

**S. N. KANSAGRA SCHOOL**  
**BIOLOGY (THEORY)**  
**Annual examination 2010-2011**

**STD11**

*(Three hours)*

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Answer **all** questions from Part I.

Part II is subjective section. Section A has five questions you may choose **any three** from them.

Section B has four questions you may choose **any two** from them

The intended marks for questions or parts of questions are given in brackets.

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**Part I**

*Answer all* questions

**Question 1**

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

1. Primase and Permease
2. Notochord and Nerve cord
3. Protonema and prothallus
4. Haustoria and mycelium
5. ATP and NADP (Based on nucleotide)

**b) Give one word for the following:** **[2]**

1. The series of loops in the polytene chromosome.
2. The protein coat in virus
3. The constriction at the distal end of the stomach in frog.
4. Fungal cellulose

**c) Give reason for the following:** **[5]**

1. Unicellular organisms show efficient mechanism of exchange of substances.
2. Cellular transport of water is by facilitated diffusion.
3. The pH of perimitochondrial space is acidic.
4. Homotypic division is a division of haploid cells.
5. Haploid individuals are most suitable for mutation related study.

**d) Mention the location and function of the following:** **[3]**

1. Alary muscles
2. Columnae carnae
3. Holdfast

e) Name the scientists who contributed the following. [2]

1. Obtained an X ray diffraction photograph of DNA.
2. Proved the one gene one enzyme hypothesis.
3. Rediscovered Mendel's work (any two)

f) Identify the group of animals based on the given characteristics and give one example. [3]

1. Poikilothermic animals with creeping mode of locomotion.
2. Aquatic animals with cartilaginous skeleton.
3. Chitinous exoskeleton with segmented body

## Part II

### Section A

*Answer any three questions*

#### Question 2

- a. What is the "Human genome project"? Discuss the positive and negative outcomes of the HGP in genetic engineering. [2]
- b. Hormones are chemical messengers that travel in the blood that act on specific target cells. Protein hormones bind to receptor on the cell surface while steroids hormones can enter the cell. Explain the property of the cell membrane that allows this. Mention two comments on the fluid-mosaic model. [3]
- c. Based on the given information identify the following - (any 4) [2]
  - i. A protective protein forms complexes with foreign proteins.
  - ii. Protein associated with oxygen in muscles.
  - iii. Protein associated with nucleic acids.
  - iv. Protein responsible for metabolic respiration.
  - v. Protein involved in cell division process.
  - vi. A mucopolysaccharide found in vitreous humor.
- d. Draw a well labeled diagram of a semi autonomous organelle and give 4 features that make it suitable to perform its specific functions. [3]

### Question 3

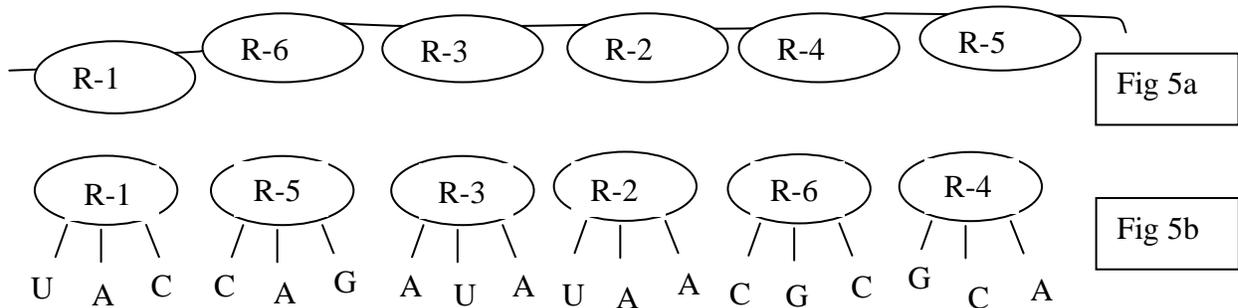
- With the help of diagrams show the sequence of the process of formation of a polypeptide chain in the cytoplasm. [5]
- How can cell use non carbohydrate food such as proteins and fats to release energy? Explain and give appropriate terms. [3]
- With the help of diagram show the beginning and the final process of cytokinesis differentiating it in plant and animal cell. [2]

### Question 4

- Explain the formation of the following bonds- [3]
  - Peptide
  - 1-6 glycosidic.
  - Phosphodiester.
- Explain the link reaction in the process of aerobic respiration. Mention a similar reaction in the Krebs cycle. [3]
- A woman whose maternal grandfather suffered from hemophilia has parents that are normal. The woman's husband is normal. She has a hemophiliac son. What is the chance that the next son will be normal? Will any of the daughters be hemophiliac? Will any be carriers? [2]
- Name any four eukaryotic cell organelles that contain nucleic acid. [2]

### Question 5

- Figure 5a is a protein chain of 6 amino acids that has been prepared from the tRNA molecules (Fig 5b). Prepare the DNA template for the same in accordance with the protein synthesis.[3]



- In human beings, migraine (a type of headache) is due to a dominant factor. A normal vision woman who has never suffered from migraine takes her daughter to the doctor for an examination.

In the course of the examination the doctor discovers that the girl is colour-blind, and suffers from migraine. What does the doctor immediately know about the father? [1]

- c. Down's syndrome is caused due to an extra 21<sup>st</sup> chromosome. Show the process that lead to this disorder with the help of diagram. [3]
- d. What are zymogens? Where are they found and why are they necessary? [2]
- e. A brown-eyed man marries a blue-eyed woman and they have eight children, all brown eyed. What are the genotypes of all the individuals of the family? [1]

### Question 6

- a. The polymerase chain reaction is a process which can be carried out in a laboratory to make large quantities of identical DNA from very small samples. The process is summarized in the flowchart-

1. The sample of DNA is placed in a solution containing free nucleotides.

2. The complementary strands of DNA are separated.

3. New complementary strands of DNA synthesized from the nucleotide in the solution

The steps 2 and 3 are repeated in the cycle.

- i. At the end of one cycle, two molecules of DNA are produced from each original molecule. How many DNA molecules will have been produced from one molecule of DNA after 5 complete cycles? [1]
- ii. Give two ways in which the PCR differs from process of transcription. [2]
- b. What problems does a cell face when it generates large amount of ATP from glycolysis? [1]
- c. A brown-eyed man whose mother was color-blind and whose father had blue eyes is engaged to marry a woman whose color-blind mother had blue eyes and whose normal vision father had blue eyes. What is the genotype of the young gentlemen? Of his fiancée? If they marry and have a family what are the chances of having: a brown-eyed normal-vision child? A blue-eyed color-blind son? [3]

d. Observe the table and answer the questions-

Fatty acids	Melting point	Number of carbons atom	Number of carbon- carbon double bound
Palmitic acid	63.1	16	0
Stearic acid	69.6	18	0
Oleic acid	13.4	18	1

- i. Why is the melting point of oleic acid much lower those of palmitic acid? [1]
- ii. Explain why cells of cold blooded animals usually have a higher proportion of unsaturated fatty acids than warm- blooded animals. [2]

## SECTION B

*Answer any two questions*

### Question 7

- a) Discuss the circulation of blood in cockroach. [3]
- b) Classify arthropods giving a reason. [2]
- c) Differentiate between immigration and emigration. [1]
- d) Give the analogous structure in Gymnosperm and Bryophytes [2]
  - i. Carpels
  - ii. Root
- e) Draw a well labeled diagram showing double fertilization and triple fusion in angiosperms.[2]

### Question 8

- a) List two diagnostic characters of chordates and two characters of higher chordates. Classify the highest class of chordates giving reason. [4]
- b) There are various ways of communication among members of the same species. Discuss the role of chemicals in communication giving examples. [2]

- c) Frogs do not chew their food; however they have different types of teeth. With the help of diagram show their location. [2]
- d) Differentiate between- [2]
- i. Endosperm in Gymnosperm and Angiosperm
  - ii. Embryo and embryo sac.

### Question 9

- a) Compare the digestive system in frog and cockroach. [3]
- b) Give the causative organism of the following fungal disease- [3]
- i. Stripe disease of barley
  - ii. Tikka disease of groundnut
  - iii. Red rot of sugarcane
- c) What is population dispersal? Discuss the various methods of population dispersal. [4]

### Question 10

- a) What is alternation of generation? Name the phylum and example of organisms showing this phenomenon. [2]
- b) Identify the plant product and mention the group to which they belong to- [2]
- i. A mixture of polysaccharides colloidal in nature covering the cellulosic cell wall of certain algae.
  - ii. Complex polysaccharide utilized in many laxative and mycological medium.
- c) Give the source organism and use of each of the following - [4]
- i. LSD
  - ii. Penicillin
  - iii. Citric acid
  - iv. Litmus
- d) Earthworm can increase the fertility of the soil. Discuss how they achieve this. [2]