

L : Zoology

Q. 1 – Q. 10 carry one mark each.

- Q.1 Which one of the following is an example of eumetazoans?  
 (A) Dictyostelium (B) Hydra (C) Sponges (D) Volvox
- Q.2 Which one of the following is characteristic of deuterostomes?  
 (A) Radially symmetric body  
 (B) Bilaterally symmetric body  
 (C) Presence of well-defined digestive system  
 (D) Formation of anus from blastopore
- Q.3 Extraembryonic tissues are derived from which one of the following?  
 (A) Ectoderm (B) Endoderm (C) Trophoectoderm (D) Mesoderm
- Q.4 Which one of the following type of immune cells is responsible for graft rejection?  
 (A) B cells (B) T cells (C) Macrophages (D) Eosinophils
- Q.5 Which of the following is a main symptom of infection by *Wuchereria bancrofti*?  
 (A) Swelling of limbs (B) Skin rashes (C) Blindness (D) Brain cyst
- Q.6 In insect's tracheal system, the transport of oxygen to the target tissue is done by  
 (A) fine branches of air tubes extending to almost every cell  
 (B) a liquid that fills the tracheal tube  
 (C) a specialized set of cells that produce myoglobin  
 (D) a specialized pigment
- Q.7 Which one of the following examples represents an adaptation or a physiological activity that **DOES NOT** minimize the loss of body temperature of animals?  
 (A) Feathers or fur (B) Fat layers in the adipose tissue  
 (C) Shivering (D) Vasodilation
- Q.8 Which one of the following hormones is **INCORRECTLY** paired with its function?  
 (A) Melatonin – biological rhythm (B) Glucagon – increases blood glucose levels  
 (C) Prolactin – stimulates milk secretion (D) Calcitonin – increases blood calcium level
- Q.9 The term *innate behavior* refers to an animal behavior  
 (A) that is triggered by an environmental change  
 (B) that is taught by the parent  
 (C) that is developmentally fixed  
 (D) that an organism learns on its own by "a hit-and trial" approach
- Q.10 Which of the following is **TRUE** about Krebs's cycle?  
 (A) Krebs's cycle generates NADPH  
 (B) The enzymes of Krebs's cycle reside in the inter-membrane space of a mitochondria  
 (C) It produces ATP, the energy currency of a cell  
 (D) None of the above

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

- Q.11 A genetic experiment was performed to map the gene(s) for eye colour in a newly-discovered moth species. Sex determination in this moth species: XY – male and XX – female. When blue-eyed males were mated to green-eyed females, all of both male and female progeny had green eyes. When these progeny were mated among themselves, about half of the males of the resulting second generation had blue eyes; however, all females were green-eyed. Which one of the following is consistent with the above data?
- (A) Multiple genes control eye colour in this moth species  
(B) Gene(s) for eye colour is located on the X chromosome  
(C) Gene(s) for eye colour is located on the Y chromosome  
(D) Gene(s) for eye colour may not be sex-linked
- Q.12 In a newly discovered organism, normal development was unaffected when a few blastomeres were removed from 100-cell stage embryo. However, removal of five cells at the 1000-cell stage abolished the formation of kidney. Which one of the following options most accurately describes the type(s) of specification operating in the development of this organism?
- (A) Conditional specification only                      (B) Autonomous specification only  
(C) Conditional and autonomous specifications      (D) Specification does not occur in this organism
- Q.13 In which one of the following organisms, it is easiest to distinguish mutations on adjacent base pairs of DNA through genetic recombination experiments?
- (A) Bacteriophages      (B) Yeast                      (C) *Escherichia coli*      (D) *Bacillus subtilis*
- Q.14 RNA is considered as the first genetic material to have evolved on the earth. Which one of the following properties of RNA is critical for its functioning as the genetic material in the absence of DNA and protein?
- (A) The presence of uracil as a base in place of thymine  
(B) The RNA is less stable than DNA; therefore RNA has higher probability to evolve as genetic material as compared to DNA  
(C) The single stranded RNA has a genotype as well as phenotype  
(D) RNA exists in 3 forms while DNA has only one form
- Q.15 The birth control pills contain hormonal formulations that may either arrest the ovulation or prevent the fertilization of egg. Some of the formulations do both. Which one of the following combinations represents a formulation that is likely to affect the process of ovulation and fertilization?
- (A) Progesterone and estrogen                      (B) Prostaglandin and estrogen  
(C) Gonadotrophin and estradiol                      (D) Prolactin and estradiol
- Q.16 Behavioral studies on animals have shown that there is relationship between mechanism of reproduction and male parental care (protecting eggs or the young ones). In aquatic invertebrates, fishes and amphibians for example, the species that practice internal fertilization rarely show male parental care while a majority of species that practice external fertilization tend to exhibit male parental care. This is likely due to
- (A) the male sex in species that practice internal fertilization are unable to defend against the predators  
(B) the male sex in species that practice internal fertilization live on female as parasite  
(C) the fact that the females of species that practice external fertilization die soon after laying the eggs  
(D) the certainty of paternity in species that practice external fertilization and this behavior is reinforced over generation by natural selection

- Q.17 The term *biological magnification* refers to the increased levels of a toxin seen in successive trophic levels in a food web. Which one of the following options correctly states the reason(s) for the increment of a toxin in the ecosystem?
- (A) The toxin is highly toxic to primary producers, relatively less toxic to primary consumers, and non-toxic to secondary consumers. Thus, a higher level of toxin is seen in species representing higher trophic levels
  - (B) The toxin cannot be degraded by microorganism and consequently persist in the environment for years
  - (C) The toxin to begin with was not toxic or less toxic, but became more toxic by metabolism in the primary producers
  - (D) Both (B) and (C)
- Q.18 From the point of view of the enzymatic reactions, which of the following **DOES NOT** belong here?
- (A) Telomerase      (B) Reverse transcriptase      (C) Taq polymerase      (D) Primase
- Q.19 Which of the following statements is/are **TRUE** about **JUXTACRINE** signaling?
- I. The ligand and the receptor engage in reciprocal signaling
  - II. Both the ligand and the receptor are membrane associated proteins
  - III. The ligand gets proteolytically cleaved after binding to the receptor
- (A) I only      (B) II only      (C) III only      (D) I, II and III
- Q.20 Which of the following amino acid change (mutation) would **MOST** adversely affect the structure of an  $\alpha$ -helix?
- (A) A valine residue changed to an isoleucine residue
  - (B) A methionine residue changed to a proline residue
  - (C) An aspartic acid residue changed to a glutamic acid residue
  - (D) A histidine residue changed to an arginine residue

**END OF SECTION - L**