Name

Centre/Index No.

Signature

S.4 BIOLOGY 1 553/1
JULY 2017
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.

1.The chromosome number in the kidney cells is 26,the number in the gametes will be

A: 26
B: 52
C: 23
D: 13

2. Which of the following animals uses its intercostal muscles and scales for locomotion?
A: gecko
B: turtle
C: snail
D: puff adder

3. Which of the following insects has the shortest life cycle?
A: Musca domestica
B: Apis mellifera
C: Culex sp
D: Anopheles sp

4. During fertilization in a flower, the two male nuclei fuse with:-
A: the egg cell and polar nuclei.
B: the egg cell only.
C: the polar nuclei only.
D: the ovule

5. Which characteristics are common to the following classes: Diplopoda Arachnida, Crustacea
A: six legs and exoskeleton.
B: many legs and divided body.
C: many legs and compound eyes.
D: jointed appendages and exoskeleton.

6. What does the paramecium use the cilia for?
A: defense and feeding B: locomotion and feeding.
C: feeding only D: locomotion and defense.

7. 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.

8. The smallest soil particles:- Mixture of
   A: sand +loam
   B: Clay + sand
   C: Clay +silt
   D: Clay + loam

9. The chromatids of a chromosome are attached at a point called:

A. centriole

B. centromere

C. Nucleotide

D. chiasma.

10. Which pair does not have an example of sex linked character in man?
   A: Sickle cell anaemia and haemophilia
   B: colourblindness and haemophilia.
   C: colourblindness and albinism.
   D: sickle cell anaemia and albinism.

11. A student heated a sample of dry soil to constant mass .The student was investigating the amount of_____in the soil.
   A: humus
   B: Moisture
   C: Living organisms
   D: air

12. Which hormones promote the processes shown?

	Conversion of glycogen to glucose in liver	Respiration of glucose in liver cells.	Uptake of glucose by muscle cells.

	cells.		
A	Insulin	Glucagon	Glucagon
B	Insulin	Glucagon	Insulin
C	Glucagon	Insulin	Glucagon
D	Glucagon	Insulin	Insulin

13. Which of the following vertebra has a largest centrum as compared to the others?

A. Axis
B. Atlas
C. Lumbar
D. Thoracic

14. The success of a mosquito in spreading pathogens may be attributed to presence of
A: Wings and claws.
B: legs and claws.
C: Proboscis and wings.
D: Proboscis and claws.

15. Which one of the following is not a reason for classifying a mouse and a frog in one phylum? Presence of the

A. gill slits.
B.closed blood system.
C.anterior mouth
D.endoskeleton

16. Why would lowland athletics report for a sports competition organized on highlands three months before the competition? This would be in order for them to acquire
A. higher fat deposits under their skins.
B. larger muscles.
C. higher erythrocyte numbers.
D. higher leucocyte numbers.

17. Starch, glycogen and cellulose are all composed of
A. glucose.
B. amino acids.
C. fatty acids.

D. minerals.

18. Which one of the following explains why digestion of starch does not occur in the human stomach?

A. Absence of starch-digesting enzymes.
B. Low pH for the starch-digesting enzymes.
C. High pH for the starch-digesting enzymes.
D. Absence of bile salts that emulsify the nutrients.

19. Which one of the following would least contribute to the green house effect?

A. Use of nuclear power.
B. Use of fossil fuels.
C. Excessive use of fertilizers.
D. Accumulation of sewage in water bodies.

20. Which one of the following is a difference between flowers of legumes and those of

A. 240
B. 360
C. 480
D. 560

24. Which one of the following may act as a respiratory surface in animals?

A. Spiracle.
B. Bronchus.
C. Skin.
D. Trachea.

.25. The crossing over takes place during

A. Prophase.
B. Metaphase.
C. Anaphase.
D. Telophase.

26. Pancreatic juice contains the enzymes:
A. amylase, trypsinogen, rennin
B. amylase, trypsinogen, pepsin
C. amylase, trypsinogen, lipase
D. amylase, lipase, maltase

27. 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 and a small stele towards the centre. The unnamed plant is most likely a

A. hydrophyte.
B. xerophyte.
C. mesophyte.
D. halophyte.

28.The lymphatic system is important in

A. promoting blood clotting.
B. distribution of body heat.
C. transporting of hormones around the body.
D. draining excess tissue fluid.

29. Which of the following are adaptations of the class aves for the terrestrial environment?

A. Lungs and shelled eggs.
B. Lungs and scales.
C. Ability to regulate body temperature and body shape.
D. Ability to climb trees and lack of parental care.

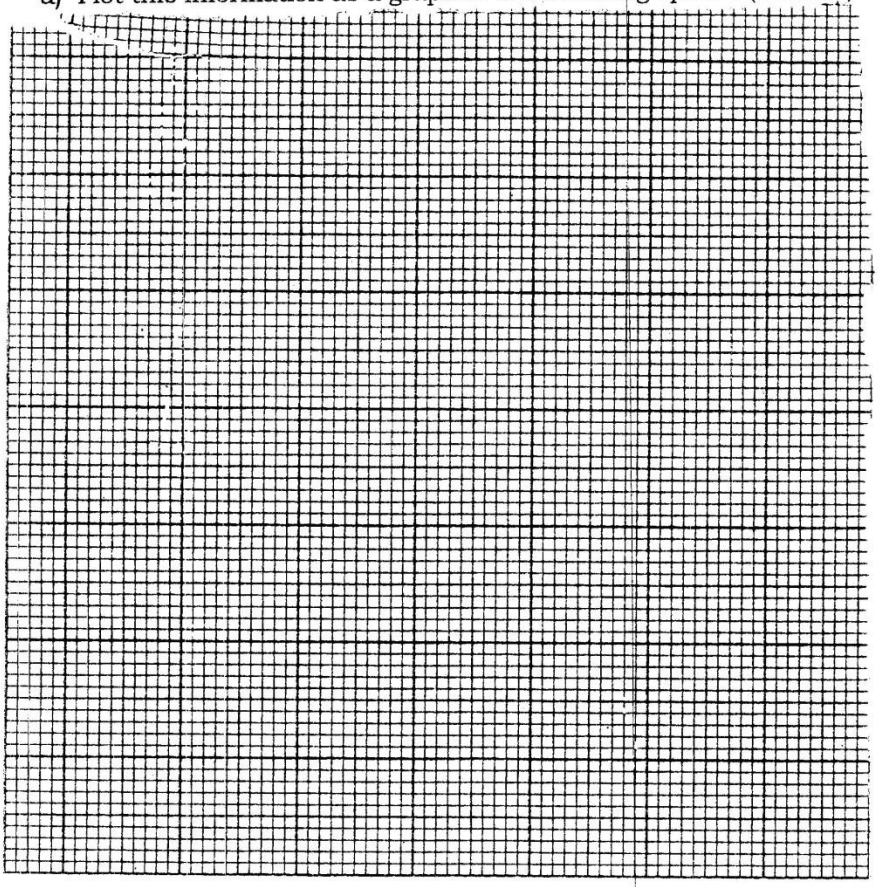
30. Guard cells differ from the normal epidermal cells in that
A. they lack nuclei.
B. their surface is not covered by cuticle.
C. they possess chloroplasts.
D. they do not photosynthesise.

SECTION B

31.The following data was obtained during the fermentation of yeast.

Time (minutes)	Volume of Carbon dioxide evolved.(cm^3)
00	00
05	08
07	16
15	39
23	68
25	80
30	87
35	90
40	90
45	90
50	90

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



b) Where in the Yeast is the carbon dioxide 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 volume of the carbon dioxide evolved during the whole period of the experiment.(3 marks)

ii) Explain the change in the volume of the carbon dioxide evolved during the whole period of the experiment. (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. A number of plants reproduce by seed or spore formation.
i) Explain the advantages and disadvantages for a plant to reproduce by seed as opposed to spore formation.(4 marks)
Advantages

Disadvantages

b i) Explain why higher vertebrates increase in number even when their rate of reproduction is low.(1 mark)

b ii)Give two species names of such vertebrates that are applicable to b i).(2 marks)

c)State three roles played by the placenta in man.(3 marks)

33. The table below shows different concentrations of substances in blood plasma, urine and glomerular filtrate. Study it carefully and answer the questions that follow.

Substance	% in plasma	% filtrate into nephron	% in urine	Concentration factor
Water	90-93	90-93	95.0	
Protein	7.0	0	0	
Glucose	0.1	0.1	0	
Sodium	0.3	0.3	0.35	x 1.0
Chloride	0.4	0.4	0.6	x 1.5
Urea	0.03	0.03	2.0	x 60.0
Uric acid	0.004	0.004	0.05	x 12.0
Creatinine	0.001	0.001	0.075	x 75.0
Ammonia	0.001	0.001	0.04	x 40.0

a) Why is the protein concentration in urine zero?

b) Glucose is filtered into the tubule. What explanation can you give for its complete absence in urine?

c) How do the concentrations of urea, ammonia and creatinine in urine compare with those in plasma?

d) Suggest a reason for any differences in concentration of the three substances.

Explain your answer.

Section C

34 a) Distinguish between nervous and endocrine co-ordination. (4 marks)

b) Draw a well labeled diagram of a motor neurone. (5 marks)

c) Briefly describe Pavlov's experiment on the conditioned reflex action. (6 marks)

35 a) i) Using illustrations, describe how sex is determined in humans (04 marks)

ii) Give three examples of characters in humans considered to be sex limited (03 marks)

iii)Differentiate between sex linked traits and sex limited traits. (03 marks)

b)In humans Albinism is controlled by a recessive allele – a.

A marriage between a man with normal skin colour and an albino wife resulted into daughters who are all carriers.

i) Give the genotype of the man, his wife and their daughters.(01 ½ marks)

ii) Work out the result of marriage between the daughters and carrier males.(04 ½ marks)

36 .a) What is the difference between humus and manure? (2 marks)

b) With named examples describe the role bacteria and fungi in the soil. (8 marks)

c) Give the economic importance of fungi. (5 marks)

37. a) What is a mutation? (03 marks)

b)State four causes of mutations. (04 marks)

c)What are the five properties of mutations? (05 marks)

d)Give three examples of mutations in nature excluding missing organs.(03 marks)