



Previous Year Question Paper  
of

**G.A.T.E. (XL) 2014**

**LIFE SCIENCES**

**XL: L Zoology**

**Examination**

*(Original Question Paper with Answer Key)*

**GRADUATE APTITUDE TEST IN ENGINEERING**



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**L : ZOOLOGY**

**Q. 1 – Q. 10 carry one mark each.**

- Q.1 Small geographic areas with high concentrations of endemic species and a large number of endangered and threatened species are known as  
(A) endemic sinks (B) critical communities  
(C) biodiversity hot spots (D) endemic metapopulations **Ans. C**
- Q.2 Which ONE of the following animals has “Osculum” as an excretory structure?  
(A) Hydra (B) Sponge (C) Jelly Fish (D) Sea pen **Ans. B**
- Q.3 During development of which ONE of the following organisms, bilateral meroblastic cleavage is found?  
(A) Mollusc (B) Fish (C) Bird (D) Amphibian **Ans. A**
- Q.4 The mitochondrion is NOT considered a part of the endomembrane system on account of which ONE of the following reasons?  
(A) It does not undergo structural changes  
(B) It is not derived from the ER or Golgi  
(C) It does not synthesize proteins  
(D) It is not attached to the outer nuclear envelope **Ans. B**
- Q.5 The end products of glycolysis include ATP,  
(A) CO<sub>2</sub> and H<sub>2</sub>O (B) H<sub>2</sub>O and pyruvate  
(C) NADH and pyruvate (D) CO<sub>2</sub> and NADH **Ans. C**
- Q.6 The TATA box is found in the vicinity of the transcription start site. The role of this box is to  
(A) serve as a ribosome recruitment site  
(B) serve as RNA polymerase binding site  
(C) provide 3-D structural integrity to a DNA molecule  
(D) act as a terminator sequence **Ans. B**
- Q.7 Which ONE of the following processes does NOT occur in prokaryotic gene expression, but occurs in eukaryotic gene expression?  
(A) Transcription of mRNA, tRNA, and rRNA  
(B) Binding of RNA polymerase to the promoter  
(C) Addition of a poly-A tail to the 3' end and the 5' capping of an mRNA  
(D) Translation begins as soon as transcription is initiated **Ans. C**
- Q.8 In Graves' disease, the presence of auto antibodies against which ONE of the following molecules is the direct cause of hyperthyroidism?  
(A) Thyroperoxidase (B) Thyroxine  
(C) Thyroid stimulating hormone (D) Thyroid stimulating hormone receptor **Ans. D**
- Q.9 In mammals, the two important organs associated with the production and elimination of urea are  
(A) gastrointestinal tract and lungs (B) gastrointestinal tract and liver  
(C) kidneys and lungs (D) liver and kidneys **Ans. D**

- Q.10 Some endocrine glands produce hormones that stimulate functions of other endocrine glands. Which ONE of the following hormones specifically acts to increase secretion of other hormones?
- (A) Thyroxine            (B) Prolactin            (C) ACTH            (D) ADH

Ans. C

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

- Q.11 If the recombination frequency between X - Y loci is 12, X - Z loci is 4, and Y - Z loci is 8, then the order of the loci on the chromosome is

(A) X-Y-Z            (B) Y-X-Z            (C) X-Z-Y            (D) Z-Y-X

Ans. C

- Q.12 A cross is made between a white eyed-miniature winged female with a red eyed-normal winged male of *Drosophila melanogaster*. Further crossing of F1 female offspring from this cross with a white eyed-miniature winged male fly gave 95 white eyed-normal winged, 102 red eyed-miniature winged, 226 red eyed-normal winged and 202 white eyed-miniature winged offspring in F2 generation. What is the percent frequency of recombination between the two genes?

(A) 20.11            (B) 31.52            (C) 49.10            (D) 34.12

Ans. B

- Q.13 A green fluorescent protein (GFP) encoding gene is fused to a gene encoding specific protein for expression in cells. What is the advantage of using GFP over staining cells with fluorescently labeled antibodies that bind to the target protein?

(A) It bleaches less compared to fluorescent probes.  
(B) It allows imaging at higher resolution than fluorescent probes.  
(C) It provides more precise location of the protein than fluorescent probes.  
(D) Its fusion allows tracking the location of the protein in living cells, while staining usually requires fixation of cells.

Ans. D

- Q.14 A newborn was accidentally given a drug that destroyed the thymus. Which ONE of the following would be the most likely outcome?

(A) Lack of class I MHC molecules  
(B) Inability to rearrange antigen receptors  
(C) Inability to differentiate to mature T cells  
(D) Reduction in T-independent number of B cells

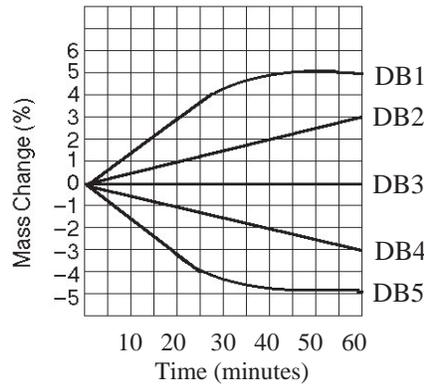
Ans. C

- Q.15 One individual has a parasitic worm infection and another is responding to an allergen such as pollen. Which ONE of the following features is common to both of them?

(A) Increase in cytotoxic T cell population  
(B) Risk of developing an autoimmune disease  
(C) Reduced innate immune response  
(D) Increased levels of IgE

Ans. D

- Q.16 Five dialysis bags (DB1-DB5), impermeable to sucrose, were filled with various concentrations of sucrose. The bags were placed in separate beakers containing 0.6 M sucrose solution. Every 10 minutes, the bags were weighed and the percent change in mass of each bag was plotted as a function of time.



Which plot in the graph (X-axis representing time in minutes and Y-axis representing mass change in percentage) represent(s) bags that contain a solution that is hypertonic at 50 minutes?

- (A) DB2                      (B) DB4                      (C) DB3                      (D) DB4 and DB5

Ans. A

- Q.17 Which ONE of the following combinations of products will result, when 3 molecules of acetyl CoA is fed into TCA cycle?

- (A) 1 ATP, 2 CO<sub>2</sub>, 3 NADH, and 1 FADH<sub>2</sub>  
 (B) 3 ATP, 6 CO<sub>2</sub>, 9 NADH, and 3 FADH<sub>2</sub>  
 (C) 3 ATP, 3 CO<sub>2</sub>, 3 NADH, and 3 FADH<sub>2</sub>  
 (D) 38 ATP, 6 CO<sub>2</sub>, 3 NADH, and 12 FADH<sub>2</sub>

Ans. B

- Q.18 A DNA fragment shown below has restriction sites I and II, which create fragments X, Y, and Z. Which ONE of the following agarose gel electrophoresis patterns represents the separation of these fragments?



- (A) (B) (C) (D)

Ans. B

- Q.19 Theoretically, it is possible to resurrect the extinct woolly mammoth by which ONE of the following methods?

- (A) Transferring cell nuclei from the frozen tissue into enucleated unfertilized eggs of a suitable mammal  
 (B) Introducing sequenced mammoth genome into donor eggs of a suitable mammal  
 (C) Transferring mammoth nuclear material into stem cells  
 (D) Collection of oocytes from ovaries of the frozen mammoth for *in vitro* fertilization and transfer of fertilized eggs into animals such as elephants

Ans. A

- Q.20 Regions of higher abundance of cholesterol molecules on the plasma membrane will
- (A) be more fluid
  - (B) result in clogged arteries as it can detach from the plasma membrane
  - (C) be more rigid than the surrounding membrane
  - (D) have higher rates of lateral movement of proteins into and out of plasma membrane

*Ans. C*

**END OF THE QUESTION PAPER**

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