

Name : Centre / Index No:

Signature : Date:

P530/1
BIOLOGY
Paper 1
2½ hrs

STANDARD HIGH SCHOOL ZZANA

Uganda Advanced Certificate of Education

Biology

Paper 1

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES

This paper consists of section A and B.

*Answer **all** questions in both sections.*

Write answers to section A in the boxes provided.

Answers to section B must be written in the spaces provided.

No additional sheets of paper should be inserted into this booklet

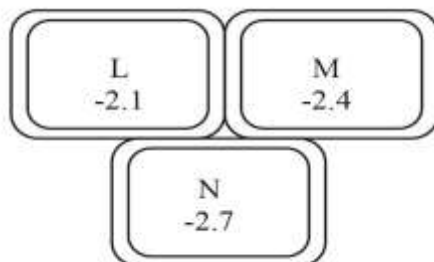
For examiner's use only		
Section / Question	Marks	Examiner's Signature
A: 1 - 40		
B: 41.		
42.		
43.		
44.		
45.		
46.		
Total		

Turn Over

SECTION A: (40 marks)

1. Facultative parasites are more difficult to control than the obligate ones because they;
- A. live in colonies.
 - B. can change the mode of feeding.
 - C. have many hosts.
 - D. are capsulated.
2. All the alleles present in the population of a species are called the population's;
- A. genome.
 - B. gene frequency.
 - C. genotype.
 - D. gene pool.
3. When individuals are found in isolated small groups within a habitat, their dispersion is termed as
- A. random.
 - B. excessive.
 - C. clumped.
 - D. uniform.
4. The beginning of the recovery process in an axon is marked by:
- A. potassium ions.
 - B. sodium ions entering the axon.
 - C. sodium ions leaving the axon.
 - D. potassium ions leaving the axon.
5. The high latent heat of fusion has a biological importance of:
- A. cooling of animals.
 - B. aquatic organisms are slow to freeze.
 - C. control heat loss in animals.
 - D. minimizing temperature change.

6. Which one of the following statements is correct about base pairing in nucleic acids?
- A. Guanine pairs with adenine.
 - B. Purines only pair with pyrimidines.
 - C. Purines pair with other purines.
 - D. Hydrogen bonds only occur between pyrimidines.
7. In single circulation, the blood pressure is low because;
- A. the main vessels are capillaries.
 - B. the blood passes through two capillary systems.
 - C. animals have a single – chambered heart.
 - D. the system lacks valves.
8. A tissue viewed under a microscope showed numerous lysosomes in the cells.
Which one of the following is the possible cause?
- A. Infection.
 - B. High rate of internal transport.
 - C. Active transport.
 - D. High rate of protein synthesis.
9. What would be the phenotypic ratio of the offspring when a test cross is carried out on an individual who is a carrier for albinism?
- A. 1 : 2 : 1.
 - B. 3 : 1.
 - C. 9 : 3 : 3 : 1.
 - D. 1 : 1.
10. Figure below represents plant cells *L*, *M* and *N*, with their respective water potentials in (*Kpa*) indicated.



Turn Over

Which one of the following is the correct direction of water movement between the cells ?

- A. *N* to *L*.
- B. *L* to *M*.
- C. *N* to *M*.
- D. *M* to *L*.

☐

11. Purple sulphur bacteria live at the bottom of ponds under green algae because the bacteria;

- A. are parasites.
- B. do not require light for photosynthesis.
- C. are shield from direct sunlight.
- D. absorb light of different wavelength from that absorbed by algae.

☐

12. Vertebrates *A* and *B* belong to the same species and are terrestrial. *A* lives in a dry environment while *B* lives in a wet environment. The kidney structure of *B* would differ from that of *A* by having

- A. more numerous and smaller glomeruli with longer loop of henle.
- B. more numerous and bigger glomeli with shorter loop of henle.
- C. fewer and bigger glomeruli with shorter loop of henle.
- D. fewer and smaller glomeruli with longer loop of henle.

☐

13. Lichens are not easy to classify since they are made up of two different organism, the alga and a fungus. However, they can be put into phylum;

- A. bacidiomycota.
- B. zygomyeota
- C. mycophycophyta.
- D. mycochlonophyta.

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14. An efficient physiological homeostatic system is the one which;

- A. allows positive feedbacks.
- B. allows large fluctuations.
- C. responds to small fluctuations.
- D. responds to deficiency faster than excess.

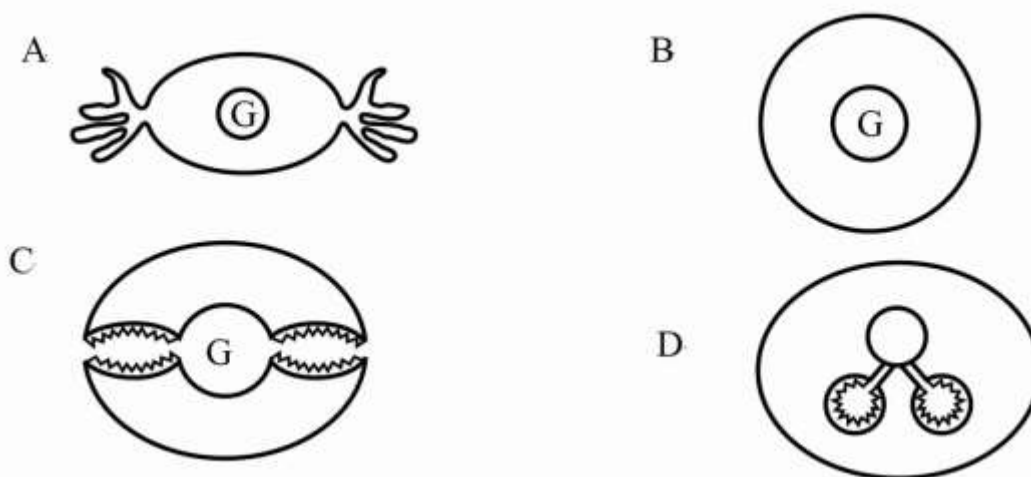
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15. During respiration in the absence of oxygen, pyruvic acids is converted into:
- A. lactic acid and carbon dioxide in animals.
 - B. lactic acid and water in animals. ☐
 - C. ethanol and water in plants.
 - D. ethanol and carbon dioxide in plants.
16. Lignification of plant cells has the effect of:
- A. widening the cells and making them more permeable.
 - B. making the cells more rigid and killing them. ☐
 - C. making the cells impermeable and lengthening them.
 - D. strengthening the cells and making them more permeable.
17. The following apply to a population which is rapidly growing except;
- A. reproduction rate is higher than death rate.
 - B. absence of predators. ☐
 - C. absence of competition.
 - D. shortage of reproducing individuals.
18. Which one of the following sets of conditions in the guard cells would lead to the opening of stomata?
- A. High carbon dioxide concentration and low sugar concentration.
 - B. Low carbon dioxide concentration and high sugar concentration. ☐
 - C. High sugar concentration and high carbon dioxide concentration..
 - D. Low pH and high starch concentration.
19. In which one of the following is the respiratory quotient most likely to be lowest?
- A. During lactic acid formation in animals.
 - B. In plants during bright light. ☐
 - C. In animals during laying down of fat.
 - D. During egg laying in birds.

Turn Over

20. When a DNA sample was analysed, it showed that 28% of the bases were adenine. The percentage of cytosine therefore is
- A. 36.
B. 16.
C. 28.
D. 22.

21. In which one of the following respiratory surfaces does gaseous exchange occurs across the entire body surface?



22. The disadvantage of parallel flow over counter current flow during gaseous exchange which is caused by presence of a vertical septum is:
- A. slows down the speed of movement of water with more oxygen.
B. slows down the speed of water with high carbon dioxide concentration.
C. deflects the water so that it tends to pass over rather than between gill plates.
D. gills run for a shorter distance thereby disrupting interaction.
23. Termites are able to benefit from feeding on woody materials because:
- A. have sharp, toothed mandibles which crush the wood materials into soluble products.
B. secrete digestive enzymes which breaks down wood.
C. use their labial palps to avail end products from wood.
D. trichonympha in their gut secrete an enzyme which breaks down cellulose in wood.

24. Which one of the following conditions results into alkaline tide in the cells?
- A. Increased concentration of hydrogen carbonate ions.
 - B. Increased concentration of hydrogen ions.
 - C. Increased formation of hydrochloric acid.
 - D. Increased dissociation of sodium chloride.
25. In amphibian double circulation, mixing of oxygenated and deoxygenated blood is prevented by;
- A. vertical septum.
 - B. spiral valves.
 - C. completely divided ventricles.
 - D. steady blood pressure in the heart.
26. Hormones achieve their activities within their target cells by any of the following processes except;
- A. nervous transmission across synapse.
 - B. enzyme activity.
 - C. exchange of materials across cell membranes.
 - D. protein synthesis.
27. Which one of the following is the simplest form of learning in vertebrates?
- A. Imprinting.
 - B. Habituation.
 - C. Insight.
 - D. Associative.
28. The U – shaped nature of the loop of Henle serves to
- A. create a region of high salt concentration.
 - A. speed up the filtration.
 - B. increase the content of filtrate.
 - C. reduce the concentration of the filtrate.

Turn Over

29. During water stress, there is reduced photosynthesis mainly due to shortage of:
- A. carbon dioxide.
 - B. water.
 - C. light.
 - D. mineral salts.

☐

30. An advantage of larval form during development is to:

- A. provides protection for the young.
- B. reduce competition between the young and the adult.
- C. allow rapid growth of the young.
- D. allow sufficient time for development.

☐

31. The figure below shows a transverse section through a muscle myofibril



Which one of the following regions does the section represent?

- A. *H* - zone.
- B. *A* - band.
- C. *I* - band.
- D. *M* - band.

☐

32. The role played by chromatophore pigments in the survival of an organism is

- A. cause rapid muscle contraction hence escaping enemies.
- B. increase oxygen delivery to the contracting muscles.
- C. cause organism's colour change hence camouflage.
- D. eliminate carbon dioxide from the respiring tissues to increase pH.

☐

33. The non – enzymatic components of intestinal juice are secreted by the cells in the:

- A. wall of illeum.
- B. crypts of lieberkiin.
- C. gastric glands.
- D. brunner's glands.

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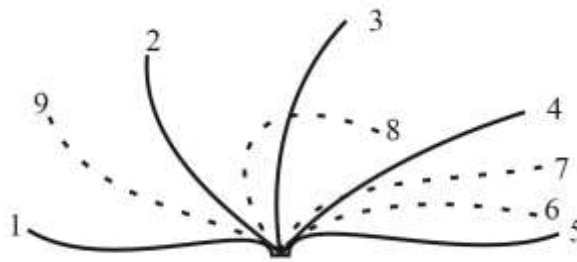
34. In which one of these insects is the wing beat frequency at the same rate as the impulse supply?
- A. Fruit fly.
B. Housefly.
C. Moth.
D. Bee.
35. The following are functions of semen except;
- A. destruction of bacteria in the urethral tract.
B. Neutralizing the acidic medium of the vagina.
C. Activation of spermatozoa.
D. Nourishing the sperms.
36. The hormone controlling ovulation and leuteal phase of human menstrual cycle is:
- A. oxytocin.
B. FSH.
C. luteinizing hormone.
D. oestrogen.
37. Which one of these makes carbon dioxide have the greatest influence on global warming?
- A. Retains more heat.
B. Has a higher concentration in the atmosphere.
C. Stays longer in the atmosphere.
D. Has acidic properties.
38. Cyclic photophosphorylation is likely to be the only operating path way in a cell where there is:
- A. high concentration of reduced NADP.
B. low concentration of oxidized NADP.
C. high concentration of oxidized NADP.
D. low concentration of reduced NADPH.

Turn Over

39. The type of locomotion in aquatic organisms where the entire body is thrown into motion is called
- A. ostraciform.
 - B. anguilliform.
 - C. carangiform.
 - D. lateral drag.

☐

40. Figure below shows the action of a cilium to cause movement.



Which one of the following sets of positions represent passive stroke?

- A. 1, 2, 3, 8.
- B. 6, 7, 8, 9.
- C. 1, 9, 4, 6.
- D. 5, 7, 3, 2.

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SECTION B: (60 marks)

41. (a) Distinguish between Altruistic behavior and Rhythmical behavior, give an example in each case. (04 marks)

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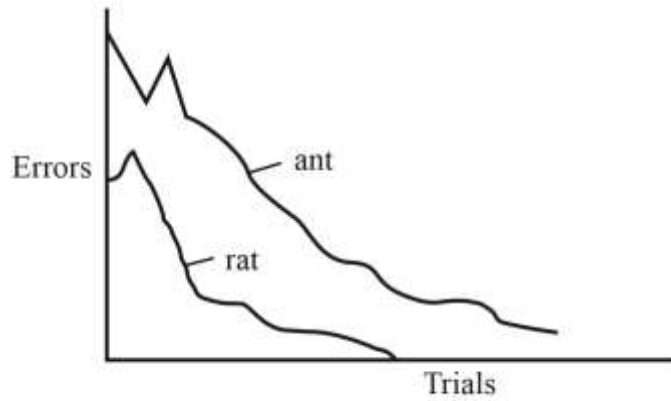
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- (b) Figure below shows the behavioral response by a rat and an ant when learning a new maze by trial and error.



- (i) What conclusions about learning in rats and ants are evident from the data? (03 marks)

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- (ii) State **three** factors that could affect the learning of a new situation like a maze in animals. (03 marks)

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42. Cystic fibrosis is a lethal hereditary defect of the internal organs determined by a recessive gene.

- (a) List down the symptoms of the condition. (03 marks)

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Turn Over

(b) A couple has a child with cystic fibrosis but neither the husband nor the wife nor any of their parents have the disease.

(i) Calculate the probability that if this couple had a child, it will have cystic fibrosis (show your reasoning) (05 marks)

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(ii) What is meant by the term “**Allopolyploidy**”? (02 marks)

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43. (a) Explain how the limbs of mammals living in arctic conditions are kept at a lower temperature than the core temperature, but higher than that of the surrounding. (05 marks)

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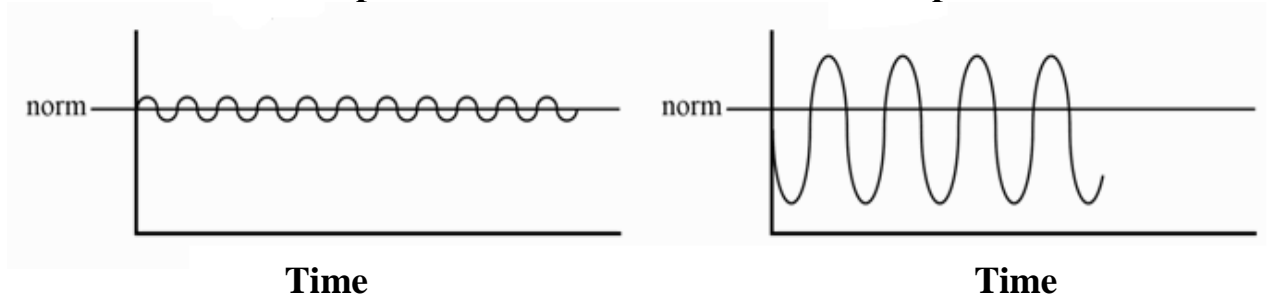
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(b) Graphs below compare the efficiency of a homeostatic systems. The vertical axis shows a parameter being considered as time goes.

Graph A

Graph B



(i) Identify the graph which represent an efficient and an inefficient homeostatic system: (01 mark)

Efficient

Inefficient

(ii) Explain your answer in (b) (i) above.

(03 marks)

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(c) Describe any **two** roles of the mammalian liver.

(02 marks)

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44. (a) Distinguish between photoperiodism and vernalisation.

(05 marks)

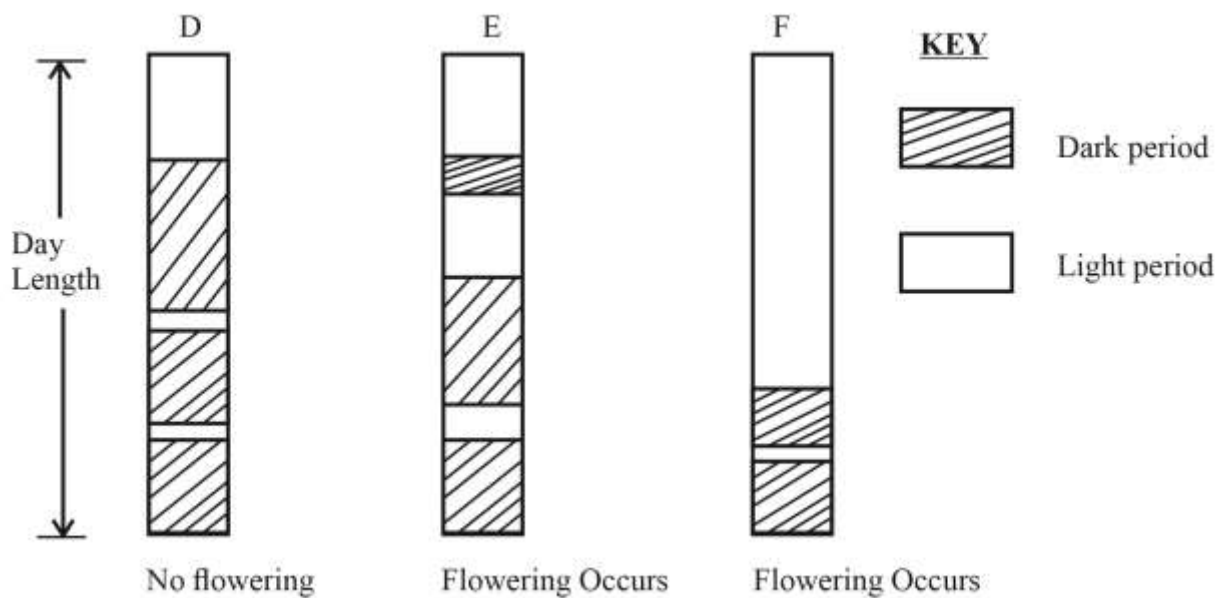
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(b) Three flowering plants of different species *D*, *E* and *F* were subjected to different light and dark conditions as shown below;



Turn Over

If other environmental and soil factors were constant,

- (i) State the photoperiodic groups to which each plant species belong. Give a reason to support your answer in each case. (03 marks)

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- (ii) Describe how the phytochrome controls flowering response showed in plants *D* and *F*. (04 marks)

D

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F

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45. (a) Briefly explain what is meant by the following terms:

- (i) Haploid perthenogenesis (02 marks)

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- (ii) Diploid perthenogenesis (02 marks)

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- (b) Describe the role of a male gamete in the process of sexual reproduction in flowering plants. (03 marks)

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- (c) Give any **three** reasons why mosses are restricted to live in moist places. (03 marks)

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46. (a) What is the role of the following hormones in human digestive system?

(i) Pancreozymin (01 mark)

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(ii) Gastrin (01 mark)

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(iii) Secretin (01 mark)

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- (b) Describe how hydrochloric acid is formed in oxyntic cells within the gastric walls. (03 marks)

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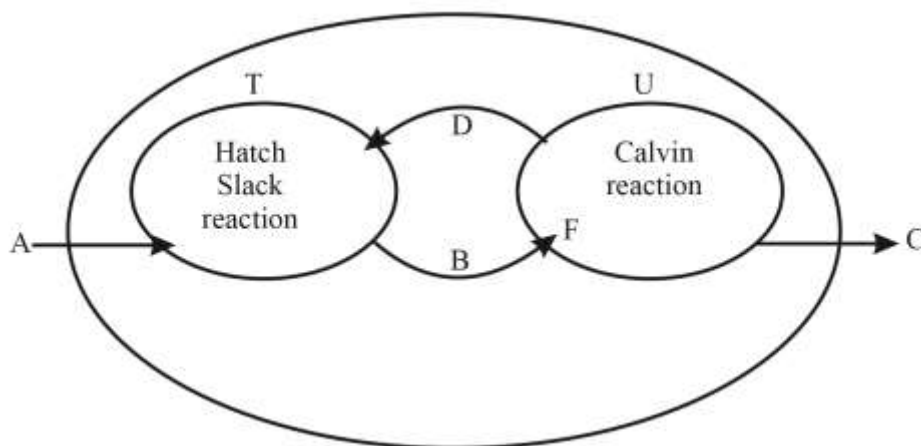
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Turn Over

- (c) Figure below shows a scheme of reactions within the plant's photosynthesizing unit.



- (i) Name the substances represented by **A**, **B**, **C** and **D**. (01 mark)

A

B

C

D

- (ii) Name the cells labelled **T** and **U**. (01 mark)

T

U

- (iii) Give **two** examples of plants where the photosynthetic pathway above is found. (01 marks)

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END

