P530/1
BIOLOGY
THEORY
Paper 1
27th July 2022
2 Hours 30 Minutes

Name : ……..……

Signature : …… Personal No : ……..

KAMPALA WAKISO GIANT SCHOOLS' ASSOCIATION (KWGSA)

National Joint Mock Examination 2022

Uganda Advanced Certificate of Education

BIOLOGY THEORY

Paper 1

2 Hours 30 Minutes

INSTRUCTIONS TO CANDIDATES

This paper consists of **two** *sections* **A** *and* **B**

Write **all** *answers to section* **A** *in the answer grid provided by writing the correct alternative*

Write all answers to section **B** *in the spaces provided.*

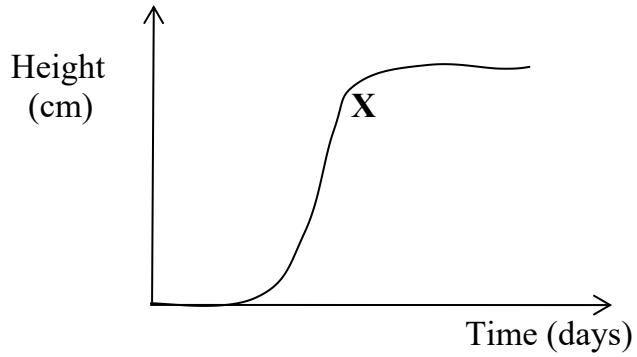
For Examiners' Use Only	
SECTION	**SCORE**
A : 1 – 40	
B : 41	
42	
43	
44	
45	
46	
TOTAL	

SECTION A (40 MARKS)

1. In triploblastic animals, the mesodern;

A. separates the jelly likr mesoglea.
B. lines the gut.
C. gives rise to most of the individual's organs.
D. allows free movement of the animal.

2. The **fig. 2** shows the effect of increase in light exposed to maize seedlings that were placed in the dark for four days and then exposed to continuous light;



After point **X**.

A. cells enter the resting phase before mitosis.
B. cell division has ceased.
C. cells have matured and incapable of elongating.
D. seedling growth inhibited by continuous light.

3. When one of the following is the immediate source of energy for D.N.A replication?

A. Hydrolysis of A.T.P
B. Oxidation of reduced NAD.
C. Hydrolysis of nucleotides
D. breakage of hydrogen bonds

4. Fresh water fish maintain water balance through;

A. drinking water.
B. excreting a hypotonic urine.
C. excreting salts across their gills.
D. reversing the activity of the chloride pump.

5. Which **one** of the following sequence represents the action of Nitrifying bacteria?

A. Ammonium $\longrightarrow$ Nitrite $\longrightarrow$ Nitrate.

B. Ammonium $\longrightarrow$ Nitrite $\longrightarrow$ Nitrite.
C. Nitrite $\longrightarrow$ Nitrate $\longrightarrow$ Ammonium.
D. Nitrite $\longrightarrow$ Ammonium $\longrightarrow$ Nitrate.

6. The reaction rate of salivary amylase kill starch decreases as the concentration of chlorine ions is reduce. This is because the chloride ions are;

A. co-enzymes.
B. competitive inhibitors.
C. confactors.
D. allostene inihibotors.

7. Pressure which tends to force water out of a cell is called;

A. Osmotic potential.
B. Tugor pressure.
C. water potential.
D. pressure potential

8. A transverse section of an unnamed plant when examined under a microscope was found to have an epidermic with poorly developed cuticle, a wide cortex with large inter cellular air space and a small stele towards the center. The plant is most likely a;

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

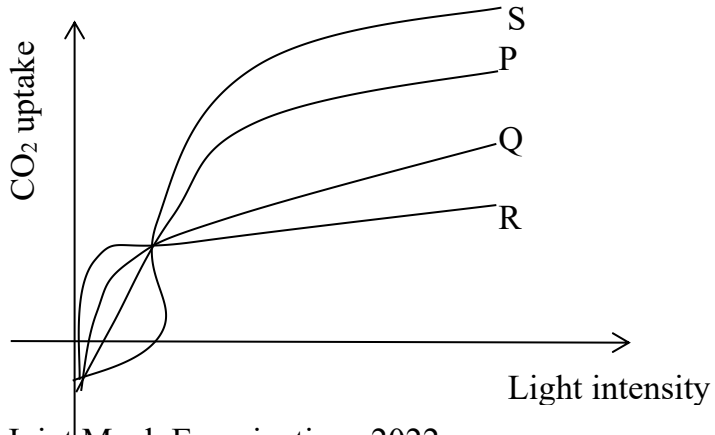
9. Which one of the following biological processes does not utilize respiratory energy?

A. Loss of water from the stomata.
B. mineral salt absorption.
C. synthesis of cellulose.
D. meiosis.

10. At what stage in the life cycle of a moss does meiosis occur?

A. Germination of spores.
B. Formation of spores.
C. Formation of gameta.
D. Gametophyte stage.

11. The figure shows the rate of carbon dioxide uptake and release by four plants at different fight intensities.



Which of the plants would survive well under forest canopy?

A. S.
B. P.
C. Q.
D. R.

12. The most important form of learning in the early stages of an animal is life's life is;

A. habituation.
B. imprinting.
C. insight.
D. exploratory.

13. Which of the following does not occur during hormonal control of breathing?

A. Cerebral cortex allows voluntary control over breathing.
B. Vagus nerve carries impulses from the respiratory center to stretch receptors to stimulate inspiration.
C. Strecth receptors in the bronchitis monitor the amount of lung inflation.
D. Impulses from chemo receptors in the aorta stimulate the respiratory center to increase the rate of inspiration.

14. A certain gene in a bacterium codes for a poly peptide that has 120 aminoacids. The number of nucleotides needed to code for this poly peptide is.

A. 30.
B. 40.
C. 360.
D. 480.

15. Colchine disrupts microtube assembly. Which of these processes would be most affected by colchine?

A. Photosynthesis.
B. Replication.
C. Movement of chromosomes to the pole during mitosis.
D. active transport by membrane proteins.

16. A filamentous organism with a cell wall but no chloroplasts was identified in decomposing organic matter. The organism belongs to kingdom

A. Prokaryote.
B. Plantae
C. Protista.
D. Fungi.

17. The counter current exchanger in the vasarecta.

A. raises concentration of sodium ions in the blood leaving the kidney.
B. removes sodium ions from the extracelullar fluid.
C. maintains high concentration of sodium ions in extracellular fluid.
D. increases amount of sodium ions in the glomerular filtrate.

18. Recombination of unlinked genes would normally occur through;

A. Crossing over in prophase 1.
B. Random chromosome assortment.
C. failure of spindle formation.
D. random gene mutations.

19. Which of the following sets of body parts possesses joints capable of bearing heavy loads?
A. Shoulders, elbows and hips.
B. Elbow, knees and fingers.
C. Wrist, elbow and hips.
D. Ankles, shoulders and fingers.

20. Contraction of muscles in the uterine wall and breasts is stimulated by;
A. Progesterone.
B. Oestrogen.
C. Prolactin.
D. Oxytocin.

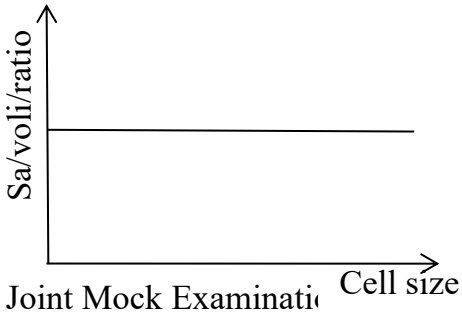
21. If a long day plant has a critical night length of 9 hours; Which of the following 24 hours cycle would prevent flowering?
A. 16 hours light and 8 hours of darkness.
B. 4 hours light, 8 hours darkness followed by 4 hours of light and 8 hours of darkness.
C. 14 hours light and 10 hours darkness.
D. 8 hours light followed by flashes of darkness and light each for 8 hours.

22. The first heart sound is produced at the;
A. beginning of systole.
B. end of systole.
C. beginning of diastole.
D. end of diastole.

23. The Quadrat as a method of sampling is not suitable for estimating the population of;
A. linchens on tree trunk.
B. slow moving invertebrates.
C. soil organism.
D. flying invertebrates.

24. Which of the following graphs shows how surface area to volume ratio changes with increase in size?

A



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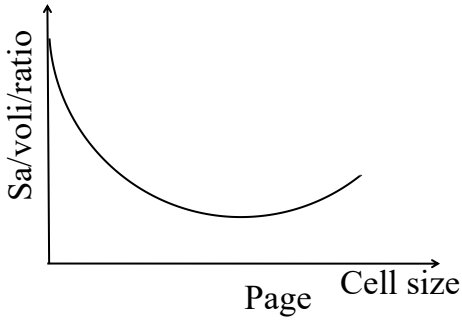

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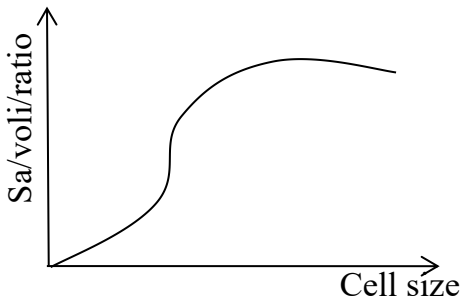

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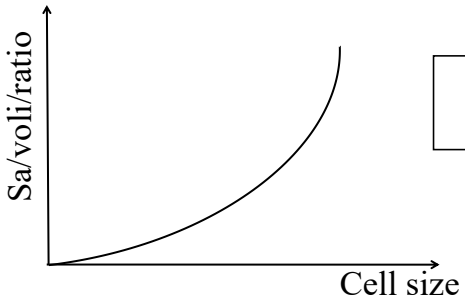


25. The absorption of amino acids after eating a heavy proteineous meal is aided by;

A. diffusion and active transport.
B. osmosis and diffusion.
C. diffusion and pinocytosis.
D. active transport only.

26. The primary role of human chrionic gonadotrophin in pregnancy is

A. maintanance of the corpus luteum
B. to reduce oestrogen levels.
C. to develop the foetus.
D. increase oestrogen levels.

27. An enzymatic reaction of the type

ATP + D - hexose ADP + D - hexose biphophate is an example of;

A. Hydrolysis.
B. Transfer.
C. Isomerization.
D. Synthesis.

28. The first division of meiosis differs from that of mitosis in that un meiosis;

A. Nucleolus disappears.
B. spindle is formed.
C. centrioles move to opposite poles of nucleus.
D. homologous chromosomes associate to form bivalents.

29. Algae with a smaller biomass compared to large trees may have the same productivity because;

A. energy is locked up in the dead xylem tissue of a tree.
B. algae have a high turn-over rate.
C. algae have a high reproductive rate.
D. rate of death in trees is higher.

30. The pathway that offers least resistance to water movement is;

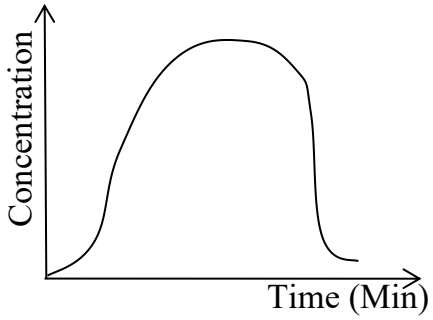
A. Symplast.
B. Cytoplasmic.
C. Vacuolar.
D. Apoplast.

31. Which of the following forms of non-disjunction of sex-hormones is lethal?

A. XXX.
B. XXY.
C. OY.
D. XO.

32. Which of the following curves represent a change in amino acid concentration in blood immediately after absorption?

A



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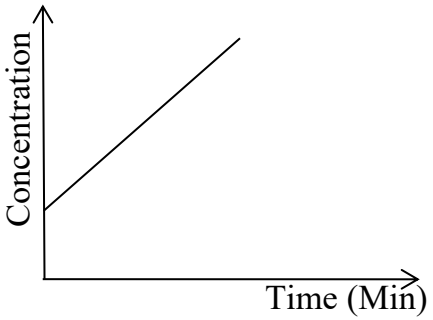

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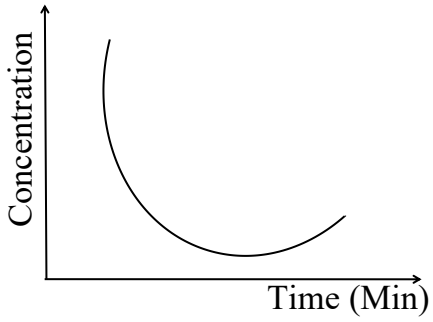

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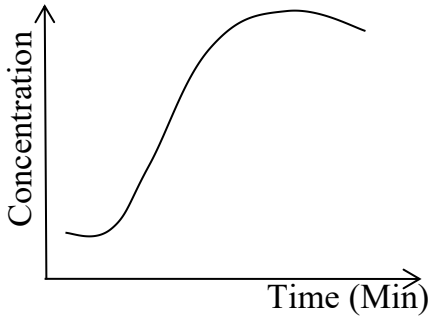

33. Regions of the plasma membrane with higher concentration of cholesterol molecules are;

A. more fluid than the surrounding membrane.
B. more rigid than the surrounding membrane.
C. are able to move from the inside the outside membrane.
D. detach from the plasma membrane and clog arteries.

34. Protein synthesis will not occur in a cell lacking

A. Nucleoli and ribosomes.
B. Ribosomes and nucleoplasm.
C. Nuclei and nucleoplasm.
D. endoplasmic reticulum.

35. The formation of a variety of structures of protein is aided by the following combination of bonds;

(i) Peptide bonds
(ii) Hydrogen bonds
(iii) Ionic bonds.

Which of the combinations of bonds results in the primary structure of the protein?

A. (i) only.
C. (i) and (ii) only.
B. (ii) only.
D. (i), (ii) and (iii).

36. Which of the following does **not** always form part of a bacterium cell?

A. cell wall.
C. cytoplasm.
B. flagellum.
D. Ribosomes.

37. The length of a cell structure on a drawing is 6mm, under magnification of x600. Its actual length is;

A. 1×10^{-1} um.
C. 1×10^{1} um
B. 1×10^{0} um
D. 1×10^{2} um

38. Which reaction taken place at a higher rate in an alveolus than active muscles?

1. Carbon dioxide + Water $\longrightarrow$ Carbonic acid
2. Carbon dioxide + haemoglobin $\longrightarrow$ Carboxyhaemoglobin
3. Haemoglobin + hydrogen ion $\longrightarrow$ haemoglobinic acid
4. hydrogen carbonate ions + hydrogen ion $\longrightarrow$ Carbon dioxide + water

A. 1 and 2.
C. 1 only.
B. 3 and 4.
D. 4 only.

39. Some soil borne fungi cause wilting in crop plants by growing within xylem vessels. Which process is directly affected by the fungi?

A. Cohesion between water molecules.
B. development of root pressure.
C. mass flow during translocation.
D. uptake of water by root hair cells.

40. Which of the following is a disadvantage of chitia on the arthropod exoskeleton?

A. Toughness.
C. Flexibility.
B. Lightness.
D. Permeability to water.

SECTION B (60 MARKS)

Answer **all** *questions in this section.*
All answers must be written in the spaces provided

41. The table below shows the contents in two types of rats over 21 days

Table 1

	Average over 21 days	
	Cafetarian rats	Control rats
Energy content in food	11670	6480
Grain in the body mass	131	103
Grain in the body fat	66	40
Energy used up	9440	4690

(a) What is the effect of changing the diet of the rats from natural food to synthetic food? (03 marks)

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(b) Determine the average grain in mass of cafeterian rats over control rats during the 21 days. (01 mark)

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(c) State any **three** features of the groups of rats that should be kept the same. (03 marks)

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(d) (i) Which chemical of life in the rats is responsible for most of the grain mass. (01 mark)

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(ii) Explain the observation that some people eat enormous amount of food without putting on weight where others become over weighed on quite small amount of food. (01 mark)

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(e) (i) Using evidence from the data above, explain why cafeterian rats were able to gain more weight than control rats (02 marks)

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(ii) Explain why the control of rats were necessary in the above experiment. (01 mark)

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42. (a) What is meant by the term **Osmo regulation?**

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(b) State **three** functions of the osmotive control in animals? (03 marks)

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(c) Describe the roles of the following hormones in the regulation of salt, water and glucose content of the body.

(i) Aldosterone (02 marks)

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(ii) Antiduiretic hormone (02 marks)

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(iii) Aldosterone (02 marks)

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(iv) Insulin (02 marks)

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43. (a) What is **Photophosphorylation**. (02 marks)

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(b) State any **four** differences between sun plants and shade plants. (04 marks)

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(c) State the comparisons between cyclic and non cyclic photophosphorylation. (04 marks)

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44. (a) Distinguish between phenetic and phytogenetic classification. (03 marks)

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(b) Explain why viruses are inclused in the tive king doms system of classification of living things. (03 marks)

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(c) (i) What is **systematics**. (01 mark)

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(ii) Give **three** reasons why taxonomy is important in biological studies

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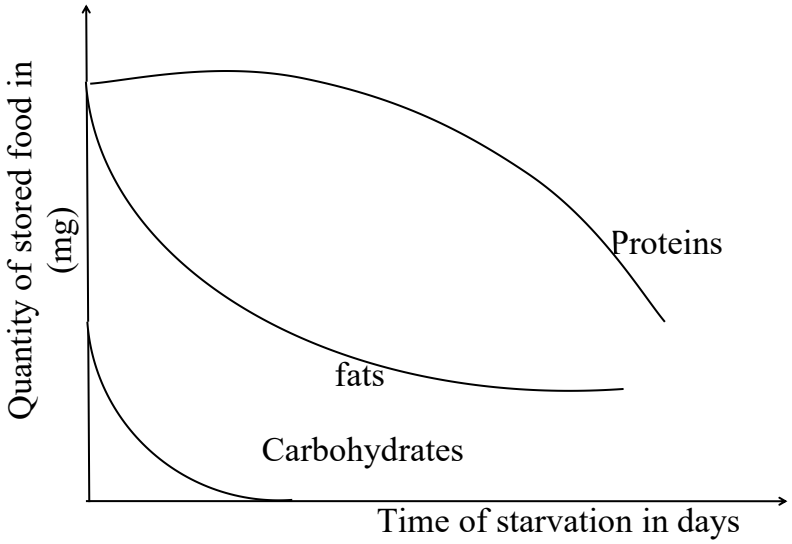
45. The figure below shows the effect of starvation on the quantities of stored food materials in a human body.



Explain the changes in the quantity of the stored food in the body

(a) Carbohydrates. (03 marks)

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(b) fats. (03 marks)

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(c) proteins. (03 marks)

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46. (a) What is a respiratory quotient? (03 marks)

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(b) Complete the table below by identifying the respiratory substrate and conditions under which the process can occur in green plants. (03 marks)

R.Q	Respiratory substrate	Condition in which the process occur
1.0		
0.7		
0.5		

(c) Explain the possible effects of a decrease in environmental temperatures on the rate or gaseous exchange in;

(i) well illuminated folliage leaf. (03 marks)

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(iii) a small animal. (02 marks)

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END