Name: …….. Index No……

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553/1
Biology
Paper 1
July/August 2022
2½ hours

BUGANDA EXAMINATIONS COUNCIL MOCKS

Uganda Certificate of Education

BIOLOGY

PAPER 1

2HOURS 30 MINUTES

INSTRUCTIONS TO CANDIDATES

- *Answer all questions in section **A** and **B** and choose any **two** questions in section **C**.*

SECTION A

1. During breathing in, which of the following does not take place?
   A. movement of the diaphragm down
   B. contraction of intercostal muscles
   C. movement of the rib cage down
   D. increase in volume of thoracic cavity

2. The human trachea is lined with cilia which beat
   A. downwards carrying moisture to the lungs
   B. in all directions spreading moisture in the trachea
   C. upwards moving foreign material towards the mouth
   D. downwards carrying saliva to the stomach

3. In a lichen, the fungus and the alga have a symbiotic relationship where the alga;
   A. provides the fungus with carbon dioxide
   B. helps to root the lichen on to a rock
   C. provides the fungus with carbohydrate
   D. fixes atmospheric nitrogen for the fungus

4. The part of the human respiratory system where half loops of cartilage are found is
   A. trachea B. bronchi
   C. bronchioles D. epiglottis

5. Which of the following statements about red blood cells is true;
   A. they are irregularly shaped
   B. they have a nucleus
   C. they can squeeze through capillary wall
   D. they carry oxygen

6. When blood flows through the heart, it follows which one of the following paths
   A. pulmonary artery → right atrium → right ventricle → vena cava → lungs
   B. pulmonary artery → right atrium → left atrium → venacava → lungs
   C. venacava → right atrium → right ventricle → pulmonary artery → lungs
   D. venacava → right atrium → left atrium → pulmonary artery → lungs

7. Which of the following is not in the urine of a healthy person?
   A. water B. urea
   C. ammonia D. glucose

8. The number of urethras in the human body is

A. one B. two
C. four D. several thousand

9. Which of the following bones is found in a bird's wing?

A. Humerus B. scapula
C. pelvis D. femur

10. Growth hormone in man is carried around the body by;

A. blood B. lymph
C. blood vessels D. nerves

11. When sound enters the human ear, which of the following pathways does it follow?

A. oval window → stirrup → Anvil → Tympanum
B. anvil → stirrup → oval window → Tympanum
C. stirrup → anvil → oval window → Tympanum
D. Tympanum → Anvil → stirrup → oval window

12. The genotypes in the offspring of this cross; Bb x BB will be;

A. all homozygote
B. all heterozygote
C. half homozygote, half heterozygote
D. ¾ homozygote, ¼ heterozygote

13. Biological control is the means by which organisms are

A. selectively bred B. killed using chemical sprays
C. treated with antibiotics D. limited in number by other organisms

14. Which of the following gases is taken in by a green plant in bright light?

A. oxygen B. nitrogen
C. carbondioxide D. hydrogen

15. Which of the following would cause iodine solution to change colour?

A. lipid B. starch
C. sugar D. protein

16. Suppose you moved a fresh water paramecium into salt water, what do you think would happen to the rate of contraction of the contractile vacuole?
    A. decrease to increase water loss
    B. decrease to reduce water loss
    C. increase to increase water loss
    D. increase to reduce water loss

17. Respiration in man involves the following except
    A. breathing
    B. gas exchange
    C. gas exchange between blood and tissues
    D. transport of gases to and from lungs

18. The terms “universal blood donor” and “universal blood recipient” may no longer be used because;
    A. blood may also contain Rhesus antigens
    B. blood may also contain Rhesus antibodies
    C. blood may also contain HIV
    D. blood volume may not be enough

19. A red blood cell carries all the oxygen it picks from the lungs to the muscle in the foot without using it because;
    A. it is biconcave-disc shaped
    B. it lacks nucleus and other organelles
    C. it has a thin cell membrane
    D. it has a lot of haemoglobin

20. The following statements about mature and immature red blood cells are FALSE except
    A. both lack a nucleus
    B. both respire aerobically
    C. immature respire aerobically while mature respire an anaerobically
    D. both do not respire

21. An arthropod with 4 antennae is
    A. arachnid
    B. insect
    C. crustacean
    D. crab

22. An arthropod with 2 antennae and an elongated body is

A. millipede
B. diplopoda
C. diplopod or chilopod
D. diplopod and chilopod

23. The ability of an organism to maintain constant conditions within the body is called

A. irritability
B. metabolism
C. homeostasis
D. stimulus

24. Proteins are polymers of

A. fatty acids
B. glycerol
C. amino acids
D. monosaccharides

25. The region on an amylase enzyme to which a starch molecule binds is called the

A. catalyst
B. active site
C. substrate
D. enzyme-substrate complex

26. Chromatids are held together by a (an)

A. centriole
B. spindle
C. centromere
D. chiasma

27. Organisms that have two identical genes/alleles for a particular trait are said to be;

A. haploid
B. diploid
C. homozygous
D. heterozygous

28. Which parental pair could produce a color blind female?

A. homozygous normal vision mother and color blind father
B. color blind mother and normal vision father
C. heterozygous normal vision mother and normal vision father
D. heterozygous normal vision-mother and color blind father

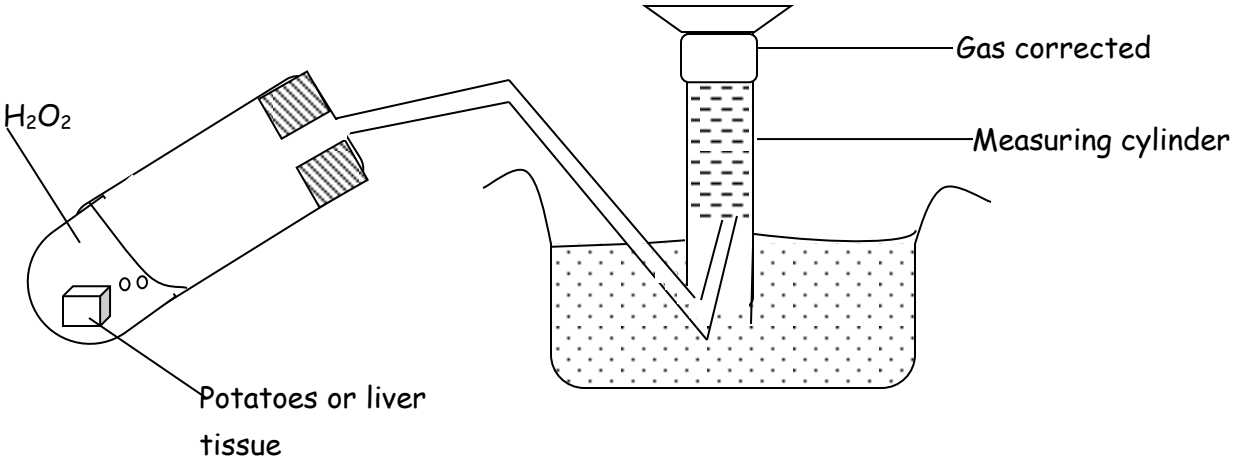
29. The nitrogenous waste that is least soluble in water is

A. urine
B. ammonia
C. uric acid
D. urea

30. The development and release of an egg for fertilization and the preparation of the uterus to receive it is;

A. menopause
B. menstrual cycle
C. puberty
D. implantation

31. A group of biology students carried out an investigation as follows:



Two different tissues, potato and liver were used. Four samples each 1cm x 1cm x 1cm were prepared from each tissue. Some of the samples were left raw and others boiled. Some were left as one cube and others chopped into small pieces/cubes $2cm^3$ of hydrogen peroxide was added to each sample. The volume of gas produced in five minutes was measured as shown above. Results are shown below:-

A. One raw potato cube $4.5cm^3$ gas
   One raw liver cube, $8.0cm^3$ gas
B. chopped potato cube, $6.5cm^3$ gas
   Chopped liver cube, $10.0cm^3$ gas
C. boiled potato cube, $0.0cm^3$ gas
   Boiled liver cube, $0.0cm^3$ gas
D. boiled chopped potato cube, $0.0cm^3$ gas
   Boiled chopped liver cube $0.0cm^3$ gas

(a)(i) Complete the simplified table of results below;

Tissue	Volume of gas (cm^3)			
	A	B	C	D
Potato				
Liver				

(02marks)

(ii) Plot the volumes of gas collected from the samples as a bar chart. (06marks)

Graph

(b) Suggest an explanation for the difference in volume of gas collected for;

(i) **A** potato and **B** potato samples (03marks)

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(ii) **A** liver and **B** liver samples (03marks)

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(c) Write a word equation for the reaction producing the gas. (02marks)

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(d) Suggest an explanation for results of samples **C** and **D**. (02marks)

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(e) Suggest how you could confirm identity of the gas collected. (02marks)

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32a(i) Define the term homeostasis. (01mark)

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(ii) State two examples of homeostasis. (02marks)

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(b) Mammals normally avoid big changes in body temperature

Explain how each of the following processes keep the body temperature fairly constant

(i) Sweating (02marks)

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(ii) Vasoconstriction (04marks)

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(c) What is the importance to mammals of maintaining a constant body temperature? (01 mark)

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33. A cheetah is a predator that feeds on small antelopes. When chasing its prey, the cheetah runs very fast but can only keep this up for short time

(a) What is;

(i) A predator (01mark)

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(ii) A prey (01mark)

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(b) From the information above, write a food chain (01mark)

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b(i) Name the hormone that would be released in large quantities into the Cheetah's blood to prepare it for the chase. (01mark)

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(ii) State two ways in which the hormone can help to provide extra energy for the Cheetah to run very fast. (02marks)

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(c)(i) To run very fast Cheetah muscles need a lot of energy released by two types of respiration. Write word equations for these two types of respiration. (02marks)

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(iii) State two disadvantages of muscles releasing energy in absence of oxygen. (02marks)

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SECTION C *(30 MARKS)*

*Choose any **two** numbers.*

34(a) What is serum? (01mark)
(b) Outline the component of blood. (05marks)
(c) What are the functions of the blood system? (07marks)
(d) What is the danger faced by hemophiliacs? (05marks)

35(a) Define the following terms
(i) Genetics (02marks)
(ii) Six-linked traits (02marks)

(iii) Carrier (02marks)

(b) Duchene muscular dystrophy is an inherited disease caused by a gene carried on the X-chromosome. The disease results in progressive wasting away of skeletal muscles.

Using suitable symbols show a cross between a carrier mother and a sick father. (06marks)

(c) Outline the applications of genetic studies. (03marks)

36(a) What do you understand by the following terms? (03marks)

(i) Denitrification
(ii) Pollution
(iii) Food web

(b) The human population has been growing exponentially/rapidly
(i) Explain any four reasons for the rapid population growth. (06marks)
(ii) State any 3 effects of rapid population growth of humans. (03marks)
(iii) What could be the solution to the effects of human population crisis? (03marks)

37(a) Distinguish between hinge and ball and socket joint, give an example in each case. (04marks)
(b) Describe the events that occur in a housefly during flight. (06marks)
(c) Outline 5 functions of the skeleton to organisms. (05marks)

END