EOT EXAMS, 2022

BIOLOGY PAPER P530/1

2 Hours 30 minutes

INSTRUCTIONS TO CANDIDATES

Answer **all** questions in both Sections **A** and **B**.

Circle the most correct answer in section **A**.

Answers to section **B** should be written in the spaces provided.

SECTION A (40 MARKS)

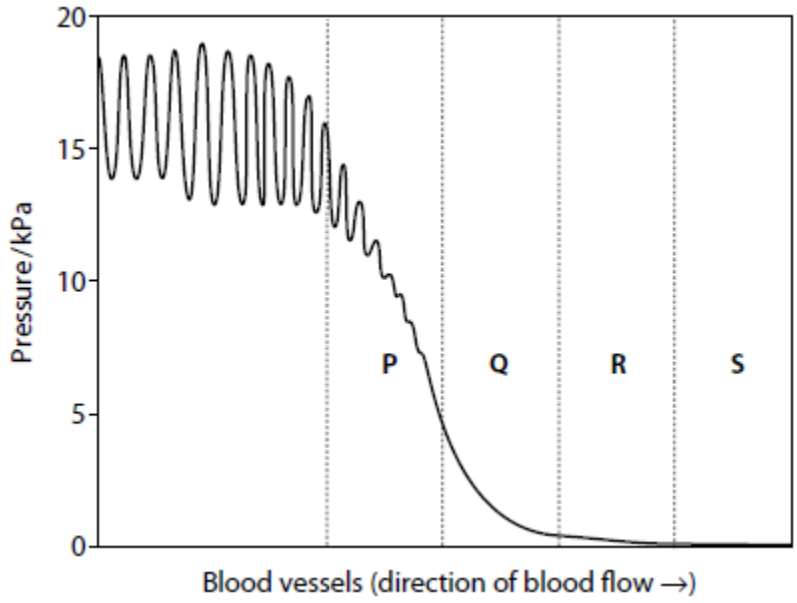
1. The enzyme that joins newly synthesized fragments of DNA is called.....
   A. Helicase
   B. DNA polymerase
   C. Prime
   D. DNA ligase
2. Which of the following could increase the rate of transpiration?
   A. Decreasing the humidity
   B. Decreasing light intensity
   C. Decreasing the temperature
   D. Decreasing wind speed
3. Which biological process takes place in the matrix of the mitochondrion?
   A. Glycolysis
   B. Tricarboxylic acid cycle
   C. Formation of lactic acid.
   D. Alcoholic fermentation
4. 20 cm^3 of liquid **T** was added to 2 cm^3 of fresh blood in a test tube. The mixture was then clear red. Which of the following was liquid **T**?
   A. Distilled water
   B. Hypertonic saline
   C. Isotonic saline
   D. Molar saline
5. What is the actual length of an animal cell that appears 4mm long when viewed through magnification of X400?
   A. 0.1nm
   B. 1.6nm
   C. 10nm
   D. 1000nm
6. Which of the following groups exhibit **radial symmetry**?
   (i) Protozoa (ii) Coelenterates (iii) Annelids (iv) Nematodes.
   A. all of them
   B. (i) , (ii) and (iii)
   C. (i) and (iv)

D. (iv) only

7. Which of the following theories best explains how the double membrane organelles were formed in eukaryotes?
   A. Endosmosis
   B. Endosymbiosis
   C. Endocytosis
   D. Endoparasitism
8. Which of the following fibres have the features below; inelastic, tough, thick, rigid, and occur in bundles?
   A. Yellow elastic fibres
   B. Collagen fibres
   C. Spindle fibres
   D. Intermediate fibres
9. If the sequence of bases on DNA templates is **ATG**, what will be the base in the anticodon of tRNA in protein synthesis?
   A. UAC
   B. AUG
   C. TAC
   D. ATG
10. Which of the following stages of mitosis will a cell reach but not complete if treated with colchicine?
   A. Anaphase
   B. Metaphase
   C. Prophase
   D. Telophase
11. The following are energy contents of different nutrients as determined by calorimetry; carbohydrates ($16KJg^{-1}$), fat ($37KJg^{-1}$) and protein ($17KJg^{-1}$). The energy content of 30g of potato crisps which contain 6% protein , 36% fat and 50% carbohydrates is
   A. 170.2KJ
   B. 70.0KJ
   C. 760.2KJ
   D. 670.2KJ
12. A nucleotide of ATP is made up of
   A. Ribulose sugar, 3 phosphate molecules and Adenine
   B. Ribose sugar, 3 phosphate molecules, Adenosine
   C. Deoxyribose sugar, Adenine, 3phosphate molecules
   D. Ribose sugar, 3 phosphate molecules, Adenine
13. Blood flows in the heart of an insect as a result of ;
   A. Raising the perivisceral membrane
   B. Contraction of the alary muscles
   C. Relaxation of the heart ligaments
   D. Increase in the pericardial pressure
14. Which one of the following amino acids commonly begins the chains of polypeptide chain during translation?
   A. Valine
   B. Aspartic acid
   C. Methionine

D. Alanine

15. In the nitrogen cycle, ammonia released from decay of plant and animal protein is converted to nitrites by a nitrifying bacteria. The cell walls of this bacteria are made up of…
    A. Capsule
    B. Peptidoglycan
    C. Cellulose
    D. Lignin
16. Which of the following explains why antibody molecules have quaternary structure?
    A. Antibodies have a variable region
    B. Antibodies have a complex 3D shape
    C. Antibodies have four polypeptides
    D. Antibodies have more than one polypeptide.
17. Which one of the following does not contribute to the movement of water from root system to the leaves in a flowering plant?
    A. Root pressure
    B. Cohesive forces
    C. Transpiration pull
    D. Atmospheric pressure
18. The diagram shows the changes in blood pressure as blood flows through the blood vessels in the human systemic circulatory system.



Which of the following correctly identifies the vessels labeled P to S?

	P	Q	R	S
A	Artery	Capillary	Arteriole	Venule
B	Arteriole	Artery	Venule	Capillary
C	Artery	Arteriole	Capillary	Venule
D	Venule	Capillary	Arteriole	Artery

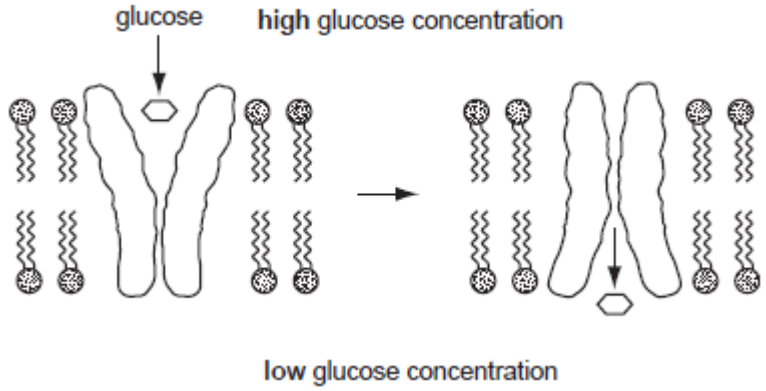
19. During prophase of mitosis, chromosomes consist of two chromatids. At which stage of the cell cycle is the second chromatid made?
    A. Cytokinesis
    B. G1

C. G2
D. S

20. Where are the carbohydrate portions of glycolipids and glycoproteins located in cell surface membranes?
    A. The inside and outside surfaces of the membrane
    B. The inside surface of the membrane
    C. The interior of the membrane
    D. The outside surface of the membrane
21. The sequence of bases that will be produced as a result of transcription of a DNA molecule CGACCCCAG is
    A. GCTGGGGTC.
    B. GCUGGGGUC.
    C. UUACCCCAG.
    D. CGACCGGAC
22. A characteristic that makes ferns better adapted for life on land than mosses is
    A. having a dominant gametophyte.
    B. producing large quantities of spores.
    C. possessing vascular tissue.
    D. having relatively large fronds.
23. Collenchyma cells differ from sclerenchyma cells in that collenchyma
    A. have unevenly thick walls.
    B. have great tensile strength.
    C. have simple pits.
    D. are made of dead material.
24. Which one of the following processes requires carrier proteins?
    A. Exocytosis.
    B. Phagocytosis.
    C. Facilitated diffusion.
    D. Pinocytosis
25. Which one of the following is true for both enzymes and inorganic catalysts? They are
    A. highly specific in the reactions they catalyse.
    B. affected by changes in pH.
    C. affected by changes in temperature.
    D. unchanged at the end of a reaction.
26. The cross carried out to find the genotype of an organism is known as
    A. Back cross
    B. Breeding true
    C. Test cross
    D. Reciprocal cross
27. Sexual reproduction can speed up evolution because it provides more
    A. chromosomes
    B. genetic variation
    C. identical cells
    D. organelles

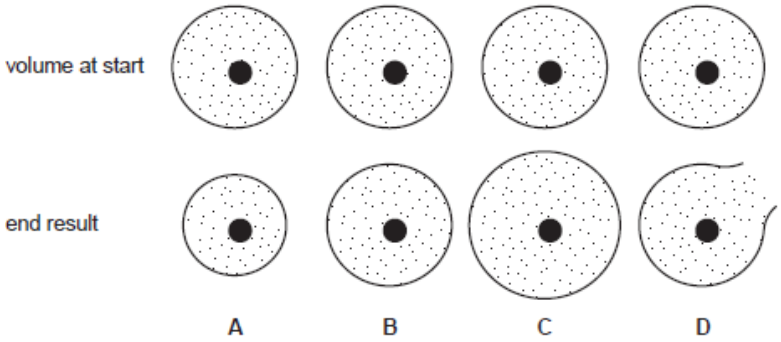
28. Organisms that require a constant supply of oxygen to live are called
    A. obligate anaerobes
    B. facultative anaerobes
    C. chemotropic autotrophs
    D. obligate aerobes
29. Which of the following processes does not require energy?
    A. Absorption of glucose from the gut,
    B. Reabsorption of glucose from the glomerular filtrate.
    C. Absorption of mineral salts by plant roots.
    D. Absorption of water by plant roots
30. Which of the following is not true about parenchyma cells?
    A. They are lignified.
    B. Are linked to one another by means of plasmodesmata through pits in walls.
    C. Some of them are photosynthetic.
    D. They act as storage sites
31. Which one of the following happens when pressure in the ventricles reaches its maximum?
    A. Both semilunar and atrio-ventricular valves close.
    B. Semilunar valves open and atrio-ventricular valves close.
    C. Semilunar valves close and atrio-ventricular valves open.
    D. Both semilunar and atrio-ventricular valves open.
32. When an allele affects more than one characteristic in an individual organism, it is said to be
    A. epistatic.
    B. polygenic.
    C. pleiotropic.
    D. polyploidy.
33. In allosteric inhibition, the inhibitor reduces the rate of enzyme activity by
    A. blocking the enzyme from reaching the substrate.
    B. permanently combining with the substrate molecule.
    C. changing the shape of the active site.
    D. causing the enzyme to precipitate.
34. Which bonds are used in maintaining the primary structure of proteins?
    A. Peptide linkage
    B. Hydrogen bonds
    C. Ionic bonds
    D. Glycosidic linkage
35. Essential amino acids are those which;
    A. Are oxidisable to produce energy.
    B. Are produced by dietary proteins.
    C. The body can synthesize on its own.
    D. Are essential for growth of tissues.
36. Plant roots in association with symbiotic bacteria is an indication that
    A. The plant is unhealthy.
    B. The roots have been attacked.
    C. Soil around the roots lacks nitrogen.
    D. Soil around the roots lacks humus.

37. The diagram represents stages in glucose uptake through a cell surface membrane.



What process is shown in the diagram?
A. Active transport
B. Facilitated diffusion
C. Osmosis
D. Simple diffusion

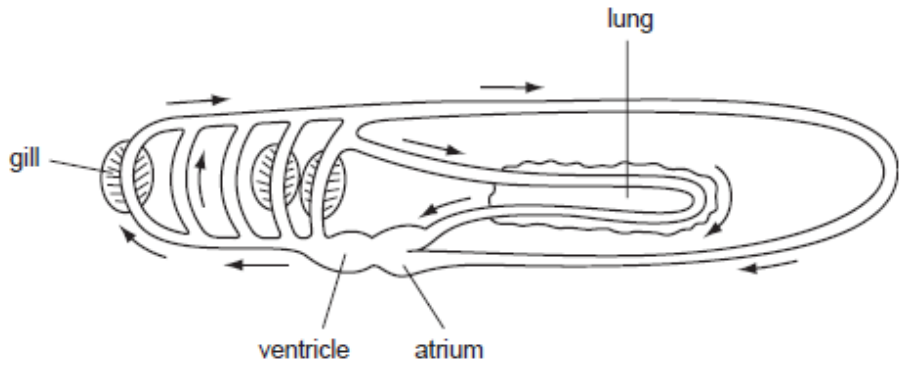
38. Identical animal cells were placed in solutions of differing water potentials. The diagram shows the volume of the cells at the start and the end result.



Which cell was placed in the solution with lowest (most negative) water potential?

39. What describes the structure of amylopectin?
A. A branched chain with 1,2 and 1,4 glycosidic bonds
B. A branched chain with 1,4 and 1,6 glycosidic bonds
C. An unbranched chain with only 1,4 glycosidic bonds
D. An unbranched chain with 1,4 and 1,6 glycosidic bonds

40. Diagram below shows circulatory system of an organism. The arrow shows the direction of blood flow in vessels.



How is the circulatory system in this organism described?
A. Closed double
B. Closed single
C. Open double
D. Open single

SECTION B (60 MARKS)

41. (a) Outline **four** advantages of garden pea, *Pisum sativa* an experimental organism used by Gregor Mendel, over other plant species. (**02marks**)

(b) In maize, there are two alleles for seed shape and two for seed colour. In a breeding experiment, all F_1 phenotype produced from a cross between coloured full seeds and colourless shrunken seed parents had coloured full seeds.

(i) With reasons, state which alleles are dominant? (**02marks**)

(ii) Using suitable genetic symbols, determine the expected proportions of F_2 phenotypes. (**06marks**)

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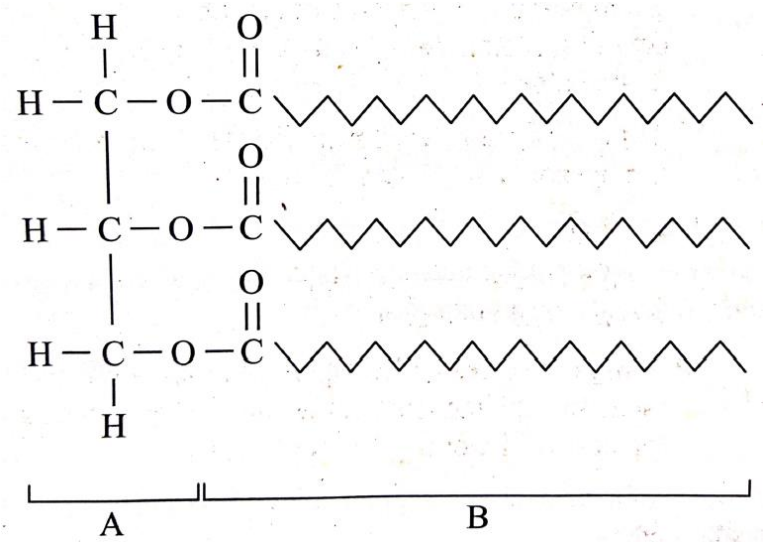
42. The diagram below shows the structure of a lipid molecule.



(a) (i) Name the parts labeled **A** and **B**. (**2 marks**)

(ii) Name this type of lipid. (**1 mark**)

(iii) Name the chemical reaction used to form the bonds between **A** and **B.** (**1 mark**)

(b) (i) State any **three** functions of this lipid in living organisms. (**3marks**)

(ii) Outline **three** features of this type of lipid which makes them suitable for the functions in b (i) above. (**3 marks**)

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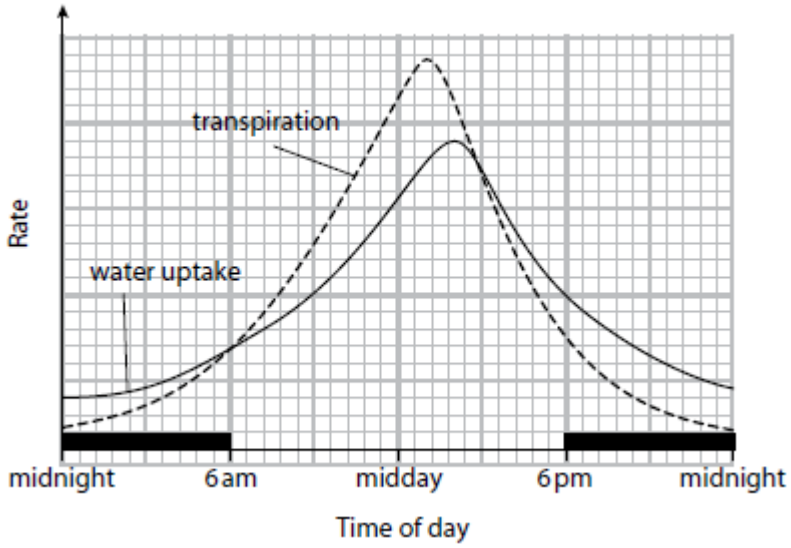
43. The graph in the figure below shows the relationship between rate of transpiration and rate of water uptake for a particular plant. Study it carefully and answer the questions that follow.



(a) Describe the relationship between the rate of transpiration and rate of water uptake during the experimental period. **(2 marks)**

(b) Explain the relationship between the rate transpiration and rate of water uptake during the experimental period. **(5marks)**

(c) Outline **three** environmental factors that affect rate of transpiration other those demonstrated on the graph in the figure above. **(3 marks)**

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44. (a) What is **chemosynthesis**? (**1 mark**)

(b) Outline **three** ways in which photosynthesis in purple Sulphur bacteria differs from that of higher plants. (**3 marks**)

(c) Explain why it is possible for photosynthetic and chemosynthetic bacteria to coexist in an oxygen free environment. (**3 marks**)

(d) Of what importance is chemosynthetic bacteria in nature? (**3 marks**)

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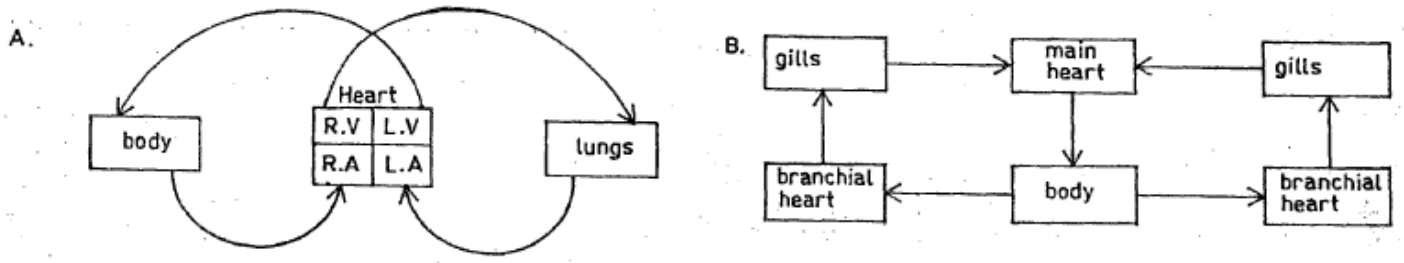
45. Figure below shows diagrams of two types of blood circulatory systems **A** and **B** in animals. The arrows show the directions of the blood flow.



(a) Describe each circulatory system.

(i) **A** (**2 marks**)

(ii) **B** (**2 marks**)

(b) How does each system maintain a high blood pressure?

(i) **A** (**2 marks**)

(ii) **B** (**2 marks**)

(c) What is the advantage of maintaining a high blood pressure over a fluctuating pressure in a circulatory system of an animal? (**2 marks**)

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46. (a) Compare the suitability of fat and glycogen as storage compounds. (**4 marks**)

(b) State the advantages of storing fat over glycogen. (**3 marks**)

(c) Why is glycogen a more suitable energy compound in muscles than fat? (**3 marks**)

END **LAB/ 10 /2022**