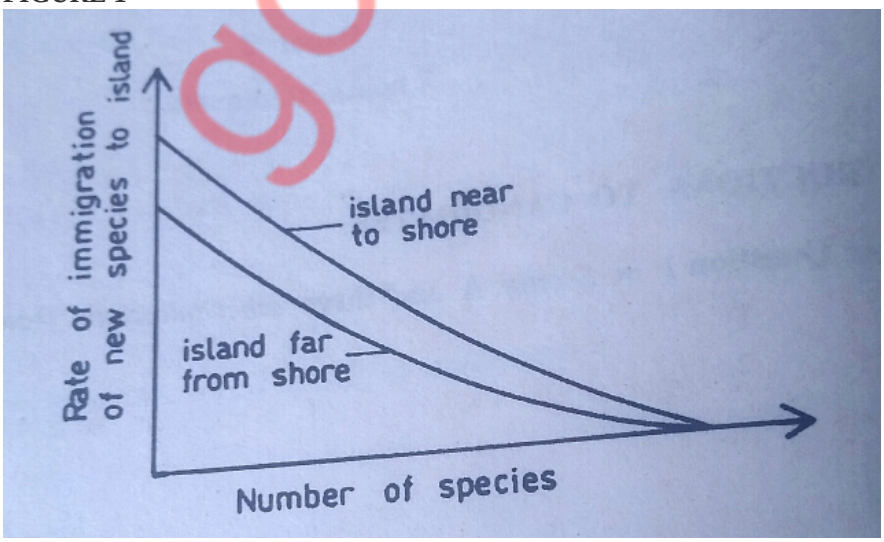

FIGURE 2

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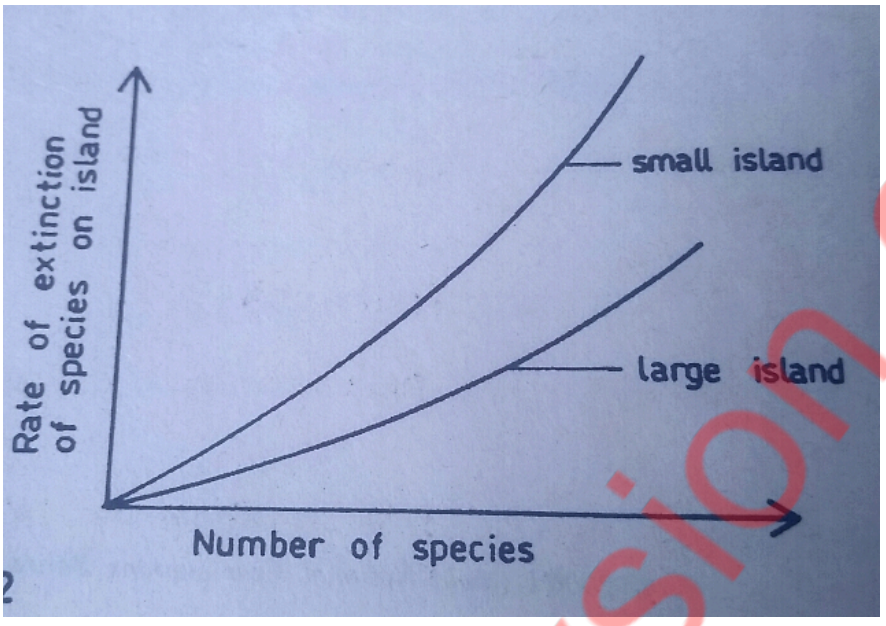
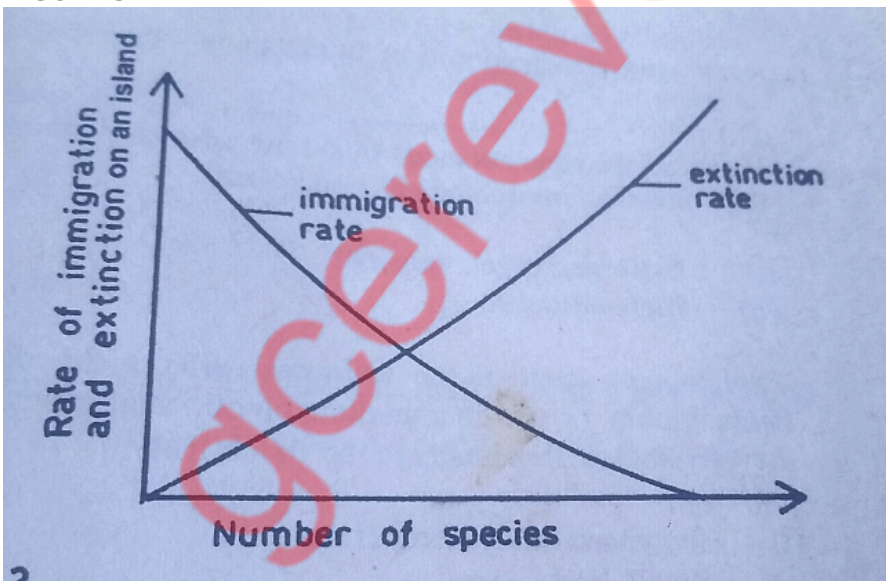


FIGURE 3



a. Explain the rate of
(i) Immigration of new species on an island that is near to the shore and one that is far from the shore(figure 1)

(ii) Extinction of species on a small island and on a large island (figure 2)

(iii) Immigration and extinction of species on an island (figure 3)

b. From figures 1,2 and 3, what conclusion can you draw about what determines the number of species on an island?

c. Describe the factors other than those depicted in the information provided, may affect the immigration of new species on an island.

d. Suggest the factors that would cause immigration of new species to a virgin island.

SECTION B

2. Describe the physiological changes that occur in a seed during germination.

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a. Giving reasons, suggest suitable conditions under which seeds for planting should be stored.

b. Even when supplied with suitable conditions for germination, some seeds remain dormant. Explain the importance of dormancy in seeds.

3. Describe the adaptations of blood in terrestrial animals living the following environmental conditions.

(i) Increased body temperature

(ii) Small body size

4. Explain the factors that influence the type of nitrogenous wastes excreted by animals.

a. Describe osmoregulation in a terrestrial insect

5. Compare DNA nad RNA molecules

b. Describe the role of the mRNA in the proteins relate to their functions.

c. How does the molecular structure of proteins relate to their functions?

6. Discuss how structure and function are related for each of the following tissues.

a. Voluntary muscle tissue

b. Parenchyma tissue in plants.

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