BIOLOGY
Paper I
(THEORY)
(Botany and Zoology)
(*Three hours*)

Answer **all** questions from Part I and **five** questions from Part II choosing **three** questions from section A and **two** questions from Section B.
All working including rough work should be done on the same sheet as, and adjacent to, the rest of the answer.
The intended marks for questions or parts of questions are given in brackets [ ].

Part I *Answer* **all** questions

Question 1

a) Mention one significant difference between each of the following: **[5]**

i) Gene and genome
ii) Chromatin and chromosome
iii) Artificial and natural system of classification
iv) Plasmids and Phasmids
v) Prophase I and Prophase II

b) Answer the following: **[2½]**

i) What is metameric segmentation?
ii) What is hilum in a starch grain?
iii) What is karyotypic analysis?
iv) What is paracentric inversion?
v) Name the part of bacterial cell that contains enzymes of ETS.

c) Give exact location of the following: **[2½]**

i) Histones
ii) Fibrous protein
iii) Flame cells
iv) Choanocytes
v) Suberin

d) Do as directed: **[3]**

i) Archaebacteria can bear extremes of temperatures. Give reason.
ii) Cnidarians have economic importance. Justify.
iii) A colourblind woman marries a man with normal vision and their first child is a girl. What is the probability of her being colourblind? Why?

e) Give the contribution/name the scientist for the following. **[2½]**

i) Two kingdom classification
ii) Linkage
iii) Robert Koch
iv) Observed Ribosomes
v) Alec Jeffery

f) Elaborate the following: **[2]**

i) cDNA
ii) FMN
iii) NOR
iv) RFLP

g) Name the following **[2½]**

i) The process of digesting parts of own cell _____
ii) The microfilaments present in the muscle cell _____
iii) The highest taxonomic category is _____
iv) Causative agent of Cholera _____
v) Aerobic prokaryotes without cell wall _____

Part II (SECTION A) *Answer any* **three** *questions*

Question 2

a) With the help of diagrams show the difference between a eukaryotic cell under light microscope and electron microscope. 4
b) What are feathered bipeds? How are they adapted to their mode of life? 2
c) What are structural polysaccharides and how are they different from storage polysaccharides? 2
d) What are zymogens? What is its importance? 2

Question 3

a) Give three examples of macromolecules and name the main bond in them that is formed by condensation reaction of their respective micromolecules. 3
b) With the help of graphs show the effect of three main factors that affect enzyme action. 3
c) Comment on the evolution of four chambered heart on the basis of classes of Vertebrata. 4

Question 4

a) With the help of schematic diagram show the base pairing in DNA, and mention two main characters based on the diagram. 4

b) Describe the main types of excretory cells in invertebrates. 4

c) We are unable to see ribosomes under light microscope. Why is it so? Mention two advantages of light microscope. 2

Question 5

a) Prontosil is a drug used to combat bacterial infection. It works on a specific mechanism of enzyme action. It does not allow bacteria to synthesize a substance required for their growth, the synthesis of which requires a specific enzyme. Thus bacterial growth is inhibited. Name and describe the mechanism. 4

b) "Aves" is the class that shows the power of flight. Name four organisms that do not compile with this characteristic and are still included in this group. 2

c) What is green house effect? Name two green house gases. 2

d) Steward and his co-workers conducted an experiment based on a particular characteristic of cell. Explain the characteristic. What was the basis of this concept? 2

Question 6

a) What is global water cycle? 1

b) Identify, draw and label the structure in fig 6-b and give its function 4

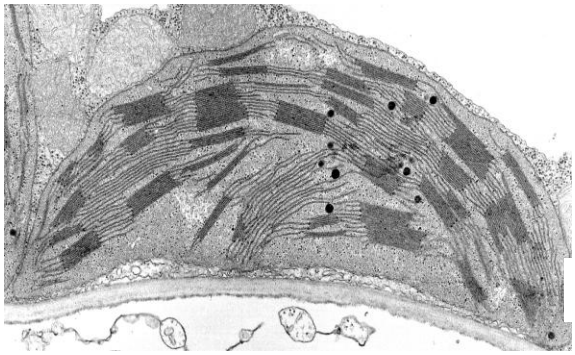

Fig. 6-b

c) During adverse conditions, Bacillus produces a resting stage. Name and describe the formation of this. 2

d) According to the classification given by R.H. Whittaker, place the following- 1

a. Organisms with rigid cell wall, without membrane bound organelles.
b. Cell wall made up of chitin and reserve food in the form of glycogen.

e) Draw the structure of a disaccharide showing 1, 2 α linkage. 2

SECTION B *Answer any* **two** *questions*

Question 7

a) Nerve cells pass impulses based on the change in concentration of Na and K ions in the extracellular and intracellular fluids. Which type of membrane protein is involved in this? Describe the mechanism. Give two other significances. 4

b) What is chromosome cycle? Draw the structure of a chromosome in metaphase. 2

c) The Ello deer can have green, yellow or blue fur. Blue crossed with green gives a 1:1 ratio of yellow to green. Yellow crossed with blue always gives green. Explain the inheritance of fur colour in the Ello deer and deduce the outcome of a cross green and green. 4

Question 8

a) Explain genomatic mutation. 3

b) What is DNA finger printing? Give 4 uses of it. 3

c) With the help of diagram show primary non-disjunction. 4

Question 9

a) What are cumulative genes? Explain it with the help of an example. 3

b) Leg colour is a sex-linked gene in the Zom Bee and can be either the dominant red or recessive blue. A female homozygous for red legs mates with a male with blue legs. Predict the leg colour of the baby bees. 2

c) Describe the biological tools used for recombinant technology. 5

Question 10

a) In the squishy squash bumpy fruit shape is dominant over smooth and soft fruit is dominant over hard. Explain diagrammatically how a plant with bumpy , hard fruit and one with smooth , soft fruit produced-

25 plants with bumpy, soft fruit.
26 plants with smooth, soft fruit
23 plants with bumpy, hard fruit
25 plants with smooth hard fruit. 2

b) Balbiani observed a specific type of chromosome in chironomous larvae. Name the type of chromosome and describe how they are formed. 2

c) Ruth Sanger and his colleagues suggested the occurrence of a specific type of inheritamce. What was it? What is the basis of it? 2

d) Draw the cell cycle of a cell that will form cortical cells of shoot. How will the cell cycle differ in a cell at the shoot tip? 4