Previous Year Solved Question Paper

of

G.A.T.E. (XL) 2019

Life Sciences

Zoology

Examination

(Original Question Paper with Answer Key)

GRADUATE APTITUDE TEST IN ENGINEERING

XL-T: Q. 1 – Q. 10 carry one mark each & Q. 11 – Q. 20 carry two marks each.

Q.1 Which one of the following animals possesses two chambered heart?

(A) Chameleon (B) Peacock (C) Gold fish (D) Blue whale

Ans. C

Q.2 In eukaryotic chromatin organization, which one of the histones seals off the nucleosome at the location at which linker DNA enters and leaves the nucleosome?

(A) H1 (B) H2A-H2B (C) H3 (D) H4

Ans. A

Q.3 Which one of the following parasites does NOT cause lymphatic filariasis?

(A) *Brugia malayi* (B) *Brugia timori*
(C) *Wuchereria bancrofti* (D) *Mansonella streptocerca*

Ans. D

Q.4 A species adapted to a specific habitat is called

(A) Biome (B) Ecotone
(C) Ecotype (D) Niche

Ans. C

Q.5 The phylum that is characterized by the animals having a "water vascular system" is

(A) Cnidaria (B) Annelida
(C) Mollusca (D) Echinodermeta

Ans. D

Q.6 The finches on the Galapagos Islands have widely differing beaks adapted according to their diets. This is an example of

(A) Adaptive radiation (B) Parallel evolution
(C) Adaptive convergence (D) Co-adaptation

Ans. A

Q.7 Which one of the following animals is named as a "living fossil", where the animal is persisting above 400 million years without further major morphological evolution?

(A) King crabs (B) Porcelain crabs (C) Horseshoe crabs (D) Hermit crabs

Ans. C

Q.8 Consider the given peptide, Ala-Glu-Val-Asn-Ile-Asp-Pro-Asp-Gln-Gly-Asp. The net charge on the peptide at pH 1.0 will be____

Ans. 1 TO 1

Q.9 The total number of complementary determining regions (CDRs) in the functional form of an IgM antibody is _____

Ans. 60 TO 60

Q.10 In a 1500 base pair double stranded B-DNA, 70% of purines are adenine bases. The total number of hydrogen bonds (Watson–Crick base pairing) in the DNA will be _____

Ans. 3400 TO 3450

Q.11 Match the given vitamins in **Column I** with the related proteins in **Column II**

Column I	**Column II**
a) Vitamin C	1) Thrombin
b) Vitamin K	2) Rhodopsin
c) Vitamin A	3) Pyruvate dehydrogenase
d) Vitamin B_1	4) Prolyl hydroxylase

(A) a-4; b-1; c-2; d-3 (B) a-4; b-1; c-3; d-2

(C) a-2; b-1; c-4; d-3 (D) a-3; b-4; c-2; d-1

Ans.A

Q.12 Match the following terms in **Column I** with the appropriate explanation in **Column II**

Column I	**Column II**
a) Spliceosome	1) Cell scavengers
b) Peroxisome	2) Metabolism of long chain fatty acids
c) Lysosome	3) Microtubules
d) Centrosome	4) Post transcriptional modifications

(A) a-3; b-1; c-4; d-2 (B) a-4; b-2; c-1; d-3

(C) a-3; b-2; c-1; d-4 (D) a-4; b-3; c-1; d-2

Ans. B

Q.13 Match the respective behaviour given in **Column I** with the appropriate explanation in **Column II**

Column I	**Column II**
a) Agonistic behaviour	1) Individual behaviour where fitness of other increases at the expense of self
b) Hierarchical behaviour	2) Individuals contribute towards enhancement of mutual fitness
c) Altruistic behaviour	3) Aggressive behaviour of individuals within a population
d) Cooperative behaviour	4) Existence of different levels of dominance within a population

(A) a-4; b-1; c-2; d-3 (B) a-3; b-4; c-1; d-2

(C) a-4; b-2; c-1; d-3 (D) a-3; b-4; c-2; d-1

Ans. D

Q.14 Closure of neural tube during neurulation is the process in which neural tube eventually forms a closed cylinder that separates from surface ectoderm. Which one of the following terms is linked to the failure in the closure of entire neural tube i.e. brain and spinal cord, over the body axis?

(A) Craniorachischisis
(B) Spina bifida
(C) Anencephaly
(D) Cleft palate

Ans. A

Q.15 Which one of the following factors does NOT contribute to "allopatric speciation"?

(A) The isolated population is exposed to different selection pressure as compared to parent population
(B) A population become geographically isolated from the parent population
(C) There is a gene flow between the two separated populations
(D) Genetic drift occurs between the two separated populations

Ans. C

Q.16 Match the hormones in **Column I** to their respective physiological effects in **Column II**

Column I	**Column II**
a) Melatonin	1) Inhibition of secretion of growth hormone
b) Oxytocin	2) Synthesis of milk in mammary gland
c) Cholecystokinin	3) Secretion of milk and uterine contraction
d) Prolactin	4) Secretion of enzymes from pancreatic acinar cells
e) Somatostatin	5) Regulation of circadian rhythms

(A) a-5; b-4; c-2; d-3; e-1
(B) a-3; b-5; c-4; d-2; e-1
(C) a-5; b-1; c-2; d-3; e-4
(D) a-5; b-3; c-4; d-2; e-1

Ans.D

Q.17 The molecular weight of a double stranded DNA fragment present in mitochondria is 7.92×10^8 g mol^{-1}. A pair of nucleotide contributes 0.34 nm to the length of DNA and the average molecular weight of a nucleotide is 330 g mol^{-1}. The number of protein molecules, consisting of 200 amino acids each, coded by this mitochondrial DNA is _____

Ans. 1900 TO 2000 OR 3900 TO 4000

Q.18 An enzyme that follows Michaelis-Menten kinetics catalyzes the conversion of 35 μM substrate into product with a reaction velocity of 10 μM s^{-1}. The K_m and k_{cat} for the substrate are 14 μM and 500 s^{-1} respectively. The total amount of enzyme taken for the enzyme reaction is _____nM.

Ans. 28 TO 28

Q.19 A distinctly large population of randomly mating laboratory mice contains 36% albino mice, which is caused by a double recessive genotype (aa). The black coloured mice in the population is due to dominant genotype (AA/Aa). Considering the fact that this population is in Hardy-Weinberg equilibrium, the frequency of heterozygous alleles (Aa) in this population is _____ **(*round off to 2 decimal places*)**.

Ans. 0.48 TO 0.48

Q.20 A genetic cross was made between homozygous wild-type males ($a^+a^+b^+b^+c^+c^+$) and triple-mutant females (aabbcc) of *Drosophila melanogaster*. Then the F_1 males ($a^+ab^+bc^+c$) were back crossed to the triple-mutant females which resulted in the following F_2 progenies:

a^+bc	16
ab^+c	115
abc	311
a^+b^+c	64
abc^+	61
$a^+b^+c^+$	317
a^+bc^+	99
ab^+c^+	17
Total	= 1000

The order of genes as determined from the above data was found to be "b a c" (*note that the order is equivalent to "c a b" and the order of outside makers are arbitrary*).

The map distance between "b and c" is _____ centiMorgan ***(round off to 1 decimal place)***.

Ans. 40.5 TO 40.5

END OF THE QUESTION PAPER

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