Name……**Stream/No**……/…… **Signature**……..

BIOLOGY

P553/1

(Theory paper 1)

April 2009

Uganda Certificate of Education

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

Answer **all** questions in sections **A** and **B**, plus **two** questions in Section **C**.
Write the answers to section **A** in the spaces in table provided, answers to Section **B** in the space provided, and answers to section **C** in the answer sheets provided.

For Examiner's Use Only		
Section	**Marks**	**Examiner's Remarks**
A		
B		
C		
Total		

Answers to section A (30 marks)

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

1. Which of the following is not a class
   A. Insecta B. arachnida C. nematoda D. Myriapoda
2. A normal skin man married an albino woman. They got children who all had normal skins. The conclusion is that
   A. The man's blood was stronger than that of the woman
   B. The gene for albinism was absent in all children
   C. The mother had a miscarriage of those who would have been albinos
   D. The gene for normal skin is dorminant over the gene for albino
3. Which of the following parts of a cell is responsible for energy release
   A. Nucleus B. mitochondria C. lysosomes D. chloroplast
4. ……. Is the hormone which causes dwarfism
   A. Insulin B. thyroxine C. oestrogen D. adrenaline
5. Which of the following is a reflex action
   A. Kicking a ball B. swallowing C. blinking D. walking
6. Plant shoots are
   A. Positively geotropic and negatively hydrotropic
   B. Negatively geotropic positively phototropic
   C. Negatively hydrotropic and negatively phototropic
   D. Positively geotropic and positively phototropic
7. The bowman's capsule is found in the region
   A. Cortex B. medulla C. pelvis D. bladder
8. The amount of light entering the eye is controlled by.
   A. Pupil B. iris muscles C. ciliary muscles D. cornea
9. Yellowing of leaves in growing plants indicates deficiency of
   A. Calcium B. sulphur C. nitrogen D. magnesium
10. What is a meristemic tissue/cell
   A. Constantly dividing cells to form new ones
   B. Responsible for food transportation
   C. Responsible for water absorption
   D. Constantly manufacturing food
11. The region of the brain concerned with memory in humans is;
   A. Mid brain B. Cerebellum C. Medulla oblongata D. Cerebral hemispheres
12. Which of the following normally live on land but have aquatic larva stages?
   A. Mosquito, butterfly and toad
   B. Mosquito, snake and toad
   C. Mosquito, toad and dragonfly
   D. Mosquito, snail and locust
13. ATP is essential to every living cell because it;
   A. Stores energy released during breakdown of ADP
   B. Makes energy instantly available when required
   C. Reacts with glucose to form ADP

D. Speeds up the digestion of high energy foods

14. In which of the following stages of meiosis does crossing over of chromosomes take place

A. Prophase 1 B. metaphase 1 C. telophase 1 D. prophase 2

15. Which of the following is the correct sequence in which mitosis takes place

A. prophase → interphase → metaphase → telophase → anaphase

B. Interphase → prophase → metaphase → telophase → anaphase

C. Interphase → prophase → metaphase → anaphase → telophase

D. prophase → interphase → metaphase → anaphase → telophase

16. Which of the following is an example of discontinuous variations

A. Blood groups B. intelligence C. skin colour D. body weight

17. Which of the following is the correct order of systemic circulation in blood circulation

A. Left ventricle → aorta → arterioles → organs → vena cava → right ventricle

B. Right ventricle → pulmonary artery → lungs → pulmonary vein → left ventricle

C. aorta → Left ventricle → organs → vena cava → arterioles → right ventricle

D. Right ventricle → pulmonary vein → pulmonary artery → lungs → left ventricle

18. Internal respiration may be defined as

A. Breathing in and releasing of oxygen in the tissues

B. The oxidation of food substances to release energy

C. The building up of complex substances

D. Getting rid of carbon dioxide that would accumulate in the tissues

19. Which of the following conditions are caused by mutations

A. Sickle cell anaemia B. Appearance of dark skin C. colour blindness D. producing twins

20. The type of muscles found in the gut, excretory systems and blood vessels of a mammalian body is described as

A. Striped B. Skeletal. C. Voluntary D. involuntary

21. A vertebra has a short neural spine, a neural canal and a vertebral arterial canal. From this description, the vertebra belongs to

A. cervical region. B. Thoracic region. C. Lumbar region D. Caudal region.

22. Which one of the following glands secrets growth hormone in mammals?

A. Pancreas B. Pituitary gland C. Adrenal gland D. Gonads

23. Cattle may be red or white and a hybrid is described as roan colour. If a roan cow is crossed with a roan bull, the offspring would be expected to be

A. all roan B. all red C. all white D. a mixture of red, white and roan.

24. In pea plants, tallness is dominant over shortness. If a heterozygous tall plant is crossed, with a short plant, the proportion of the offspring will be

A. 50%tall, 50%short

B. 25%tall, 75%short

C. 25%tall, 75%short

D. 75% tall, 25%short

25. Which one of the following is NOT a characteristic of insects?
    A. Two pairs of antennae
    B. Jointed legs
    C. External skeleton
    D. Body divided into head, thorax and abdomen.
26. The following is a list of some parts of the alimentary canal: stomach, ileum, colon and oesophagus.
    Which of the following places them in the correct order in which food passes through?
    A. Stomach, ileum, colon, oesophagus.
    B. Oesophagus, stomach, ileum, colon.
    C. Oesophagus, stomach, colon, ileum.
    D. Stomach, colon, oesophagus, ileum.
27. Epiphytes are not regarded as parasites because-
    A. they do not at any time derive their nutritional requirements from the trees n which they grow.
    B. They have roots and leaves and so can make their own food.
    C. They never harm they trees on which they grow.
    D. Both the epiphytes and the trees on which they grow mutually benefit from one another
28. Which one of the following body activities occur during cold weather?
    A. Sweat production increases
    B. Blood capillaries dilate.
    C. Splasmodic contraction of muscles occur.
    D. More blood flows to the surface of the skin.
29. Which one of the following chromosomal changes results in the loss of genetic materials?
    A. Duplication B. Inversion C. Translocation D. Deletion
30. Ecological systems often have producers, consumers, predators and preys. Which organisms maintain the balance of systems?
    A. Preys B. Consumers C. Producers D. Predators

SECTION B (40 MARKS)

Answer all the questions in this section. The answers to these questions MUST be written in the blank spaces provided.

31. 1 cm^3 of catalase solution was added to equal volumes of hydrogen peroxide solution at different pH values. The time taken to collect 10cm^3 of oxygen was measured and the results were as follows:

pH of solution	5.5	6.0	*6.5*	*7.0*	*7.5*	*8.0*	*8.5*	*9.0*
Time taken to collect 10 cm^3 of oxygen gas (seconds/cm^3)	*30*	*20*	*12*	*8*	*5*	*9*	*15*	*25*

a) Reflect the above results on a graph with the pH of solution against time taken to collect 10cm^3 of oxygen gas (7 marks)

b) Describe the shape of the graph (5 marks)

c) Account for the shape described above (4 marks)

d) write down the word equation for the reaction catalysed by catalase (1 mark)

e) what is the significance of the reaction you have given in (c) above in a living tissue (2 marks)

f) i) From the graph state the optimum pH value for the enzyme (1 mark)

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32. The diagram below shows the bowman's capsule of a mammalian kidney nephron

a) Name the parts labeled J, K and L
b) Vessel J is narrower than vessel L. what effect does this have on the blood in K

c) Name two components of blood that will not diffuse into the capsular space

d) Name the nitrogenous substance that is present in urine but absent from vessel J

e) State the main nitrogenous product excreted by each of the following types of animals

Fresh water fish……..

Birds……..

Mammals……

33. a) Define the following terms applied in genetics with an example in each case

i) Phenotype…….

ii) Genotype……

b) The gene for normal production of haemoglobin is dominated to the mutant gene which causes sickle cell anaemia. If a female heterozygous for the sickle cell anaemia marries a Normal man, illustrate, using suitable symbols, the possible genotypes and phenotypes of the offspring.

Section C. (30 marks)
Answer any two questions from this section

34. (a) what is meant by the term mitosis (2 marks)
(b) What is the significance of the following processes in living organisms? (8 marks)
(i) Mitosis
(ii) Meiosis
(c) Give any five differences between mitosis and meiosis (5 marks)

35. Explain the different ways in which leaves are adapted for the process of photosynthesis (15 marks)

36. (a) Explain why a skeleton is necessary in a mammalian body. (10 marks)

(b) With the aid of a diagram describe how a human arm can bend and straighten. (5 marks)

37. (a) how is self pollination prevented in flowering plants

(b) Outline the events leading to the formation of a seed in flowering plants

END