

**S. N. KANSAGRA SCHOOL**  
**BIOLOGY (THEORY)**

**STD11**

**1<sup>st</sup> Terminal examination 2010-2011**

*(Three hours)*

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.

**Part I**

*Answer all questions*

**Question 1**

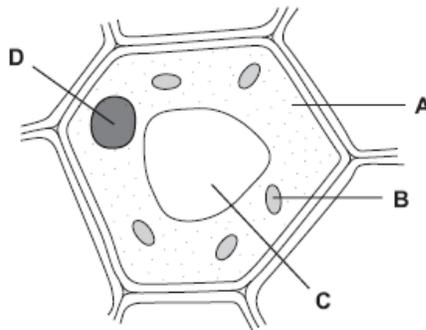
**a) Choose the correct answer and mention in your answer sheet.**

**[6]**

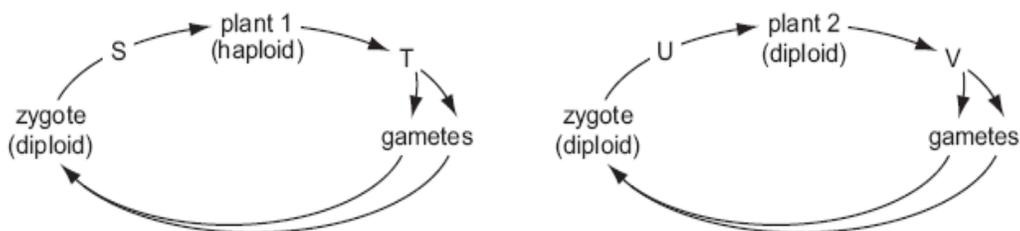
1. There are about \_\_\_\_\_ kinds of living organisms known at present.

- a) 1.7 million
- b) 1.7 billion
- c) 1.2 million
- d) 0.5 million

2. The diagram shows the structure of a typical plant cell. Which cell component is also present in prokaryotes?



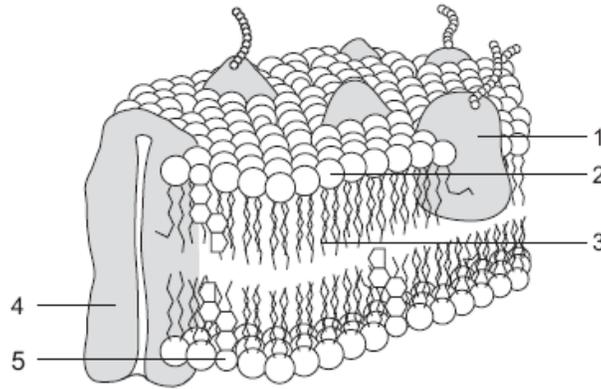
3. The diagram shows the life-cycles of two types of simple plant.



Where will reduction divisions occur in the life cycles?

- a) at S and U
- b) at S and V
- c) at T and U
- d) at T and V

4. The diagram shows part of the cell surface membrane.

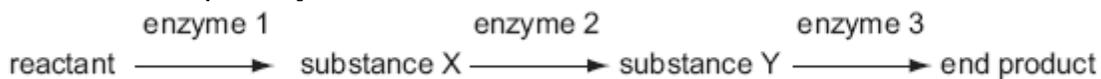


Which components help to maintain the fluidity of the membrane?

- a) 1 and 3
  - b) 1 and 4
  - c) 2 and 4
  - d) 3 and 5
5. After vigorous exercise, changes occur in the muscle tissue. Compared with 'at rest' condition what will the changes be?

	glycogen	ATP	lactate	pH
a)	decreased	decreased	increased	decreased
b)	decreased	increased	increased	increased
c)	increased	increased	increased	increased
d)	increased	decreased	decreased	increased

6. A metabolic pathway is



What would be the effect of adding a small amount of a non-competitive inhibitor of enzyme 2?

- a) Enzyme 2 would be partially denatured.
- b) Substance X would increase in concentration.
- c) Substance Y would no longer be formed.
- d) The initial reactant would no longer be metabolised.

7. The diagram shows the chromosomes of one cell which has been squashed during mitosis.



Which stage of mitosis is shown and what is the haploid chromosome number in this species?

	stage of mitosis	haploid chromosome number
<b>A</b>	anaphase	5
<b>B</b>	anaphase	10
<b>C</b>	metaphase	5
<b>D</b>	metaphase	10

8. Three polypeptides were made using synthetic mRNA molecules as shown.

synthetic mRNA used	polypeptide produced
UUUUUUUUUUUUU	phenylalanine-phenylalanine-phenylalanine-phenylalanine
AAAAA AAAAAA	lysine-lysine-lysine-lysine
UUUAAA UUUAAA	phenylalanine-lysine-phenylalanine-lysine

What are the DNA codes for the amino acids phenylalanine and lysine?

	phenylalanine	lysine
<b>A</b>	AAA	TTT
<b>B</b>	AAA	UUU
<b>C</b>	TTT	GGG
<b>D</b>	UUU	AAA

9. A peptide consists of ten amino acids of four different kinds.

What is the theoretical minimum number of t RNA molecules required to translate the mRNA for this peptide?

- a) 4
- b) 10
- c) 12
- d) 30

10. Which type of cell will contain the highest proportion of single membrane-bound structures?

- a) ciliated epithelial cell
- b) goblet cell
- c) red blood cell
- d) smooth muscle cell

11. Which type of sugar and types of bonds are found in a DNA molecule?

	type of sugar	types of bonds
<b>A</b>	non-reducing	hydrogen and ionic
<b>B</b>	non-reducing	hydrogen and peptide
<b>C</b>	reducing	covalent and hydrogen
<b>D</b>	reducing	hydrogen and peptide

12. If a colourblind man marries a woman with normal vision and their first child is a boy who is colour blind. The second child is a girl. What is the probability of her being colour blind?

- a) 1 in 1
- b) 1 in 2
- c) 2 in 3
- d) 1 in 4

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

- i) Amphotery and amphipathy
- ii) Trichocysts and heterocysts (based on occurrence)
- iii) Bivalent and tetrad (based on structure)
- iv) FAD and NAD (based on composition)
- v) Microtubules and microfilaments (based on structure)

**c) Give the contribution of the following scientists.** [2]

- i) Stern and Hotta (1969)
- ii) Rosalind franklin
- iii) Embden, Meyerhof and Parnas
- iv) R.W.Holley

**c) Give one word for the following** [3]

- i) Evolutionary history of a group of organisms.
- ii) A cofactor participates directly in most of the oxidation-reduction reactions.

- iii) A type of mutation in which single base change may not lead to a change in amino acid.
- iv) Any recognizable feature of an individual.
- v) The failure of homologous chromosomes to separate in meiosis.
- vi) Phycoerythrin containing chloroplast.

**d) Mention the most significant function/ role of the following:** [2]

- i) Haemocyanin
- ii) Phosphoproteins
- iii) Aminoacyl t RNA synthetase
- iv) Cholesterol

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

- i) dGTP
- ii) UDP
- iii) NAG
- iv) FMN

**Part II**  
**Section A**

*Answer any three questions*

**Question 2**

**a)** Identify the following biomolecules 'A' and 'B'. [3]



- i. Classify the biomolecules on the basis of their shape.
- ii. Identify X. Mention its role.
- iii. How is molecule 'A' different from enzymes molecule?

**b)** Draw a diagram of Singer and Nicholson's cell membrane model. [4]

Label the diagram according to following statement and mention their name also.

A- Allow diffusion of gases.

- B- Carbohydrate unit attached with protein.
- C- Allow transport of polar molecules.
- D- The HIV virus which causes AIDS attacks certain WBC, interfering with a person's immune response. The virus attaches to specific receptor sites on the cell surface membrane of WBC. Mark this component of the cell surface membrane that acts as receptor site.

Answer the following on the basis of diagram drawn.

- i. If our cells and body fluids are hypertonic to the water of a swimming pool, then why do we not swell and pop when we go for a swim?
- c) Large head and red body color in flour beetles are dominant characters on chromosome 5. The corresponding recessive characteristics are small head and black body. Deduce the genotype and phenotype ratios of the offspring if a cross is made between a heterozygous and a recessive parent. [3]

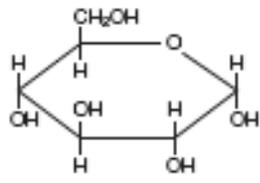
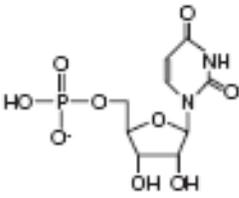
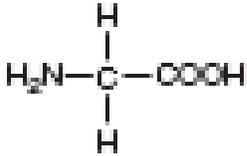
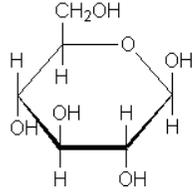
### Question 3

- a) Name a polymer in which the repeating monomer units are not same, but the fixed positions of these in the polymer decide the function. [1]
- b) What do you mean by zwitterions? Explain with the help of formula. [3]
- c) Differentiate between the following.(two points) [3]
  - i. Nuclear lamina and nuclear membrane
  - ii. Flagella and pili
  - iii. Autophagosome and heterophagosomes
- c) What is autocatalytic function of DNA? When does it occur? Give its significance. [3]

### Question 4

- a) Explain the following by giving a suitable reaction of cellular respiration. [3]
  - i. Phosphorylation
  - ii. Isomerisation
  - iii. Oxidative decarboxylation
- b) What is Chargaff's rule? How did this help Watson and crick? [3]

- c) Below mentioned figures are monomers of different biomolecules. By using monomer A, B, C and D make their individual polymers (max three units). Name the polymer and the type of bond formed between monomers. [4]

	
A	B
	
C	D

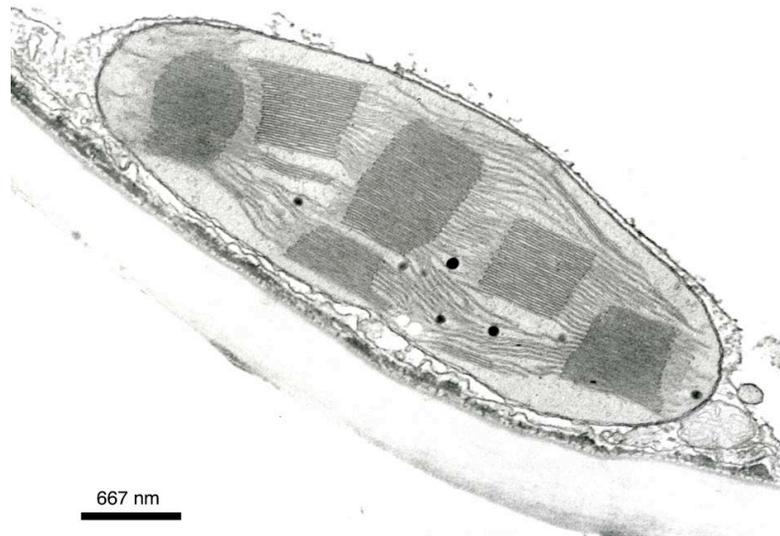
### Question 5

- a) State the property of water that allows each of the following to take place and, in each case, explain its importance. [4]
- i. The cooling of skin during sweating
  - ii. The survival of fish in ice covered lakes
  - iii. The ability of insects, such as pond skater, to walk on water.
  - iv. The transport of glucose and ions in a mammal.
- b) Macromutations are important however micromutations are more beneficial. Explain [3]
- c) What do you mean by the term central dogma? The HIV virus does not follow the central dogma of molecular biology. Explain the statement. [3]

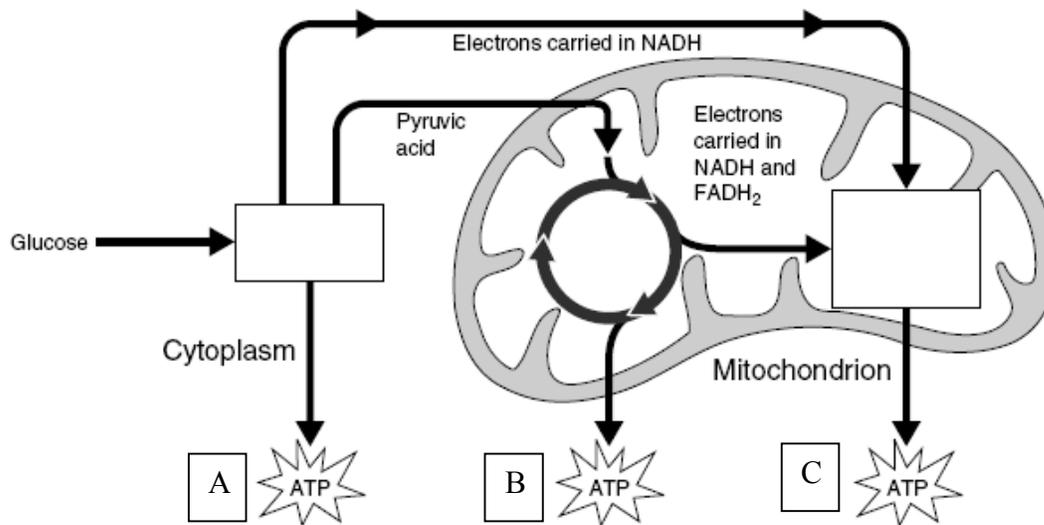
### Question 6

- a) How does competitive inhibition different from allosteric inhibition? [4]

- b) Identify and draw a well labelled diagram of the following electron micrograph. [3]



- c) Given figure shows the summary of cellular respiration. [3]



- i. Identify the processes (B and C) of ATP formation.
- ii. How will you use the following terms to explain process C?
  - i) Proton motive force
  - ii) Electron carrier
- iii. How can a cell use non-carbohydrate foods such as proteins and fats to release energy?

## SECTION B

*Answer any two questions*

### Question 7

- a) Mention the type of classification system given by following taxonomists. [2]
- John Ray
  - Lamarck
  - Takhtajan
  - Bentham and Hooker
- b) Why are blue green algae included under monera and not under plantae? Mention any one advantage and disadvantage of BGA. [2]
- c) Name the group which include [2]
- A protist that can be used to make furnace.
  - A protist that produce light from chemical energy.
- d) In cats tortoise shell fur colour is a mixture of black and orange hairs but it has only been seen in female cats. Male cats are either black or orange. When black female was mated with an orange male all the male offsprings were black and all the female offsprings were tortoise shell. Deduce the phenotype and genotype ratios of F<sub>2</sub>. (With Punnet square) [4]

### Question 8

- a) Identify the following taxonomic categories and define them. [2]
- Mammalia
  - Anacardiaceae
  - Felidae
  - Primates
- b) Mention the role of bacteria in following: [5]
- Ensilage
  - Fibre retting
  - Leather tanning
  - Tea curing
  - Tobacco curing
- c) The 2n number of chromosomes in plant X is 6. Explain the prophase I of meiosis with suitable diagrams [3]

### Question 9

- a) Mention any two drawbacks of five kingdom system. Classify the followings according to five kingdom system. [2]
- i. Star fish
  - ii. Rusts
  - iii. Seed plants
  - iv. Water molds
- b) 'Bacteria do not show true sexual reproduction'. Explain any one mode of reproduction to prove this. [2]
- c) Explain in brief on the basis of given feature. [4]
- a) Reproduction in diatoms (sexual reproduction)
  - b) Acellular slime moulds (morphology)
  - c) Parasitic zooflagellates (examples with disease)
  - d) Nucleus in *Paramoecium* (Function)
- d) In *Lathyrus odoratus* when two white flowers were crossed F1 progeny had coloured flowers. The F2 progeny obtained from F1 had coloured flowers and white in the ratio 9:7. Explain the type of inheritance. [2]

### Question 10

- a) With the help of suitable flow chart explain different types of meiosis occurring in protista. [3]
- b) Given figure shows a pair of homologous chromosomes during meiosis. [4]



- i. State the stage of meiosis is shown.
  - ii. State the process occurred in the given figure.
  - iii. Explain how this can lead to variation.
  - iv. Describe **two** other sources of variation that are possible as a result of meiosis.
- c) Consider the characters seed colour and seed shape. Explain the law of independent assortment on the basis of these characters. State why recombination is seen in the F2 generation. [3]