SN Kansagra School

BIOLOGY-I

STD12   **Prelim 1 2015-2016**   (*Three hours*)

Answer all questions in Part I and six questions in Part II, choosing two questions from each of the two section A and three 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 II each point carries half mark.

NOTE: ATTACH THE QUESTION PAPER WITH THE ANSWERSHEET.

Part I (20 marks)

Answer **all** questions

Part I

Answer **all** questions

Question 1

A. Answer briefly   [4]

1. What is the importance of natural selection in evolution?
2. Why is apoplastic pathway considered as the most important pathway?
3. What is the importance of nucellus?
4. What is the central dogma?

B. Give a scientific term for   [4]

1. The viruses that infect the bacteria
2. The inflorescence where the main axis is compressed and bears stalk-less flowers
3. Drooping of shoots and leaves when water loss is more than water uptake.
4. The embryonic development of an organism.
5. The peripheral waterproof tissue formed in mature woody stems.
6. The shape of guard cells in monocot leaves
7. The thin walled tube of 2 cm that opens into the urethra
8. The single base differences in the human genome.

C. Name the scientists associated with.   [2]

1. Obtained the fossil of *Archaeopteryx lithographica*
2. Coined the term "diffusion pressure deficit"
3. Discovered double fertilization
4. Proposed the recapitulation theory

D. Elaborate the following: [2]

1. RUBISCO
2. PEP
3. rDT
4. IPM

E. Choose the correct option (copy and write the answer with the alphabet): **[4]**

1. Which pair of factors is inversely proportional to the rate of diffusion?
   A. concentration gradient and surface area over which diffusion occurs
   B. distance over which diffusion occurs and size of diffusing molecule
   C. size of diffusing molecule and concentration gradient
   D. surface area over which diffusion occurs and distance over which diffusion occurs

2. In the DNA sequence for sickle cell anaemia, adenine replaces thymine in a CTT triplet, forming the triplet CAT. During synthesis of the sickle cell haemoglobin molecule, the amino acid valine is incorporated instead of glutamic acid. What is the anticodon in the transfer RNA molecule carrying this valine?
   A. CAU   B. CUA   C. GAU   D. GUA

3. A normal woman whose father was colour blind marries a normal man. Her sons would be
   A. 75% colour blind   B. 50% colour blind   C. all normal   D. all colour blind

4. When cylinders of potato tissue were immersed in a 0.35 mol dm–3 sucrose solution, they showed no change in mass.
   What will happen when cylinders are immersed in a 0.1 mol dm–3 sucrose solution?
   A. The pressure potential of the cells will become more positive.
   B. The solute potential of the cell will become more negative.
   C. The water potential of the cells will become more negative.
   D. The water potential of the solution will become less negative.

5. Which factor(s) is/are essential for evolution to occur within a population?
   I. Inheritance of characteristics
   II. Variation in the population
   III. Natural selection
   A. I only
   B. I and II only
   C. II and III only
   D. I, II and III

6. What part of eukaryotic RNA is removed after transcription?
   A. Codons   C. Introns
   B. Exons   D. Operons

7. What accumulates in the inter-membrane space of the mitochondrion during electron transport?
   A. ATP
   B. Electrons
   C. Protons (hydrogen ions)
   D. Oxygen

8. What does Mendel's law of independent assortment relate to?
   A. The independent separation of alleles of a gene
   B. The independent separation of a pair of homologous chromosomes
   C. The independent separation of alleles of different genes
   D. The formation of new combinations of chromosomes

F. Differentiate between- **[4]**

1. Founder's effect and Bottle neck effect
2. Solute potential and pressure potential
3. Polygenes and pleotropism
4. Epipetalous and epiphyllous

Part II
Section A
*Answer any **two** questions*

Question 2

1. Give two differences between homology and analogy.(excluding examples)   [1]
2. Discuss the importance of coacervates in evolution.   [1]
3. Name the scientist who discovered and one main feature of-   [3]
        a. *Homo erectus*   b. *Homo neanderthalensis,*   c. *Cromagnon man*

Question 3

1. On the basis of embryology, discuss the common ancestry of evolution.   [2]
2. Describe the experiment conducted to prove the abiogenesis of life.   [3]

Question 4

1. Mutations are subjected to natural selection. Explain on the basis of DeVries theory.   [2]
2. Explain the significance of paleontology in the study of evolution.   [3]

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

Question 5

1. Give four differences between the vascular bundle of monocot and dicot stem.   [2]
2. What is photophosphorylation? Give two differences between cyclic and non-cyclic photophosphorylation.   [2]
3. What is ascent of sap? Describe the transpirational pull theory for ascent of sap.   [3]
4. Mention the three main phases of the menstrual cycle and give two features of each.   [3]

Question 6

1. Describe anatomical details of monocot root.   [3]
2. Describe the process of oogenesis.   [2]
3. Describe the hormonal control of lactation.   [2]
4. Describe the types of endosperm formation.   [3]

Question 7

1. Discuss embryo formation in dicots.   [3]
2. Describe the structure of testis.   [2]
3. Define pollination. Give the adaptations of the flower and pollen for wind pollination.   [2]
4. Give a graphic representation of the C3 cycle.   [3]

SECTION C
*Answer any **two** questions*

Question 8

1. Differentiate between bioinsecticides and bioherbicides giving examples.   [2]
2. Describe the process of protein synthesis in brief.   [4]
3. State and explain the Mendel's laws of inheritance. Discuss a deviation of 1st law.   [4]

Question 9

1. Explain gene expression by induction.   [3]

2. Describe Griffith's experiment. [3]
3. A widely used social drug that acts as a depressant has numerous individual and social effects. Mention four effects of each. [2]
4. Discuss the types of growth curves in human population. [2]

Question 10
1. In dogs, wirehair is due to a dominant gene (W) and smooth hair is due to its recessive allele (w).
   a. If a homozygous wire-haired dog is mated with a smooth-haired dog, what type of offspring could be produced? (genotype and phenotype). [1]
   b. What type of offspring could be produced in the F2? (genotype and phenotype) [1]
   c. Two wire-haired dogs are mated. Among the offspring of their first litter is a smooth-haired pup. If these two wire-haired dogs mate again, what are the chances that they will produce another smooth-haired pup? What are the chances that the pup will be wire-haired? (Show Punett square) [1.5]
   d. A wire-haired male is mated with a smooth-haired female. The mother of the wire-haired male was smooth-haired. What are the phenotypes and genotypes of the pups they could produce? (Show Punett square) [1.5]
2. Describe sex-linked inheritance with an example. [3]
3. Give a brief idea of the breeding techniques in animal husbandry. [3]