REV-01
MSZ/91/96

2022/12

SET D

M.Sc. ZOOLOGY
THIRD SEMESTER
GENETICS AND EVOLUTION
MSZ-301
[USE OMR FOR OBJECTIVE PART]

Duration: 3 hrs. Full Marks: 70

(Objective)

Time: 30 mins. Marks: 20

Choose the correct answer from the following: ***1×20=20***

1. The long intervals of geologic time in which there is very limited morphological changes is called the period of:
   a. Extinction
   b. Stasis
   c. Splitting
   d. None of the above
2. Colloidal aggregates of macromolecules are called:
   a. Coacervates
   b. Proteinoid microspheres
   c. Prebiotic soup
   d. None of the above
3. Honeycreeper songbirds evolved different types of beaks after a finch-like ancestor colonized Hawaiian Islands. This is an example of:
   a. Frequency dependent selection
   b. Cyclic selection
   c. Microevolution
   d. Macroevolution
4. Genetic drift results from fluctuations in allele frequencies that are:
   a. Directional and random
   b. Directional and non-random
   c. Non-directional and random
   d. Non-directional and non-random
5. Statement A: Neutral theory of evolution states that speciation is not due to selection of advantageous genotypes.
   Statement B: Speciation is due to elimination of deleterious alleles and random selection of neutral alleles
   a. Statement A is correct but statement B is incorrect
   b. Statement A is incorrect but statement B is correct
   c. Both statements A and B are correct
   d. Both statements A and B are incorrect
6. Which histone stabilizes the complex?
   a. H2A
   b. H3
   c. H1
   d. All of the above
7. Which of the following statement is NOT true?
   a. Human genomic DNA contain 2.8 x 10^9 base pairs
   b. There are 4 types of histones
   c. DNA is organized in 3 different forms
   d. Chromatin contains the entire DNA of cell
8. Which of the following is correct regarding genomics?
   a. It includes mapping of genome
   b. It includes genome sequencing
   c. It includes genome analysis
   d. All of these

9. Transfer of genetic material from the donor to recipient bacterium through cell contact is termed as:
   a. Transduction
   b. Recombination
   c. Conjugation
   d. Transformation

10. Common vegetative reproduction in bacteria is by:
   a. Conjugation
   b. Budding
   c. Oidia
   d. Binary fission

11. XIST mRNA coats the inactive X and calls in:
   a. tRNA and ribosome
   b. Other mRNA
   c. Deacetylase and specific methylase
   d. Acetylase and demethylase

12. Which of the following statements regarding cyclin-dependent protein kinase is not correct?
   a. Their activity is regulated by cyclins
   b. They can alter the activity of proteins involve in the progression of cells through cell cycle
   c. Their activity fluctuates during cell cycle
   d. Each type of cell contains one specific form

13. Cyclin dependent kinases which control progression through cell cycle checkpoints are totally activated by which of the following?
   a. Binding to cyclin, plus phosphorylation by a Cdk activating protein kinase
   b. Binding to cyclins
   c. Phosphorylation by Cdk activating protein kinase
   d. Phosphorylation by a tyrosine kinase

14. Which of the following occurs in meiosis but not in mitosis?
   a. Attachment of spindle fibers to kinetochore
   b. Replication of DNA prior to start of cell division
   c. Separation of sister chromatids at anaphase
   d. Pairing of homologous chromosomes at metaphase plate

15. Which of the following is incorrect with respect to Klinefelter's syndrome?
   a. The fusion of an abnormal egg with normal sperm
   b. The fusion of a normal egg with an abnormal sperm
   c. The fusion of a normal egg with a normal sperm
   d. An additional copy of X-chromosome

16. The genitalia of the male damselfly vary in shape. Certain males can only hold onto & mate with females whose genitalia fit. What type of reproductive barrier is this?
   a. Behavioral Isolation
   b. Temporal Isolation
   c. Gametic Isolation
   d. Mechanical Isolation

17. What stops a new chromosome variant appearing as a unique mutation from increasing in frequency?
   a. It is because polyploidy is a rare process
   b. It will interbreed with majority form causing heterozygotes to be inferior
   c. Allopatric speciation does not necessitate reinforcement
   d. All of these

Descriptive

Time : 2 hr. 30 mins. **Marks : 50**

[Answer question no.1 & any four (4) from the rest]

1. What is speciation? Write a detailed note on the different mechanism of reproductive Isolation. 2+8=10
2. What are cyclins? Discuss different types of cyclins. Explain the mechanism of activation of cdk with proper illustrative diagrams. 2+2+6=10
3. Differentiate between aneuploidy and polyploidy. Write a note on different type chromosomal abnormalities related to autosomal chromosomes in human being. 2+8=10
4. What is genome? Explain with detail about the role of histones in genome organization. 2+8=10
5. Differentiate between an ape & *Australopithecus*. Explain briefly the evolution of different species of *Australopithecus* in the correct chronological order. 5+5=10
6. "Neo-Darwinism is the merger of Darwinian selection and genetic theory". Justify the statement. 10
7. What is the biochemical or chemosynthetic origin of theory by Oparin-Haldane? Describe the events in biogeny or biological evolution. 3+7=10
8. Define nucleosome. Describe the structure of nucleosome with proper diagram. What is histone? Describe about its different types and their function. 1+4+1+4=10

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