

Name
Signature

Centre/Index No.

S.4 BIOLOGY 1 553/1
May 2014
2 HOURS 30 MINUTES

Instructions to Candidates.

Answer all the questions in Section A and B, plus two questions in section C.
Answers to section A and B must be written in the spaces provided.

SECTION A

1. Which one of the following is not an arthropod?

A. Millipede B. Earthworm C. Beetle D. Cricket

2. Which of the following is a class?

- A. Myriapoda
- B. Platyhelminthes
- C. Annelida
- D. Mollusca

3. Some live centipedes were put in a glass tubing. Both ends were blocked with cotton wool. The middle part was wrapped with black paper. After 20 minutes all the centipedes had moved to the darkened area of the glass because they _____.

- A. show negatively nastic response to darkness.
- B. show positively nastic response to darkness.
- C. show negatively tactic response to light.
- D. show negatively tactic response to darkness.

4. Earth worms get rid of nitrogenous wastes through structures called

A. Nephridia B. tracheoles C. Nephrons D. Malpighian tubules.

5. Simple aquatic plants containing chlorophyll and with their bodies not differentiated into root, stem and leaves are:

A. Fungi B. Liverworts C. Mosses D. Algae

6. Whenever it rains on clay soils, water takes long to sink down because clay soils have

- A. Poor capillary attraction.
- B. Good drainage system.
- C. Small air spaces.
- D. Many air spaces.

7. Where would one expect to have the highest transpiration rate?

- A. In dark room covered with a wet polythene bag.
- B. In a shady cooled and enclosed place.
- C. In a cold, humid and shaded place.
- D. Outside the laboratory during a bright afternoon.

8. Blood grouping is done by adding specimen blood to known samples of serum. A blood sample was added to anti-B serum. There was no clumping. When the sample was added to anti-A serum clumping occurred. What was the blood sample? Blood group_____.

- A. B
- B. A
- C. AB
- D. O

9. Which of the following statements is not true of the gene for haemophilia in humans?

- A. It is found frequently in males than females.
- B. It does not appear in a female unless it also appeared in the paternal parent.
- C. It rarely appears in both father and son, then only if the maternal parent is heterozygous
- D. It is found more frequently in the female than in the male.

10. Which of the following secretions contains an enzyme that digests sucrose?

- A. Gastric juice
- B. Succus entericus
- C. Pancreatic juice
- D. Saliva

11. The table below shows the surface area and volume of 4 animals. Which one of them would most need a transport system?

Animal	Surface area (Cm ²)	Volume (Cm ³)
A.	1154	1127
B.	72	24
C.	30	50
D.	10	4

12. Which of the following bacteria are responsible for converting nitrates into free atmospheric nitrogen?

- A. Denitrifying bacteria.
- B. Putrefying bacteria
- C. Nitrogen fixing bacteria
- D. Nitrifying bacteria

13. Some xerophytes have solved the problem of water loss physiologically by

- A. reducing the number of stomata.
- B. possession of long roots which absorb water from deep down the soil.
- C. possession of hairy epidermis.
- D. opening the stomata at night and closing them by the day.

14. A transverse section of unnamed plant when examined under a microscope was found to have an epidermis with a poorly developed cuticle, a wide cortex with intercellular air spaces. The unnamed plant is most likely _____ plant.

- A. Halophyte
- B. Hydrophyte
- C. Mesophyte
- D. Xerophyte

15. An athlete has just finished a race. 'oxygen debt' refers to

- A. The amount of oxygen originally present in the muscles of the athlete before the race.
- B. The total amount of oxygen the athlete requires to restore the breathing rate to normal.
- C. The amount of oxygen taken in after the race and used to complete the combustion of some of the lactic acid.
- D. The amount of oxygen required after the race to convert excess lactic acid to glycogen in the liver.

16. Which change occurs in the cell and what causes the change?

	Change	Cause
A	Cell becomes more flaccid	Solution diffuses out of the cell
B	Cell becomes more flaccid	Water diffuses out of the cell
C	Cell becomes more turgid	Solution diffuses into the cell
D	Cell becomes more turgid	Solution diffuses into the cell

17. In which region of the mammalian kidney does ultrafiltration occur?

- A. Cortex
- B. Medulla
- C. Pelvis
- D. Pyramid

18. If a woman who is heterozygous for haemophilia marries a normal man, which of the following will be true of their offspring?

- A. All of their sons will be haemophiliac.
- B. All of their daughters will be carriers of haemophilia.
- C. One half of their children of either sex may receive the abnormal allele.
- D. All of their children will be carriers.

19. In the classification of organisms which of the following is the correct hierarchy of the taxonomic groups?

- A. family genus class order phylum
- B. family genus order phylum class
- C. genus family order class phylum
- D. genus phylum order family class

20. Which of the following would have their growth rate increased by a rise in levels of atmospheric carbon dioxide?

- A. Mushrooms.
- B. Beans
- C. Earthworms
- D. Paramecium

21. In a bid to reduce or eliminate the population of one species of organisms, it is possible to use another species which will feed on the other species. This process is known as.

- A. Biological control.
- B. Natural selection.
- C. Cross-breeding.
- D. Species interaction.

22. Which hormones promote the processes shown?

	Conversion of glycogen to glucose in liver cells.	Respiration of glucose in liver cells.	Uptake of glucose by muscle cells.
A	Insulin	Glucagon	Glucagon
B	Insulin	Glucagon	Insulin
C	Glucagon	Insulin	Glucagon
D	Glucagon	Insulin	Insulin

23. Which one of the following plants develops without fertilization?

- A. Pawpaw.
- B. Redpepper.
- C. Lemon
- D. Pineapple.

24. A certain species of rat produces a small volume of highly concentrated urine. It is reasonable to suggest that the most likely habitat of the rat is:

- A. Savanna
- B. Rain forest
- C. High mountain
- D. Desert.

25. Which of the following mineral nutrients are constituents of chlorophyll?

- A. Potassium and sulphur.
- B. Nitrogen and magnesium.
- C. Calcium and phosphorus.
- D. Zinc and copper.

26. Relaxation of the internal intercostal muscles results into

- A. increased pressure in the chest cavity.
- B. ribs moving inwards and downwards.
- C. increased volume of the chest cavity.
- D. flattening of the diaphragm.

27. Which one of the following is likely to be due to deficiency of calcium in plants?

- A. Stunted growth and poor root development.
- B. Poor growth and yellow leaves.
- C. Tall slender stems with few leaves.
- D. Short plants with well developed root system.

28. The table below shows the changes in the dry weight of seedlings during the first six weeks of germination.

Time(weeks)	0	1	2	3	4	5	6
Dry weight(g)	150	100	75	50	80	160	300

Which one of the following would explain the change taking place during the first weeks?

- A. The soil is dry and seeds are losing water too quickly.
- B. The cotyledons were eaten away by the soil organisms.
- C. The seedlings are using some of their food substances for respiration.
- D. The rate of respiration is lower than that of photosynthesis.

29. The main reason for the decrease in humus content of cultivated soil.

is _____.

- A . consumption of organic matter by earthworms.
- B.continuous removal of plant material by harvesting.
- C. Pollution of the soil by pesticides.
- D. Erosion of soil materials by wind and rain.

30.Which of the following fins are paired?

- A.Anal and pectoral.
- B. Anal and pelvic
- C.Pelvic and pectoral.
- D.Pectoral only.

ANSWER SHEET

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

SECTION B

31.The following data was obtained before,during and after the exercise performed by an athlete.

Time (minutes)	Concentration of lactic acid in(mol dm)
0	0.04
5	0.04
7	0.14
9	0.33
11	0.52
12	0.57
13	0.59
17	0.46
23	0.36
40	0.16

70	0.04
----	------

a) Plot this information as a graph in the following space . (8marks)

b) Where in the body is the lactic acid formed?(1 mark)

c) From what process does it result?(1 mark)

d) Write an equation that summarises the overall process.(1 mark)

e)i) With reference to the graph describe the change in the lactic acid concentration during the whole period.(3 marks)

ii) Explain the change in the lactic acid concentration during the period of the exercise.(5 marks)

f)State one way in which fermentation by the yeast cells differs from the process that results in the lactic acid formation.(1 mark).

32. Draw and label a section of the lower epidermis of a canaly under the High power of a microscope.

A ii) State the main functions of the stoma (3 marks)

b) Describe briefly how the stoma increases in size. (2 ½ marks)

c) Comment on the distribution of the stomata on the upper and lower surface of a leaf of a mesophyte. (2 marks).

33.a) A number of organisms reproduce by seed or spore formation.

i) State how advantageous and disadvantageous it is for an organism to reproduce by seed as opposed to spore formation. (Give two reasons for each.) (4 marks)

Advantages

Disadvantages

b i) Give the reproductive behaviour that justifies why higher chordates increase in number even when their rate of reproduction is low. (1 mark)

b ii) Give two specific examples of such chordates that are applicable to b i). (2 marks)

c) State the significance of meiosis. (3 marks)

SECTION C

Answer any two questions.

34. Trace the developments that take place in a flowering plant from the time gametes are mature to the formation of seeds.(15 marks)

35.a)What is tissue fluid?(1 mark)

b) Using a diagram explain how tissue fluid is formed.(7 marks)

c)Explain how tissue fluid is returned into the circulation.(4 marks)

d)Distinguish between tissue fluid and the lymph.(3 marks)

36. a)Give four differences between nervous and endocrine co-ordination (4 marks)

b) Describe how sound waves produced externally reach the brain for hearing.(9 marks)

c) Mention any two human activities that can lead to deafness.(2 marks)

37.a) What is seed dormancy?(1 mark)

b) What causes seed dormancy?(4 marks)

c) Giving reasons mention 3 ways in which dormancy is important to plants.(6 marks)

d) How can dormancy be broken?(4 marks)