

O : ZOOLOGY

Q. 1 – Q. 6 carry one mark each.

- Q.1 In theories of evolution, the example that a giraffe stretching the neck to reach on higher branches has been used to explain the following:
- (A) Use and disuse theory (B) The concept of inheritance of acquired characters
(C) Intelligent design (D) Both A and B
- Q.2 Which of the following statements is true for the systematics of the animal kingdom?
- (A) Systematics employs a hierarchical system of classification
(B) Systematics can also be based on cladistic analysis
(C) Systematics can infer phylogeny from molecular data
(D) All the above
- Q.3 Most modern taxonomists group living organisms into how many kingdoms?
- (A) 2 (B) 3 (C) 4 (D) 5
- Q.4 In many terrestrial vertebrates, including humans, the sensory organ for hearing and equilibrium are closely associated within the inner ear. Which of the following parts in the inner ear represents the organ of equilibrium?
- (A) Tectorial membrane (B) Tympanic membrane
(C) Semicircular canals (D) Sacule
- Q.5 Which combination of mechanisms best explain cross-continental migration of animals ?
- (A) Orientation and navigation (B) Orientation and piloting
(C) Navigation and piloting (D) Orientation, navigations, and piloting
- Q.6 Hemolin is
- (A) An antibody produced by sponges (B) An antibody produced by annelids
(C) A member of the immunoglobulin superfamily (D) A cytotoxic molecule produced by nematodes

Q. 7 to Q.24 carry two marks each.

- Q.7 The fossil records suggest evolutionary trends. Choose the correct statement:
- (A) An evolutionary trend does NOT imply that evolution is goal oriented
(B) An evolutionary trend implies that evolution is goal oriented
(C) Fossil record can NOT be considered as indicators of evolutionary process
(D) A fossilized specimen undergoes gradual change over time that "mimics" the evolutionary process
- Q.8 Which of the following statements identify the term "biological magnification" ?
- (A) Green house effect will have greater impact on tropical countries
(B) Toxins become concentrated in successive trophic levels of food webs
(C) Energy is lost at each level in a food chain
(D) Primary producers are at the bottom of the food chain

- Q.9 Honey bee returning to the hive from a food source performs a “waggle dance”. It indicates the:
- (A) Distance between the beehive and the food source
 (B) Direction to the food resource
 (C) The type of food available in the source
 (D) All of the above
- Q.10 Choose the choice that correctly pairs the following:
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|--------------------------------|-----------------|
| a. Initial response to antigen | i. Coelomocytes |
| b. Cytokines | ii. IgM |
| c. Passive immunity to foetus | iii. IgG |
| d. Humoral immunity | iv. T cells |
| e. Phagocytosis | v. B cells |
- (A) a-iv; b-iii; c-ii; d-v; e-i
 (B) a-i; b-iv; c-v; d-iii; e-ii
 (C) a-ii; b-iv; c-iii; d-v; e-i
 (D) a-ii; b-v; c-i; d-iv; e-iii
- Q.11 Which of the following is correctly paired?
- (A) Blastopore – organizer
 (B) Regulative development – syncytial specification
 (C) Vegetal pole – mesoderm
 (D) Spiral cleavage – chick embryo
- Q.12 Which of the following is seen in an adult frog?
- (A) Somite
 (B) Notochord
 (C) Branchial arches
 (D) None of the above
- Q.13 Which of the following has all the pairs correct?
- | | |
|-------------|---------------------|
| a. Ectoderm | i. Heart |
| b. Mesoderm | ii. Stomach |
| c. Endoderm | iii. Enteric neuron |
| d. Ectoderm | iv. Skull |
| e. Mesoderm | v. Kidney |
- (A) a-iii, b-ii, c-i, d-iv, e-v
 (B) a-iii, b-i, c-ii, d-iv, e-v
 (C) a-ii, b-iv, c-v, d-i, e-iii
 (D) a-ii, b-i, c-v, d-iii, e-iv
- Q.14 Which combination of following statements is true?
- i) *Hox* genes have undergone multiple duplications during animal evolution.
 ii) For some reptiles, sex is determined by environmental factor(s).
 iii) Metamorphosis in amphibians is regulated by nuclear hormone receptor signaling.
- (A) i and ii
 (B) i and iii
 (C) ii and iii
 (D) i, ii and iii
- Q.15 The 5'-untranslated region (5'-UTR) is found:
- (A) Upstream of the promoter
 (B) Within the first intron
 (C) Within the first exon
 (D) Immediately upstream of the splice acceptor site
- Q.16 A:T and G:C ratios in a newly discovered organism are 0.63 and 0.8, respectively. Genome of this organism is likely to have:
- (A) Single stranded DNA
 (B) Double stranded DNA
 (C) Single stranded RNA
 (D) Double stranded RNA
- Q.17 During enzyme-catalyzed reaction, a competitive inhibitor acts by:
- (A) Reducing activation energy
 (B) Increasing activation energy
 (C) Reducing effective substrate concentration
 (D) Increasing effective substrate concentration

- Q.18 Which of the following pairs is NOT correct?
 (A) Reverse transcriptase - DNA synthesis (B) Primase - RNA synthesis
 (C) Acetyl transferase - Transcription (D) Reverse transcriptase - transcription
- Q.19 In an organism with diploid chromosome number of 8, the cells at anaphase II will display:
 (A) 4 chromosomes (B) 2 chromosomes with 4 chromatids
 (C) 4 chromatids (D) 8 sister chromatids
- Q.20 Symbiotic microbes that help the digestive process in ruminants live in a specialized part of the alimentary canal known as:
 (A) Liver (B) Pharynx (C) Stomach (D) Cecum
- Q.21 In animals, respiration and circulatory systems are often functionally interlinked. Which animal group represents an exception?
 (A) Aquatic mammals (B) Fish (C) Terrestrial insects (D) Amphibians
- Q.22 Match the term with the correct description:
- | | |
|----------------------|--|
| a. Gene flow | i. Source of new alleles |
| b. Natural selection | ii. Changes in a population's allele frequencies due to chance alone |
| c. Mutations | iii. Allele frequencies changes due immigration, emigration, or both |
| d. genetic drift | iv. Outcome of differences in survival and reproduction among individuals that vary in forms shared traits |
- (A) a - iii, b - iv, c - i, d - ii (B) a - iv, b - iii, c - ii, d - i
 (C) a - ii, b - i, c - iv, d - iii (D) a - ii, b - iv, c - iii, d - i

Common Data Questions

Common Data for Questions 23 and 24:

Many nematodes are parasites on animals. *Ascaris lumbricoides* is an example of nematode parasite on human. It infects more than 1 billion people in Africa and Asia. *Ascaris* passes through several stages of its life cycle inside the human body.

- Q.23 *Ascaris lumbricoides* enters the human host in which stage of its life cycle?
 (A) Egg (B) Larva (C) Adult (D) Adult female
- Q.24 During its life cycle within the host, *Ascaris* migrates from
 (A) Intestine to heart (B) Intestine to brain
 (C) Lungs to throat (D) Intestine to liver

Linked Answer Questions: Q.25 to Q.28 carry two marks each.

Statement for Linked Answer Questions 25 and 26:

Synthetic progesterone and estrogen are commonly used as birth control pills. Based on your understanding of hormonal regulation of reproduction, answer the following 2 questions.

- Q.25 These two hormones act by
 (A) Negative feedback to stop the release of GnRH
 (B) Positive feedback by increasing the release of LH and FSH hormones
 (C) Increasing the level of LH and decreasing the level of FSH
 (D) Decreasing the level of LH and increasing the level of FSH

- Q.26 During a menstrual cycle in human female, elevated levels of progesterone indicates that the process of ovulation is:
- (A) Yet to occur (B) Completed (C) Advanced (D) Delayed

Statement for Linked Answer Questions 27 and 28:

When an animal of the genotype $AaBb$ was mated with another of the genotype $aabb$ (test cross), the following progeny were observed:

$AaBb - 980$; $aabb - 976$; $Aabb - 287$ and $aaBb - 291$

- Q.27 Based on your understanding of the law of independent assortment, what ratios of progeny phenotypes are expected in a test cross ($AaBb \times aabb$)?
- (A) 1:1:1:1 (B) 2:2:1:1 (C) 1:2:1:2 (D) 1:1:2:2
- Q.28 Based on your answer to the previous question, which one of the following statements MOST accurately describes the test cross results mentioned above?
- (A) Genes A and B are on different chromosomes
(B) Genes A and B are probably on the same chromosome
(C) Inheritance of A is modified by B
(D) Genes A and B assort independently

END OF SECTION - O