1. Which one of the processes aids the absorption of amino acids after eating a heavy proteneous meal?
   A. Active transport and diffusion.
   B. Diffusion and osmosis.
   C. Diffusion and pinocytosis.
   D. Active transport only.

A

2. Of the following pairs of responses in plants, which one is caused by unequal distribution of auxins?
   A. Phototropism and abscission.
   B. Geotropism and phototropism.
   C. Photoperiodism and phototropism.
   D. Nastic movement and geotropism.

B

3. Which one of the following is true of linked characteristics? They
   A. Are always transmitted as a single block.
   B. Are allelic to one another.
   C. Occur on non-homologous chromosomes.
   D. Can be transmitted independently.

D A

4. The amount of progesterone in the blood increases steadily from the time of ovulation to menstruation, then begins to decline. This is because...
   A. Implantation of the zygote occurs.
   B. It is washed out with blood during menstruation.
   C. Luteinising hormone inhibits its production.
   D. Its work of repairing the uterine wall gets complete.

C

5. What is the main advantage of the C4 pathway during the process of photosynthesis?
   A. Fix carbon dioxide in the carbon cycle.
   B. Concentrate carbon dioxide in the cells of leaves.
   C. Fix carbon dioxide from the atmosphere into the leaves.
   D. Store carbon dioxide in form of organic acids.

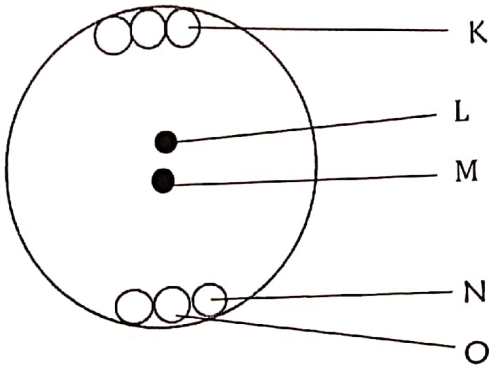
B

6. During flight in insects, upstroke is brought about by?

   A. Contraction of direct flight muscles.
   B. Relaxation of indirect flight muscles.
   C. Contraction of indirect flight muscles.
   D. Sudden up thrust of the body.

Mark To be transferred.
C
No Answer
A, B, C

7. The figure below represents an ovule of a flowering plant.



A triploid nucleus is formed by the fusion of a male nucleus with

   A. N and M.
   B. L and M.
   C. K and L.
   D. N and O.

B

8. Which one of the following pairs of events occur together to increase the oxygen concentration in the air sacs of the lungs?

   A. Contraction of diaphragm muscles and internal intercostal muscles.
   B. Relaxation of diaphragm muscles and internal intercostal muscles.
   C. Contraction of diaphragm muscles and external intercostal muscles.
   D. Relaxation of the diaphragm muscles and external intercostal muscles.

C

9. Which one of the following structures are found in both the xylem and phloem tissues of higher plants?

   A. Sieved tracheids.
   B. Companion cells.
   C. Hollow vessels.

D

D. Parenchyma cells.

10. The following are characteristic features of amphibians;

i. Have moist skins.

ii. Carry out externa fertilisation.

iii. Use gills at early stages for respiration.

iv. Use lungs for respiration.

Which one of the following pairs of characteristics limit them from inhabiting a totally terrestrial environment?

A. (ii) and (iii).

B. (i) and (ii).

C. (iii) and (iv).

D. (i) and (iv).

A

11. What is the significance of the vascularisation of the endometrium before implantation in mammals? To.....

A. Prevent menstruation.

B. Ensure firm attachment of the foetus onto the uterine wall.

C. Assist in producing hormones that maintain pregnancy.

D. Facilitate food and oxygen supply to the foetus.

B

12. 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. Evolved convergingly.

D. Descended from a common ancestor.

D

13. Dioecious plants are very rare in spite of having the advantage of cross pollination because

A. Anthers and stigma mature at different times.

B. The male and female plants are usually apart.

C. Half of the individuals do not produce seeds.

D. Only few agents of dispersal are involved.

C

14. Birds have learnt to ignore a scare crow that is left in the same spot for a long period of time. This type of behaviour is called.

A. Habituation.
B. Associative learning.
C. Imprinting.
D. Conditioning.

A

15. Which one of the following is an essential feature for successful terrestrial life of flowering plants?

A. Reduction of sporophyte to seeds.
B. Development of the pollen tube to transfer male gamete.
C. Possession of well-developed vascular system.
D. Reduction of the gametophyte to spores.

B

16. Which one of the following is not true about the cells of a tissue? They

A. Have physical linkage.
B. Are of the same origin.
C. Are of the same type.
D. Have similar function.

C

C, B, D

17. Which one of the following is likely to occur when an actively photosynthesising plant was suddenly removed from light?

A. No change in the amount of PGAL.
B. Accumulation of PGAL.
C. Reduction in PGA.
D. Accumulation of PGA.

D

18. In guinea pigs, the allele for rough coat (**R**) is dominant over one for smooth coat (**r**) and that for black coat (**B**) is dominant over one for white coat (**b**). the alleles are for coat type and colour are not linked. A cross between rough black guinea pig and rough white one produced 28 rough black, 31 rough white, 11 smooth black and 10 smooth white. Which one of the following is likely to be the genotype of the parents?

A. **RrBb X Rrbb**

B. **RRBB X RRbb**

C. **RRBb X Rrbb**

D. **RrBB X Rrbb**

A

19. The mixing of oxygenated blood and deoxygenated blood in the amphibians is minimised by

A. Rapid contraction of the ventricle.

B. Spongy nature of the heart muscles.

C. Spiral valve in the truncus arteriosus.

D. Columnae carnae in the ventricular walls.

C

20. In which of the following parts of the chloroplast are water splitting enzymes mostly located?

A. Intergrana.

B. Cytoplasm.

C. Stroma.

D. Grana.

D

21. Which of the following tissues would be stained deepest red by a dye that contains nuclei red?

A. Sieve tube.

B. Tracheid.

C. Collenchyma.

D. Cambium.

D

22. Which one of the following is the correct statement about a neurone membrane during resting potential?

A. The inside of the neurone membrane is negatively charged.

B. The Na^+, K^+, and Cl^- ions are evenly distributed on either side of the membrane.

C. The concentration of Na^+ ions is greater inside the membrane.

D. The concentration of K^+ ions is greater outside the membrane.

A

23. A cockroach possesses a respiratory system while the earthworm does not possess one because

A. Earthworms do not need much oxygen.
B. The surface volume ratio of the cockroach is small.
C. Earthworms can be parasitic.
D. The respiratory system provides shape in a cockroach.

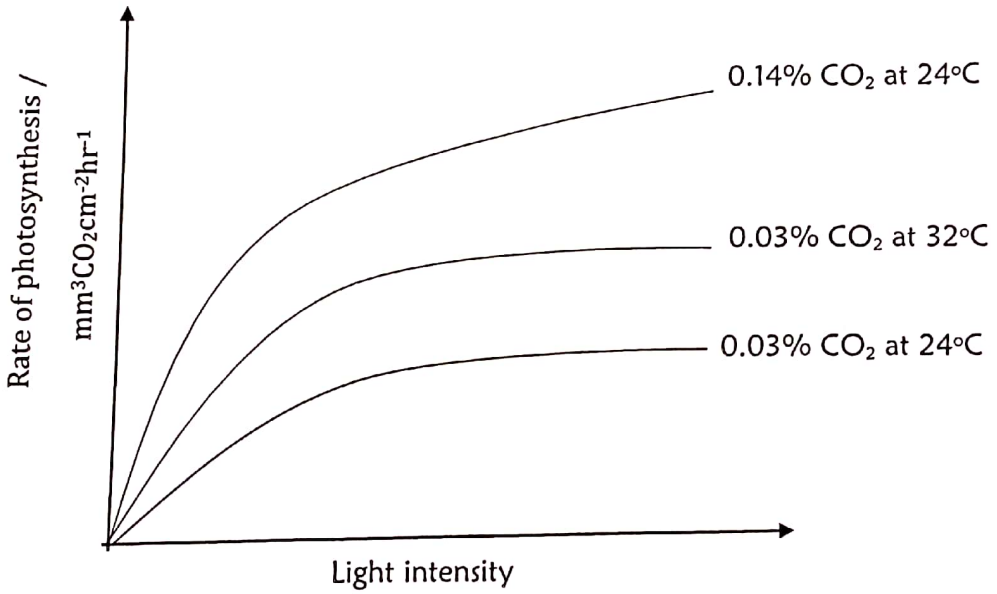
B

24. The cartilaginous fish retain urea in the blood in order to

A. Reduce entry of salts into the tissue.
B. Avoid loss of excess water by excreting it.
C. Avoid dehydration.
D. Maintain an internal ionic concentration in balance with the external medium.

C

25. Which one of the following is illustrated in the figure below?



A. With increase in light intensity, the rate of photosynthesis increases until the temperature becomes a limiting factor.
B. Rate of photosynthesis increases with an increase in the carbon dioxide concentration.
C. With increase in light intensity, the rate of photosynthesis increases indefinitely.

D

D. Rate of photosynthesis increases with an increase in light intensity until carbon dioxide concentration becomes a limiting factor.

26. Which one of the following is the ultimate hydrogen acceptor during anaerobic respiration in animals?

A. Lactate.
B. NAD.
C. Pyruvic acid.
D. Acetaldehyde.

C

27. Which one of the following is the correct shape, in the region of the body of an earthworm where its circular muscles are contracted?

A. Short and thick.
B. Long and thin.
C. Short and thin.
D. Long and thick.

B

28. Worker bees and the queen bee are polymorphic forms which differ in their fertility as a result of

A. Feeding on different diets.
B. Worker's eggs not being fertilised.
C. Workers being produced parthenogenetically.
D. The queen having diploid cells while the workers have haploid cells.

A

29. Which one of the following organisms does not belong to the same phylum as the rest?

A. Tapeworm.
B. Leech.
C. Liver fluke.
D. Planaria.

B

30. which one of the following is not a purpose for courtship behaviour among animals?

A. Ensuring that both partners are sexually mature.
B. Establishing a pair-bond.
C. Ensuring that both partners are ready for mating.

D

D. Establishing territories.

31. Which one of the following adaptations of xerophytes does not reduce transpiration?

A. Hairy leaves.

B. Leaves with thick waxy cuticle.

C. Small sized leaves.

D. Succulent stems.

D

32. In a multi-enzyme controlled reaction,

$$P \xrightarrow{\text{Enzyme 1}} Q \xrightarrow{\text{Enzyme 2}} R \xrightarrow{\text{Enzyme 3}} V$$

If an excess of V controls the metabolic pathway of the reaction, the control mechanism is known as

A. Multi-enzyme control.

B. Excess inhibition.

C. End product inhibition.

D. Negative feedback.

C

33. Adaptation by plants to obtain nitrogen include all the following except

A. Possession of aerial roots.

B. Being insectivorous.

C. Mycorrhiza on plant roots.

D. Bacteria in root nodules.

A

34. Which one of the following refers to groups of individuals of at least two species living together?

A. Population.

B. Community.

C. Habitat.

D. Niche.

B

35. Net productivity in the C_4 plants is much higher than that in C_3 plants because

A. C_4 plants have a higher turnover rate.

B. Energy accumulates at a higher rate in C_4 plants.

C. Photophosphorylation occurs in C_3 plants.

D. The rate of respiration is higher in C_3 plants.

A

36. Which one of the following ecological pyramids may be used to determine productivity in an ecosystem?

A. Pyramid of energy.

B. Pyramid of biomass.

C. Pyramid of numbers.

D. Pyramid of productivity.

A

37. Which one of the following forms of environmental hazards is attributed to application of CFCs?

A. Ozone layer depletion.

B. Acid rain.

C. Greenhouse effect.

D. Eutrophication.

A

38. Which part of the vestibular apparatus responds to the vertical movement of the head?

A. Vestibular canal.

B. Saccule.

C. Utricle.

D. Semi-circular canal.

C B

39. Three counts of 103, 46, and 20 of a plant species were made using a quadrant of 25cm^2. The density of the plant per m^2 is

A. 169.

B. 56.3.

C. 225.

D. 676.

C

40. Which one of the following couples is likely to produce a foetus suffering from fatal erythroblastosis?

A. Rh^+ mother and Rh^- father.

B. Rh^- mother and Rh^- father.

C. Rh^+ mother and Rh^+ father.

D. Rh^- mother and Rh^+ father

D

SECTION B

41. a) **What do you understand by the term apical dominance?** **(02 mks)**

This is a condition where the shoot tip produce alot of auxins, that prevent the growth of lateral buds.

This is the ~~process~~ whereby the shoot tip inhibits the outgrowth of axillary buds further down the stem to control the number of growing shoot tips and branches

b) **State the causes of each of the following:**

i. **Seed dormancy.** **(02 mks)**

Hard seed coat/ testa; ✓

Immature embryo; ✓ ***(any two)*** | Premature harvest

Presence of germination inhibitors; ✓ | e.g Abscisic acid

Harsh environmental conditions for example lack of water; absence of oxygen; high temperatures; ✓

ii. **Apical dominance.** **(02 mks)**

High concentration of auxins; ✓

High levels of abscisic acid; ✓

Deny a mark to an answer without 'high' levels/conc

c) What is the ecological importance of

I. **Seed dormancy.** **(02 mks)**

Allows the seed *to survive hash environmental conditions; ✓*

*It also allows time for the dispo*er*sal of seeds; ✓*

It gives ample time for the embryo to develop; ✓ ***(Any two)***

It also increases chances for germination and survival of the seedlings; ✓

Prevents seeds from germinating in a fruit

[11]

II. **Apical dominance.** **(02 mks)**

Causes elongation of the stems to heights for maximum capture of light; ✓

Also causes elongation of the stems to heights for easy flower pollination and dispersal of fruits; ✓ ***(Any two)***

Also brings about a reduction in intraspecific competition. ✓

10

42. a) What is meant by the term environmental resistance? **(02 mks)**

Refers to the sum or total of limiting factors, both biotic and abiotic which interact; ✓ together to prevent the biotic potential from being obtained; ✓

b) Outline the factors:

i. **Affecting biotic potential.** (internal) **(04 mks)**

Procreation that is the number of times per year the organisms reproduce; ✓

Maturity which refers to the age at which reproduction begins; ✓

The male to female ratios in the population; ✓ ***(Any four)***

The age structure that is age at which reproduction is high e.g. in man at 45, chances of producing become minimal; ✓

Clutch size, the number of offspring produced at each reproductive event; ✓

Frequency of reproduction; ✓

The reproductive lifetime; ✓

The survivorship of offspring to reproductive maturity; ✓

ii. **Hindering biotic potential.** (external) **(04 mks)**

Lack or loss of food; ✓

Increased predator population; ✓

High pollution in the environment; ✓ ***(Any four)***

Fire outbreak which destroys organisms, breeding sites, nest, eggs, slow moving organisms; ✓

Man's activities e.g. encroaching on swamps, wet lands, forests, road construction which separates ecosystems; ✓

Diseases, parasites and pests; ✓

[12]

43. a) What is meant by water stress in relation to plants? **(01 mk)**

This is a condition where plants lose; ✓ more water through transpiration; than they can take in; ✓

block mark.

b) What is the effect of water stress in green plants? **(04 mks)**

Causes wilting or loss of turgidity; ✓

Results into rapid closure of the stomata; ✓

Causes reduction in rate of photosynthesis; ✓ due to cut off in CO_2 supply; ✓

Also causes reduced growth rate; ✓ Reduces ~~rate of~~ productivity ✓

Also causes a reduction in metabolic processes; ✓ Any four

c) Outline the structural adaptations of the xylem vessel for long distance transport of water and mineral salts. **(05 mks)**

They are long tubes and hollow *made by fusion of neighbouring cells end to end; ✓ providing* ~~little resistance to the~~ continuous *flow of water; ✓*

They are made of dead cells; ✓ which reduces resistance to water flow; ✓

Their tubes highly lignified; ✓ and thus cannot easily collapse during the transportation of water; ✓

They are fine tubes; ✓ thereby necessary for high capillarity in the xylem vessels; ✓

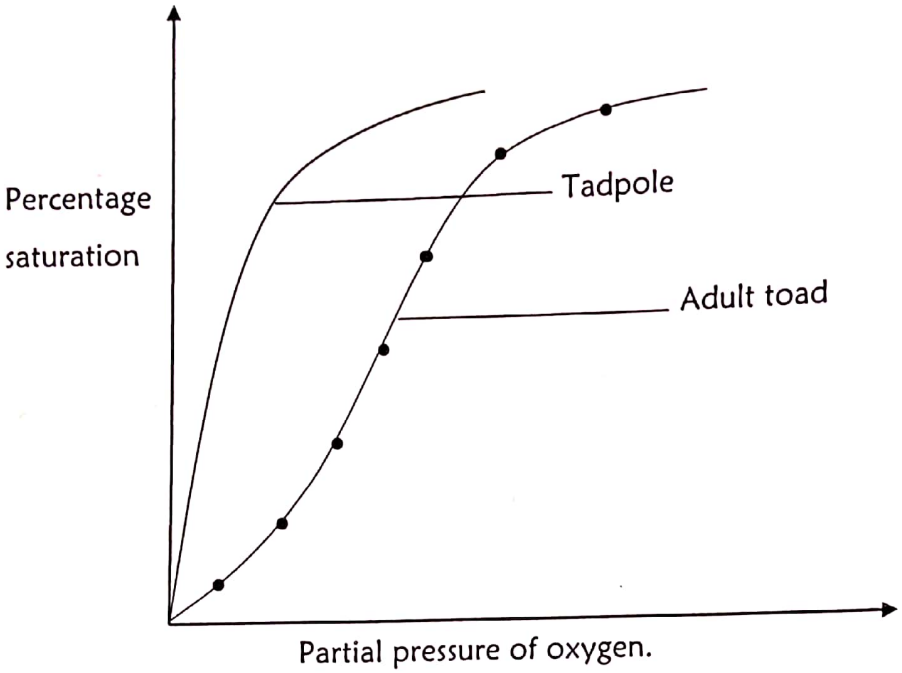
Possess lignin on the cellulose cell walls; ✓ which increases the adhesion of water molecules thence water rise by capillarity; ✓

10

Give a mark only if structure and function are mentioned.

[13]

44. The figure below shows oxygen dissociation curves for a tadpole blood and that of an adult toad. Study it carefully and then give responses to the following questions:



a) **Explain the relative position of the curves for the tadpole blood and that of the adult toad.** **(03 mks)**

The curve for tadpole haemoglobin is to the left of that of adult toad haemoglobin; ✓ therefore, tadpole haemoglobin has a higher affinity for oxygen; ✓ as it lives in areas of lower oxygen tension; ✓

b) **What advantage is the position of the dissociation curve for the tadpole in its environment?** **(04 mks)**

A tadpole lives in stagnant ponds; ✓ with low oxygen content/ high carbon dioxide content; ✓ thus, it needs haemoglobin with a high affinity for oxygen; ✓ to enable it extract oxygen from the environment; ✓

c) **How is the skin of the adult toad adapted for gaseous exchange? (03 mks)**

It is moist; ✓ to allow easy diffusion of respiratory gases; ✓

It possesses a rich supply of blood capillaries; ✓ so as to maintain a steep concentration gradient for diffusion of gases; ✓

The skin is quite thin; ✓ in order to allow fast diffusion of gases; ✓

[14]

The skin is also highly permeable: ✓ for easy diffusion of the respiratory gases; ✓

10

45. Fungi were originally classified under kingdom plantae.

a) Outline the characteristic features that made it necessary for them to be placed in their own kingdom. **(03 mks)**

Fungi are heterotrophic organisms; ✓ – mycelial body (filamentous body)
They possess cell walls made up of chitin; ✓ – store carbohydrate in form of glycogen.
They are multinucleated cells that is they are coenocytic; ✓ **(any three)**
They also undergo nuclear mitosis; ✓
Their mitochondria are flattened cristae; ✓

Deny mark for those x-tic shared by fungi & plants

Deny marks for negative answers eg lack chlorophyll.

b) Explain why fungi are wide spread and in vast numbers. **(04 mks)**

Deny feeding on dead decaying matter

They produce vast numbers of spores each of which can grow into a new individual; ✓

They reproduce both sexually and asexually thence the vast numbers; ✓

Fungi can also tolerate a wide range of pH, temperature etc thereby wide spread and in vast numbers; ✓

They feed on dead organic matter which are in plenty and actually found in all areas within the ecosystem; ✓

Fungi also live in association with other organisms where it would be quite difficult for it to survive independently thence their wide spread and vast numbers; ✓ **(any four)**

They form zygspore which can remain dormant for a long period of time in order to survive adverse conditions; ✓

Fungi also reproduce by means of spores which are very light and therefore very easy to disperse thence wide spread and vast in numbers; ✓

c) What is the economic importance of fungi? **(03 mks)**

They are decomposers thereby important in the ecosystem; ✓
Fungi cause diseases to both plants and animals; ✓
Some fungi serve as food for other ~~materials~~ organisms; ✓
Extracts from fungi are used as antibiotics; ✓

[15]

Fungi are used in the fermentation industry eg yeast; ✓

They are also used for experiments eg in genetic investigation research; ✓

They cause deterioration of materials eg food, leaves; ✓ Any three. 10

46. Three healthy, unrelated species of flowering plants A, B and C were subjected to a range of different light and dark treatments. The results obtained are shown in the table below:

	Treatments					
	1	2	3	4	5	6
Hours of light	15	14	13	12	11	10
Hours of darkness	9	10	11	12	13	14
Species: **A**	+	+	+	+	-	-
B	-	-	-	-	+	+
C	+	+	+	+	+	+

KEY: + Means flowering occurred - Means No flowering occurred.

a) State the photoperiodic group under which each species belongs and give reasons to support your answer. **(03 mks)**

(i) A *Long day plant; requires 12 or more hours of light to flower; ✓* (Short night plant)

(ii) B *Short day plant; requires more than 12 hours of darkness to flower; ✓* (long night plant)

(iii) C *Day neutral plant; it is not affected by day length or darkness; ✓* Deny neutral plant.

b) Describe how the phytochrome controls flowering response exhibited in species A and B. **(04 mks)**

(i) Species A *Long exposure to light favours the accumulation of P_{fr}; ✓ (conversion of Pr to Pfr) which stimulates flowering; ✓*

(ii) Species B *Long dark periods; ✓ favours conversion of P_{fr} to P_r stimulates flowering; ✓*

c) What would be the likely effect of flashing light during darkness on each of the specimens? **(03 mks)**

(i) A *Results in the accumulation of P_{fr} which promotes early flowering; ✓* will increase / will be promoted.

(ii) B *Results in accumulation of P_{fr} which inhibits flowering; ✓*

[16]

Deny if the effect is accompanied with wrong explanation.

(iii) C No effect on flowering. ✓

END