

M.Sc. ZOOLOGY
THIRD SEMESTER
GENETICS & EVOLUTION
MSZ-301

(Use separate answer scripts for Objective & Descriptive)

Duration : 3 hrs.

Full Marks : 70

(PART-A : Objective)

Time : 20 min.

Marks : 20

Choose the correct answer from the following:

1×20=20

1. Which of the following apes have smaller brains than monkeys?
 - a. Orangutan
 - b. Gorilla
 - c. Gibbon
 - d. Chimpanzee
2. The Neanderthals appeared in Europe about..... years ago.
 - a. 130,000
 - b. 600,000
 - c. 350,000
 - d. 90,000
3. Assumptions underlying Hardy-Weinberg equilibrium are:
 - a. Organisms are diploid
 - b. Mating is random
 - c. Population size is infinitely large
 - d. All of these
4. The reproductive isolating factor that occurs when individuals of a species mate at different times is referred to as.....
 - a. Temporal isolation
 - b. Ecological isolation
 - c. Gametic isolation
 - d. Behavioural isolation
5. The appearance of ancestral characteristics in a new born baby such as multiple mammae and tail is very rare. These organs are called:
 - a. Analogous organs
 - b. Vestigial organs
 - c. Atavistic organs
 - d. Homologous organs
6. Who said "Molecular evolution proceeds in a rather regular fashion with respect to time"?
 - a. Allan Wilson
 - b. Mooto Kimura
 - c. Zuckerkandl
 - d. King and Juke
7. The small population that gets separated from the main population is known as a:
 - a. Random population
 - b. Splinter population
 - c. Bottleneck effect
 - d. Shift population
8. Speciation refers to evolution of:
 - a. New genus
 - b. Endangered species
 - c. New species
 - d. Rare species
9. Stromatolites are:
 - a. Viral mats
 - b. Fossilized Bacteria
 - c. Fossilized plants
 - d. None
10. A species inhabiting different geographical area is known as:
 - a. Allopatric
 - b. Sympatric
 - c. Biospecies
 - d. Sibling

11. What changes occur in the chromosome to make it inactive?
a. Methylation b. Glycosylation
c. Acetylation d. Phosphorylation
12. Which of the following controls the cell cycle progression from G2 to M phase?
a. Cyclin-cdk b. Cyclin
c. Cell Adhesion Molecule d. cAMP
13. Barr bodies (Seen in saliva test in Olympic games) are found in human and are associated with:
a. Male autosome b. Female autosome
c. Male Sex chromosome d. Female sex chromosome
14. During the progression from G2 to M phase in fission yeast cell, the mutation in *Wee1* would lead to:
a. Premature Cell Division b. Normal cell Division
c. Prolonged Cell growth d. Cell Cycle Arrest
15. Which region of embryonic gonad is induced by Testis Determining Factor (TDF) for testis formation?
a. Cortex b. Medulla
c. Peripheral d. Both a and b
16. Down's Syndrome is due to:
a. Crossing over b. Linkage
c. Sex linked inheritance d. Nondisjunction of chromosome
17. Cyclic dependent kinases which control progression through cell cycle check point are totally activated by:
a. Binding to cyclin, plus phosphorylation by a cdk activating protein kinase.
b. Binding to cyclin.
c. Phosphorylation by cdk activating protein kinase.
d. Phosphorylation by a tyrosine kinase.
18. Match the following:

Column -I	Column-II
A. Down's syndrome	P. An additional sex chromosome
B. Cri-du-chat	Q. Loss of a part of chromosome
C. Klinefelter's syndrome	R. Absence of sex chromosome
D. Turner's syndrome	S. Presence of an extra chromosome
	T. Presence of two extra chromosome
a. A-S, B-T, C-Q, D-R	b. A-T, B-S, C-P, D-Q
c. A-S, B-Q, C-R, D-P	d. A-S, B-Q, C-P, D-R
19. The distinct Zig-Zag appearance of the chromatin is due to.....
a. Nucleosome b. Histone H₁
c. Histone core d. Linker DNA
20. In an experiment you add the short arm of Y chromosome to a Cell line with composition AA+XX. What will you see?
a. The cell rejects the Y Chromosome b. The cell develops female character
c. The cell develops male character d. The cell develop neuter gender character

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(PART-B : Descriptive)

Time : 2 hrs. 40 min.

Marks : 50

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

1. Define Endosymbiotic theory. Describe about the brief history of Origin of life. How Miller & Urey explains about the conditions of primitive Earth? 2+5+3=10
2. What are CpG Islands? What are the important roles played by CpG Islands in the human genome? 4+6=10
3. A population of rabbits may be brown (the dominant phenotype) or white (the recessive phenotype). Brown rabbits have the genotype BB or Bb. White rabbits have the genotype bb. The frequency of the BB genotype is 0.35. What is the frequency of heterozygous rabbits, the 'B' allele and the 'b' allele? 10
4. How did Cro-Magnons differ from Neanderthals? Is there any evidence that they coexisted with Neanderthals? If so, where and when? 2+6+2=10
5. What is meant by Dosage Compensation? Explain the mechanism of inactivation of 'X' chromosome in human female. 2+8=10
6. What are Cell Cycle Checkpoints? Explain how APC/C helps in regulation and separation of sister chromatids to progress cell into Anaphase. 3+7=10
7. a. Write about the Prokaryotic and Eukaryotic evolution. 5+5=10
b. Discuss the development of multicellular organisms from early prokaryotes.
8. What is somatic cell genetics and explain its use on the chromosome mapping in a given somatic cell? 3+7=10

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