

**L : ZOOLOGY**

**Q. 1 – Q. 10 carry one mark each.**

- Q.1 The term "paedomorphosis" refers to
- (A) Accelerated reproductive development as compared to somatic development
  - (B) A transient stage in the developmental event
  - (C) Two independent structures resembling each other, yet performing different functions
  - (D) A form of mimicry
- Q.2 Which one of the following statements is TRUE when determining the age of a fossil using carbon dating?
- (A) Carbon dating is based on carbon-13 to carbon-12 ratio in fossils
  - (B) Carbon dating is useful for determining the age of only fossils older than 100,000 years
  - (C) Older the fossil, lesser the carbon-14 to carbon-12 ratio
  - (D) Older the fossil, lesser the carbon-12 to carbon-14 ratio
- Q.3 Constitutive enzymes are
- (A) Induced by effector molecules
  - (B) Repressed by repressors
  - (C) Encoded by sequences that occur as part of an operon
  - (D) Always produced in the cell
- Q.4 Which one of the following is a function of intermediate filaments?
- (A) Chromosome movement during the cell division
  - (B) Cytoplasmic streaming
  - (C) Formation of tight junctions
  - (D) Anchorage of the nucleus
- Q.5 Which one of the following statements is FALSE with respect to phospholipids?
- (A) Phospholipids have amphipathic character
  - (B) Phospholipids form the lipid bilayer of the cell membrane
  - (C) Phospholipids form micelles in living systems
  - (D) Some phospholipid molecules may contain a double bond in hydrophobic tails
- Q.6 Which one of the following organs is INCORRECTLY paired with its function?
- |   |  |
|---|--|
| (A) Intestinal villi – absorption         | (B) Epiglottis – closure of larynx     |
| (C) Gall bladder – carbohydrate digestion | (D) Parietal cells – hydrochloric acid |
- Q.7 Where do B lymphocytes acquire immune competence?
- |            |                 |                 |            |
|------------|-----------------|-----------------|------------|
| (A) Thymus | (B) Bone Marrow | (C) Lymph nodes | (D) Spleen |
|------------|-----------------|-----------------|------------|
- Q.8 Which one of the following life cycle stages of *Plasmodium falciparum* is infectious?
- |                |                 |               |                 |
|----------------|-----------------|---------------|-----------------|
| (A) Sporozoite | (B) Cryptozoite | (C) Merozoite | (D) Trophozoite |
|----------------|-----------------|---------------|-----------------|

- Q.9 What is the role of the notochord during organogenesis in a vertebrate embryo?
- (A) Signaling the development of placenta  
 (B) Induction of neural plate formation  
 (C) Stimulation of the umbilical chord formation  
 (D) Suppression of the development of extra-embryonic membranes
- Q.10 The behavior of young ducks following their mother is known as
- (A) Imprinting (B) Innate behavior (C) Habituation (D) Mimicry

**Q. 11 – Q. 20 carry two marks each.**

- Q.11 Match the species names with class names
- |                                  |                     |
|----------------------------------|---------------------|
| P. <i>Calotes versicolor</i>     | i. Insecta          |
| Q. <i>Periplaneta americana</i>  | ii. Reptilia        |
| R. <i>Glyphidrilus birmancus</i> | iii. Actinopterygii |
| S. <i>Clarias batracus</i>       | iv. Clitellata      |
- (A) P-ii; Q-i; R-iv; S-iii (B) P-i; Q-ii; R-iii; S-iv  
 (C) P-ii; Q-i; R-iii; S-iv (D) P-iii; Q-i; R-ii; S-iv
- Q.12 A population of spotted deer found in a national forest is in Hardy-Weinberg equilibrium. For a particular genetic locus in this deer species, only two alleles  $A$  and  $a$  are possible. If the frequency of the  $A$  allele in this population is 0.6, and the frequency of the  $a$  allele is 0.4, what will be the frequency of the genotype  $Aa$ ?
- (A) 0.24 (B) 0.48 (C) 0.96 (D) 1.6
- Q.13 In *Drosophila*, the gene for eye colour is present on the X chromosome. When a red-eyed female was mated with a white-eyed male, a total of 100 progeny were obtained – 50 females and 50 males. Of the 50 females, 25 were red-eyed, and 25 were white-eyed. How many of the male progeny were red-eyed?
- (A) 0 (B) 10 (C) 20 (D) 25
- Q.14 Defect in poly-A tail formation in eukaryotic mRNA leads to
- (A) Increased translation of the resulting mRNA  
 (B) Decreased translation of the resulting mRNA  
 (C) Premature transcription termination  
 (D) Decreased mRNA stability
- Q.15 Assuming equal frequency for all 4 nucleotides (G, A, T, C), how many EcoRI recognition sites (GAATTC) are possible in a bacterial artificial chromosome of 100,000 base pairs?
- (A) 6 (B) 12 (C) 24 (D) 48
- Q.16 Choose the correct option that shows pairing of the organelle to its function
- |                                 |                                 |
|---------------------------------|---------------------------------|
| P. Smooth endoplasmic reticulum | i. Internalization of receptors |
| Q. Peroxisome                   | ii. Protein secretion           |
| R. Golgi apparatus              | iii. Membrane biogenesis        |
| S. Endosome                     | iv. Breakdown of fatty acids    |
- (A) P-i, Q-ii, R-iii, S-iv (B) P-i, Q-iii, R-ii, S-iv  
 (C) P-iii, Q-iv, R-ii, S-i (D) P-ii, Q-iii, R-iv, S-i

- Q.17 Choose the correct option based on your understanding of the circulatory system
- |                              |                 |
|------------------------------|-----------------|
| P. Open circulatory system   | i. Fish         |
| Q. Closed circulatory system | ii. Frog        |
| R. Three chambered heart     | iii. Earthworm  |
| S. Two chambered heart       | iv. Grasshopper |
- (A) P-iv; Q-iii; R-ii; S-i                      (B) P-iv; Q-i; R-ii; S-iii  
(C) P-i; Q-iv; R-ii; S-iii                      (D) P-i; Q-iii; R-iv; S-ii
- Q.18 The popular birth control pills for women have a combination of synthetic forms of estradiol and progesterone. Which one of the following statements is INCORRECT with regard to their function as contraceptive?
- (A) The pills inhibit the release of GnRH leading to inhibition of gonadotropin-stimulated ovarian function  
(B) They act directly on the pituitary gland to inhibit gonadotropin surges  
(C) The low dose of estradiol in the pill inhibits the release of FSH, and thus blocks ovulation  
(D) The synthetic forms of estradiol and progesterone bring about their effects by binding to their respective intracellular receptors
- Q.19 Which one of the following is consistent with the germplasm theory of August Weismann?
- (A) Regulative development observed in frog embryos  
(B) Mosaic development observed in tunicates  
(C) Normal embryonic development of embryos formed by somatic nuclear transfer  
(D) Ability of differentiated cells to form pluripotent stem cells under certain conditions
- Q.20 Which one of the following statements DOES NOT explain altruism?
- (A) Altruism reduces the fitness of the individual that displays this behavior  
(B) Altruism increases the fitness of other individuals in the population  
(C) Altruism reduces the fitness of the individual that displays this behavior and at the same time increases the fitness of other individuals in the population  
(D) Altruistic behavior helps the individual escape from predators

**END OF THE QUESTION PAPER**