S4 BIOLOGY TERM II HOLIDAYS ACTIVITY/PACKAGE

MULTIPLE CHOICE /10marks

1. Which term describes both collagen and haemoglobin?
a) Enzymes b) fibrous proteins c) globular proteins d) macromolecules

2) What type of chemical reaction is involved in the formation of disulfide bonds?
a) Condensation b) hydrolysis c) oxidation d) reduction

3. The group of classification where organisms resemble one another and are capable of interbreeding together to produce viable offspring is known as:
a) Species b) kingdom c) Genus d) Phylum

4. Which one of the following is not a kingdom of living organisms?
a) Monera b) Animalia c) Annelida d) Protoctista

5. Which one of the following is a characteristic feature common to fish, reptiles and birds but absent in mammals?

a) Possession of scales b) Has no limbs c) Possession of feathers
d) Undergo internal fertilization

6. Which one of the following statements about fish is not correct?

a) Fish live both in water and on land and undergo external fertilization.
b) Most fish have bones while others are cartilaginous
c) Most fish have streamlined body, lateral line and swim bladder.
d) Gills are organs for gaseous exchange in fish

7. **(a) Fig.5.1** is provided for you.

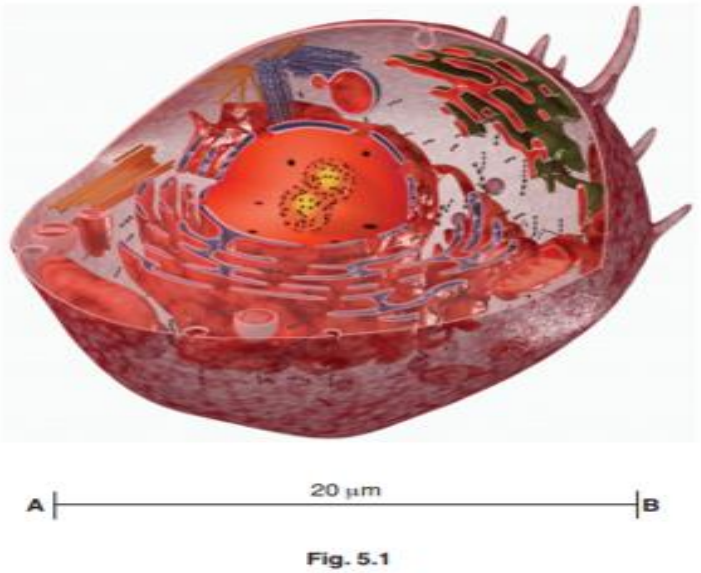


Fig. 5.1

(i) State two features of the cell shown in the **fig.5.1** that indicate is eukaryotic.

(2marks)

(ii) The line **A-B** on Fig.51 represents 20µm

Calculate the magnification of the cell shown in **Fig.5.1.**

Show your working **(3marks)**

(b) The cells of multicellular organism are usually specialized to perform a

particular function.

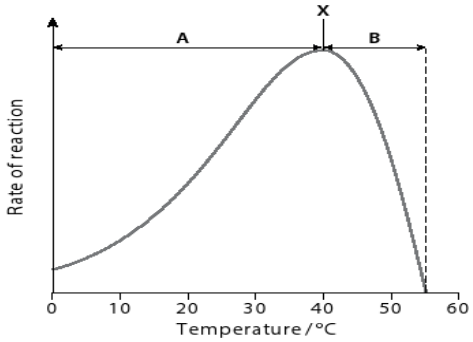
(i) Name the process in which a cell becomes specialized. **(1mark)**

(ii) A student was telling his colleagues that the lysosome is not important to the cell. Discuss his idea. **(3marks**

8. What is the main difference between the guard cells and the other epidermalcells?

a) Guard cells have chloroplast while the remaining epidermal cells have no chloroplast
b) Guard cells have oval shape while other cells have cubic shape
c) Guard cells are beneath the spongy mesophyll
d) The guard cells are covered by a transparent cuticle

9. The graph below shows the effect of temperature on the rate of reaction of an enzyme.



a) What is indicated by X? **(2 Marks)**
b) What temperature would X be for a mammalian enzyme? **(2 Marks)**
c) Explain what is happening in region A. **(2 Marks)**
d) Explain what is happening in region B. **(2 Marks)**

Enzymes are effective because they lower the activation energy of the reactions they catalyse. Explain what is meant by 'activation energy'. **(2 Marks**

10. Copy and complete the following table. Place a tick or a cross in each box as appropriate.

	Globular protein e.g. haemoglobin	monosaccharide	glycogen	starch	cellulose	lipid
Monomer						
polymer						
macromolecule						
Contain subunits that form branched chains						
Contain amino acids						
Made of organic acids and glycerol						
Contain glycosidic bond						
Contain peptide bond						

11. Copy and complete the table below, which summarizes some of the functional categories into which proteins can be placed. **(8marks)**

Category	Example
structural	1. 2.
enzyme	
	insulin
	haemoglobin and myoglobin
defensive	
	actin and myosin
storage	

12. The table below shows the rate of an enzyme reaction at a range oftemperature:

Temperature / °C	Mass lost by reactants /mg	Rate of reaction = mass lost : temperature
10	5	
20	10	
30	40	
40	80	
50	20	

Fill that table with the values of the rate of reaction and plot a graph of rateat different temperatures (use x-axis for temperature). **(5maks)**

a) Calculate Q10 at 30°C (**2marks)**

b) Explain what happen between 20and30°C and between 40and50°C.**(4marks)**

13. Distinguish between the terms ecosystem and niche. **(2marks)**

14. Copy the diagrams below.

A B

a) Identify with labels which one represents a lipid and which a phospholipid.

(1Mark)

b) (i) For molecule A, indicate on the diagram where hydrolysis would take place if the molecule was digested. **(2marks)**

(ii) Name the products of digestion. **(2marks)**

c) Each molecule has a head with tails attached. For molecule B, label the headto identify its chemical nature. **(1mark)**

d) (i) Which of the two molecules is water-soluble? **(1mark)**

(ii) Explain your answer to d i. **(1mark)**

e) State one function of each molecule. **(2marks)**

15.Copy and complete the table below **(5marks)**

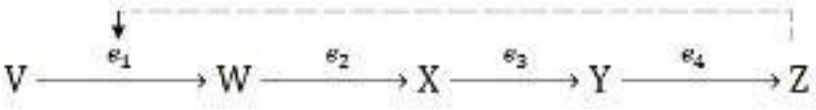
Common name	Scientific name	Genus	Species
	Homo sapiens		H. sapiens
Common beans		Phaseolus	P. vulgaris
Dog		Canis	

16. a) What do you think would happen to plants if there were no insects?

(2marks)

b) Suggest different ways to conserve our forests. **(2marks)**

17.The diagram below represents a metabolic pathway controlled by enzymes.



- **V** is a substrate
- **W, X** and **Y** are intermediate compounds
- Z is a product
- e1, e2, e3, and e4 are enzymes

a. Name the type of control mechanism which regulates production ofcompound Z **(2marks)**

b. Explain precisely how an excess of compound Z will inhibit its furtherproduction. **(2marks)**

18. a) what does meant by microscope? **(1mark)**

b) What is the difference between magnification and resolution power?**(2marks)**

c) Compare light microscope the electron microscope. **(3marks)**

19. a)What structures do both animal and plant cells have in common? **(2marks)**

b) State any 3 principles of the cell theory. **(3marks)**

20. a) Explain why muscle cells contain a lot of mitochondria,whereas most fat storage cells do not. **(2marks)**

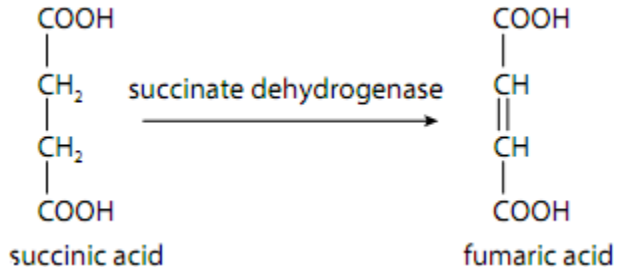
b) What kind of information is contained in chromosomes?

(2marks)

c. Describe the functions of the endoplasmic reticulum, Golgi apparatus, chloroplasts, mitochondria, and nucleus in the cell.

(2marks)

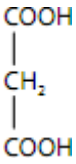
21. The reaction below occurs during aerobic respiration. The reaction iscatalysed by the enzyme succinate dehydrogenase.



a) Name the substrate in this reaction. **(1mark)**

b) The molecule malonic acid, which is shown here, inhibits this reaction. It

does not bind permanently to the enzyme. Describe how malonic acid inhibitsthe enzyme succinate dehydrogenase. **(3marks)**



Malonic acid

c) Heavy metals such as lead and mercury bind permanently to –SH groups ofamino acids present in enzymes. These –SH groups could be in the active site or elsewhere in the enzyme.

(i) Name the amino acid which contains –SH groups. **(1mark)**
(ii) Explain the function of –SH groups in proteins and why binding of heavymetals to these groups would inhibit the activity of an enzyme. **(4marks)**
(iii) What type of inhibition would be caused by the heavy metals? **(1mark)**

22. State any four functions of water in animals **(4marks)**

23. Two students visit the medical centre with different complains, student A told to the Doctor that whenever he/she brushes teeth there is bleeding. Student B doesn't see well objects around him/her. He/She looks cloudy especially in the evening. The doctor said that they all have the same problem, lack of vitamins .The student A will take the required vitamin supplement everyday, but the student B will take the supplement after each two days.

a) What vitamin is lacking for each of the two students? (**2marks)**

b) Why student A can take his/her supplement every day, while student Btakes it each two days. **(2 marks)**
c) Humans obtain vitamins from natural sources such as vegetables, fruits, meat, fish, and dairy products. What are the two vitamins that are not providedby fruits and vegetables? (**1mark)**