Q.1. Select the best option/answer and fill in the appropriate box on the Answer Sheet. (20)

(i) NADH from the Krebs cycle is approximately equal to:  
(a) 2 ATP (b) 3 ATP (c) 4 ATP  
(d) 6 ATP (e) None of these  

(ii) In mitochondrial electron transport chains, the final electron acceptor is:  
(a) H₂O (b) H₂O₂ (c) NAD⁺  
(d) FAD (e) None of these  

(iii) The movement of water from cell to cell via plasmodesmata is called:  
(a) Symplastic (b) Transmembrane (c) Apoplastic  
(d) Facilitated (e) None of these  

(iv) In maize plant, the CO₂ fixation mechanism is called:  
(a) C₃ pathway (b) C₄ pathway (c) CAM pathway  
(d) C₃ – C₄ intermediate (e) None of these  

(v) Salt-loving plants are known as:  
(a) Glycophytes (b) Halophytes (c) Xerophytes  
(d) Mesophytes (e) None of these  

(vi) With the addition of solution to a liquid system, the water potential of the system:  
(a) Increases (b) Decreases (c) Remains stable  
(d) Remains variable (e) None of these  

(vii) The conversion of pyruvate into acetyl CoA is called:  
(a) Glycolysis (b) Fermentation (c) Oxidative carboxylation  
(d) B-Oxidation (e) None of these  

(viii) Between adenine and thymine, there are:  
(a) Two hydrogen bonds (b) 3 hydrogen bonds (c) One hydrogen bond  
(d) 4 hydrogen bonds (e) None of these  

(ix) The stage of meiosis in which pairing of homologous chromosomes starts is called:  
(a) Leptotene (b) Zygotene (c) Diplotene  
(d) Pachytene (e) None of these  

(x) The site of chromosome on which a gene is located is called:  
(a) Allele (b) Locus (c) Site  
(d) Trait (e) None of these  

(xi) In a dihybrid cross, the ratio of F₂ generation is:  
(a) 9:3:3:1 (b) 3:1 (c) 1:2:1  
(d) 1:1 (e) None of these  

(xii) When a single gene has multiple effects, the phenomenon is called:  
(a) Codominance (b) Epistasis (c) Pleiotropy  
(d) Genostasis (e) None of these  

(xiii) Lamarck’s theory of evolution was published in:  
(a) 1807 (b) 1808 (c) 1809  
(d) 1810 (e) None of these  

(xiv) The book “Origin of Species” was written by:  
(a) Linnaeus (b) Lamarck (c) Mendel  
(d) Darwin (e) None of these  

NOTE: (i) **First attempt PART-I (MCQ) on separate Answer Sheet which shall be taken back after 30 minutes.**  
(ii) **Overwriting/cutting of the options/answers will not be given credit.**
(xv) The interaction between algae and fungi to form lichen is called:
(a) Parasitism  (b) Mutualism  (c) Commensalism  
(d) Amensalism  (e) None of these

(xvi) The actual location or place where an organism lives is called:
(a) Habitat  (b) Ecosystem  (c) Niche  
(d) Biome  (e) None of these

(xvii) Which of the biomes has been increased in area by human activities?
(a) Savanna  (b) Grassland  (c) Desert  
(d) Coniferous forest  (e) None of these

(xviii) Which zone of the lake ecosystem consists of phyto-and zoo-planktons?
(a) Littoral zone  (b) Limnetic zone  (c) Profundal zone  
(d) Water deep layers  (e) None of these

(xix) Which of the following is a biotic component of an ecosystem?
(a) Producers  (b) Consumers  (c) Decomposers  
(d) All of these  (e) None of these

(xx) A sequence of changes in the community structure of an ecosystem over a period of time is called:
(a) Natural selection  (b) Succession  (c) Neo-Darwinism  
(d) Lamarckism  (e) None of these

PART – II

NOTE:
(i) PART-II is to be attempted on the separate Answer Book.
(ii) Attempt ONLY FOUR questions from PART-II. All questions carry EQUAL marks.
(iii) Extra attempt of any question or any part of the attempted question will not be considered.

Q.2. (a) What is Oxidative phosphorylation? How does it take place on the mitochondrial membrane and how is it associated with the synthesis of metabolic energy?  
(b) What is pigment? Give the structures and chemical composition of all plant pigments involved in photosynthesis.

Q.3. Describe the structure, transport, biosynthesis and mode of action of Auxins.

Q.4. (a) Differentiate between Dark Respiration and Photo-respiration.  
(b) Describe the salient effects of water-logging on plants.

Q.5. What is Ecosystem? How is its composition affected by different environmental factors?

Q.6. Write notes on the following:
(i) Genetic code  
(ii) Gene transformation

Q.7. (a) What are major factors which affect the evolution of a trait?  
(b) Describe Ecological Energetics.

Q.8. Write short notes on ANY TWO of the following:
(i) Photoperiodism  
(ii) Ultra-structure of chloroplast  
(iii) Conservation of Natural resources

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