

P530/1  
BIOLOGY  
Paper 1  
2<sup>nd</sup> Term Holiday Aug 2014  
2 hours 30 minutes

SENIOR SIX  
BIOLOGY  
(THEORY)  
Paper 1  
2 hours 30 minutes

**INSTRUCTIONS**

Answer all questions in both sections A and B

**SECTION A**

Answers to this section must be written in the spaces provided.

**SECTION B**

Answers to this section should be written in the spaces provided and not anywhere else.

For Examiner's Use Only	
SECTION A : 1 – 40	
SECTION B : 41	
42	
43	
44	
45	
46	
TOTAL	

SECTION A

1. Which one of the following provides the basis on which organisms are classified?

- A. Phylogeny
- B. Dichotomous keys.
- C. Variation among organisms
- D. Natural selection.

2. Which one of the following is lined with a cuboidal epithelium in mammals?

- A. distal convoluted tubule
- B. stomach.
- C. Vestibular apparatus of the ear.
- D. Trachea.

3.If the pectoral fin on a fish was removed, the fish would

- A. tend to roll.
- B. be unable to turn efficiently.
- C. have reduced speed of movement.
- D. be unable to swim to the surface.

4.Which one of the following characteristics of the newt can be said to limit its efficiency as a terrestrial animal ?

- A. Presence of lungs.
- B. Double circulatory system.
- C. Possession of mucus secreting epithelial cells.
- D. Possession of glomeruli

5..Which of the following is caused by a non-disjunction?

- A. Haemophilia.
- B. Phenylketonuria.
- C. Sicklecell anaemia.
- D. Down's syndrome.

6.. Which of the following cells produce oestrogen?

- A. Germinal epithelium.
- B. By Cells of the Graafian follicle.
- C. Corpus albicans.

D. Sertoli cells.

7. Vasopressin hormone secreted *by* the posterior lobe of the pituitary gland.

A. raises blood pressure .

B. reduces blood pressure .

C. brings equilibrium in blood pressure

D. has no action on blood pressure .

8. In mammals, stroke volume and cardiac frequency determine.

A. Peripheral resistance .

B. Cardiac output.

C. systole

D. diastole

9. . The immediate effect that happens to a child born with a hole in the wall between the two ventricles is

A. prevention of flow of blood into the aorta.

B. . prevention of blood flow to the pulmonary artery.

C. blood flowing back into the veins.

D. oxygenated blood mixing with the deoxygenated blood.

10. The recessive genes in *Zea mays* are brown mid-rib(b) and Short internodes (v) and are on the same chromosome. A cross was made between *Zea mays* heterozygous for brown mid-rib and short internodes and one, which was homozygous for these alleles. The numbers of each offspring were

1024 All normal

152 Green midrib short internode

136 Brown midrib long internode

1088 Brown midrib short internode

What is the cross-over value?-----%

A.6.7

B.8

C.12

D.18

11. Which one of the following organisms has the greatest amount of energy?

A. Herbivores.

B. Carnivores.

- C. Omnivores.
- D. Decomposers.

12. In the gastric glands, the hydrochloric acid and digestive enzymes are secreted by the following cells respectively:

- A. Peptic (chief) cells and oxyntic cells.
- B. Oxyntic cells and peptic (chief) cells.
- C. Kupffer cells and peptic (chief) cells.
- D. Kupffer cells and oxyntic cells.

13. If in a certain area weaver bird's population is increasing beyond the food supply available, which is most likely to occur?

- A. Natality decline.
- B. Immigration.
- C. Migration.
- D. Increased mortality.

14. Which function of the liver results in the production of bile pigments?

- A. breakdown of haemoglobin
- B. deamination of amino acids
- C. detoxification of metabolic poisons
- D. release of stored vitamin A

15. Which one of the following phenotypic ratios result from a recombination due to linkage?

- A. 1:2:1
- B. 1:1:1:1
- C. 2:1
- D. 1:1

16. Which of the following techniques is most suitable for investigating the distribution of rodents in an open grassland?

- A. Line transect .
- B. Lincoln index method.
- C. Random quadrats.
- D. Belt transect.

17. What is the most likely effect of a population explosion among carnivores in a national park?

- A. The population of herbivores will go up.
- B. The vegetation cover will increase.
- C. There will be an increased demand on the primary producers.
- D. There will be increased number of decomposers

18. During anaerobic respiration, the hydrogen atoms taken up by NAD are handed to
- A. FAD
  - B. Cytochrome oxidase.
  - C. Pyruvic acid.
  - D. Acetyl coenzyme

19. During what stage of prophase 1 of meiosis do the homologous chromosomes appear as having 2 chromatids each?

- A. Leptotene
- B. Zygotene
- C. Pachytene
- D. Diplotene

20. Which biological process takes place in the matrix of the mitochondrion?
- A. Glycolysis.
  - B. Formation of the lactic acid.
  - C. Tricarboxylic acid cycle.
  - D. Alcoholic fermentation.

21. It has been found that an aqueous suspension of isolated chloroplasts will evolve oxygen if illuminated in the presence of a certain type of compound. Which type of compound and which colours of light are required for maximum oxygen evolution?

	Type of compound	Colours of light at which maximum evolution occurs
A	Electron acceptor	Blue and green
B	Electron acceptor	Blue and red
C	Electron donor	Blue and green
D	Electron donor	Blue and red

22. Which of the following have homologous organs?
- A. Bats, ostrich, insects.
  - B. Bats, man, whales.
  - C. man, hydra, salamander.
  - D. mite, obelia, insects.

23. Which one of the following is a morphological mechanism developed to prevent self pollination in plants?

- A. Dioeciousness
- B. Incompatibility of pollen grains with the stigma of the same flower.
- C. Protogyny.
- D. Protandry.

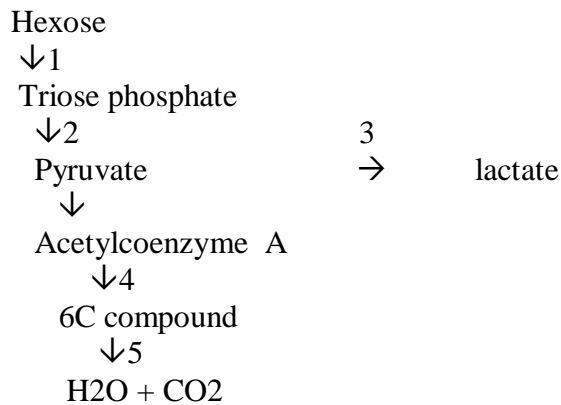
24. Which one of the following does not apply to a climax community of plants?

- A. The community is in equilibrium with its environment.
- B. Some other dominant species may become established.
- C. Only drastic environmental changes can alter climax community.
- D. Climax community always has one type of species.

25. Which of the following is an example of secondary succession in progress?

- A. Former pond now supporting growth of shrubs and trees.
- B. Appearance of lichens and mosses on a bare rock surface.
- C. Establishment of plants on a newly formed island.
- D. Abandoned farmland now covered with weeds and shrubs.

26.



Which two steps result in a net increase of ATP?

- A. 1 and 4
- B. 2 and 4
- C. 2 and 5
- D. 3 and 5

27. Which one of the following is possessed by a smooth muscle fibre?

- A. Peripherally located nucleus.

- B. Centrally located nucleus.
- C. Dorsally located nucleus.
- D. Ventrally located nucleus.

28. Thylakoids of the grana have the enzymes for:

- A. The C-3 pathway.
- B. The C-4 pathway.
- C. The light reactions.
- D. The pentose phosphate pathway.

29 Genes responsible for the ABO blood groups of man are example of

- A. Multiple alleles
- B. Multiple genes
- C. Dominant genes
- D. Recessive genes,

30. Which of the following best defines Adaptive radiation.

- A. the development of new structures as a result of constant use.
- B. the distribution of organisms in their habitats.
- C. the evolution of different forms of organisms as a result of isolation.
- D. the presence of the same organism in different localities.

31. The centromere is

- A. a gene segment of the chromosome.
- B. a structure for chromosomal separation.
- C. the longitudinal half of a duplicate chromosome.
- D. cross over point of a chromosome.

32. Modern Biologists would not agree with Larmarck because they do not accept the concept of

- A. survival of the fittest
- B. over production of offsprings
- C. Somatic mutations
- D. Evolution of organs because of need.

33. Stomatal closure is normally caused by

- A. rising turgor of the guard cells.
- B. increasing pH of the guard cell sap
- C. conversion of starch to sugar in the guard cells.
- D. loss of guard cell turgor

34. Which one of the following statements best describes a thallus?

- A. It is concerned only with sexual reproduction.
- B. It is found only in liverworts and mosses.

- C. It is produced only as the gametophyte generation.
- D. It is a simple undifferentiated plant body.

35. What would you expect to be the long-term effect on life in general if the nitrogen fixing organisms ceased to exist?

- A. there would be no noticeable change
- B. all organisms would die out
- C. only soil organisms would cease to exist
- D. the total quantity of organisms would be much less.

36. Which of the following stages in plant life cycles are equivalents?

- A. Seed, zygote, spore ,
- B. Flower, sporophyll, gametophyte.
- C. Stamens, carpels, sporophy]] ,
- D. Spore, sporophyll, stamens.

37. Which process is an example of active transport?

- A. Influx of sodium ions into a nerve axon during the conduction of a nerve impulse.
- B. Movement of the sodium ions from the glomerular filtrate into the blood plasma.
- C. Movement of the potassium ions from the blood plasma into the lumen of a Bowman's capsule.
- D. Shift of chloride ions across the membrane of a red blood cell.

38. The dissociation curve of human oxyhaemoglobin, when measured in the absence of CO<sub>2</sub> is found to be to the left of the curve which is obtained in the presence of 40mm CO<sub>2</sub> pressure. Which one of the following statements gives the fullest explanation of this phenomenon?

- A. In the absence of CO<sub>2</sub>, there is a higher concentration of oxygen and therefore dissociation is slower.
- B. CO<sub>2</sub> competes with oxygen to combine with haemoglobin forming carbaminohaemoglobin.
- C. Hydrogen ions from carbonic acid depress the dissociation of oxyhaemoglobin and favour its formation.
- D. In presence of CO<sub>2</sub>, the dissociation of oxyhaemoglobin is favoured and its formation is depressed.

39. The transmission of the electric impulse across the synaptic cleft between two nerves is caused by?

- A. Sodium pump mechanism.



- B. Release of acetylcholine.
- C. Release of cholinesterase.
- D. Depolarisation ions.

- 40.. Which one of the following may be regarded as an adaptation to reproduce out of water in plant?
- A. Meiosis during gamete formation.
  - B. Conjugation and external fertilization.
  - C. Antheridia and archegonia.
  - D. Pronounced sporophyte generation.

SECTION B(60 MARKS)

41.a) Draw the structure of ATP.

b) List the advantages of using ATP as a source of energy in living organisms.

b) Outline the process of Glycolysis showing only the key stages.

42 a) Give three structural differences between parenchyma and sclerenchyma tissue.

b) State four modifications of parenchyma tissue.

c) Briefly describe the structure of sclerenchyma tissue.

43. Bacteria were originally classified under the plant kingdom.

a) State the unique features of bacteria that necessitate them to have a kingdom of their own. (5 mks)

b) What is the economic importance of bacteria in the natural ecosystems. (5 mks)

44. Many of the metabolic reactions that occur in organisms produce hydrogen ions which could change the pH of body fluids

a) (i) Name two substances which act as buffers in mammals.

1

2

ii) Describe how the kidney maintains the pH of the blood at a constant level. (05 mks)

b) Outline ways in which marine teleosts achieve osmoregulation. (04 mks)

45. Define each of the following terms:

a)i) Enzyme inhibition (02 mks)

ii) End product inhibition. (02 mks)

iii) Enzyme activators(02 mks)

iv) Prosthetic groups(02 mks)

v) Allosteric effect(02 mks)

46. Fill in the following table

Animal	Excretory organ	Excretory substrate
Reptile		
Paramecium		
Earthworm		
Cockroach		

b) Outline any three adaptive features that the following have to conserve water.

i) xerophytes

( 03 mks)

ii ) Desert mammals.

( 03 mks)