

M.Sc. ZOOLOGY
Third Semester (Repeat)
GENETICS & EVOLUTION
(MSZ - 301)

Duration: 3Hrs.

Full Marks: 70

Part-A (Objective) =20
Part-B (Descriptive) =50

(PART-B: Descriptive)

Duration: 2 hrs. 40 mins.

Marks: 50

Answer any four from *Question no. 2 to 8*
Question no. 1 is compulsory.

1. Explain about the origin of life with reference to its evolution of prokaryotes and eukaryotes. How Prokaryotic and eukaryotic evolution leads to the diversity of plants and animals? (5+5=10)
2. What is meant by DNA packaging? Describe the various steps of DNA packaging leading the process inactivation in the metaphase stage of a given cell. (2+6+2=10)
3. What is meant by Cell cycle Checkpoint? How does the activity of Anaphase Promoting Complex, Cyclosome (APC/C) leads to the separation of sister chromatids. (3+7=10)
4. What is the difference between macro and micro evolution? State the various types of Micro Evolution. State the significance of macro evolution. (1+4+5=10)
5. Define Somatic cell fusion. How do propagate somatic cell fusion in HAT medium? State the significance Of HGPRT enzyme system (Strain) for the culture of somatic cell hybrids. (2+3+5=10)
6. What is speciation? What are the different types of speciation? Explain with examples. (2+4+4=10)

7. Prepare a phylogram from the sequences given below using both UPGMA and maximum parsimony methods. (10)

	1	2	3	4	5	6	7	8	9
Human	G	T	C	A	C	A	T	G	T
Chimpanjee	C	T	C	A	C	A	T	C	T
Gorilla	C	A	C	C	C	A	T	T	C
Orangutang	A	A	A	C	C	A	G	C	C

8. What are the factors responsible for autosomal chromosome aberration in number?
Differentiate between dominant pedigree trait and recessive pedigree trait.

(5+2+3=10)

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Duration: 20 minutes

Marks – 20

(PART A - Objective Type)

I. Choose the correct answer:

1×20=20

- The Mutation may be described as:
 - Change due to hybridization
 - Phenotypic change
 - Discontinuous genetic variation
 - Continuous genetic variation
- Stromatolites are:
 - Bacteria
 - Virus
 - Autotrophs
 - Photoautotrophs
- The loss of genetic variation that occurs when a new population is established by a very small number of individuals from a larger population is called:
 - Bottle neck effect
 - Mutation
 - Genetic recombination
 - Founder effect
- Motoo Kimura's theory that opposed Natural selection was the:
 - Natural theory
 - Nearly neutral theory
 - Neutral theory
 - Adaptive theory
- The process of DNA methylation leads to a situation called:
 - Genetic imprinting
 - Genetic signature
 - Molecular signature
 - Gene inactivation
- The best example of transduction is the :
 - Transfer of T₄ phage protein into bacteria E.coli.
 - Transfer of RNA into the bacteria E.coli.
 - Transfer of DNA into the bacteria E.coli.
 - Transfer of DNA through conjugation tube.
- The eukaryotic cell cycle is controlled several points ; which of these statement is not true?
 - Cell growth is assessed at the G₁/S checkpoint.
 - DNA Replication is assessed at the G₂/M checkpoint.
 - The chromosomes are assessed at the G₂/M checkpoint.
 - Environmental conditions are assessed at the G₀ checkpoint.

- Prezygotic isolating mechanisms include all of the following except:
 - Hybrid sterility
 - Courtship rituals
 - Habitat separation
 - Seasonal reproduction
- In man, which of the following genotypes and phenotypes may be the correct result of aneuploidy in sex chromosomes?
 - 22 pairs + Y females
 - 22 pairs + XX females
 - 22 pairs + XXY males
 - 22 pairs + XXXY females
- In a given CPG strand in the promoter region of a gene is characterized by:
 - They are arranged linearly.
 - Arranged in the form of diestric bond between C and G.
 - Arranged in complementary manner.
 - All of these.
- The effects of natural selection may be countered by:
 - Gene flow
 - Genetic drift
 - Mutation
 - None
- The random loss of allele in a population is called:
 - Mutation
 - Selection
 - Genetic drift
 - None
- The movement of new genes into a population as a result of migration or hybridization is called:
 - Founder principle
 - Selection
 - Bottleneck effect
 - Adaption
- The heterochromatin region of a chromosome:
 - consists of only inactive genes.
 - contains repetitive DNA.
 - can be activated by methylation.
 - contains no chromosomal proteins.
- A species inhabiting same geographical area with different species is known as:
 - Sympatric
 - Allopatric
 - Sibling
 - Biospecies
- The microevolution is associated with the process of :
 - Mutation, recombination and natural selection.
 - Recombination, allele frequency suffling and natural selection.
 - Genetic drift, recombination and natural selection.
 - Mutation, genetic variation and genetic bottleneck.
- Genetic drift is found in:
 - Small population with or without mutated genes.
 - Large population with random mating.
 - Plant population.
 - Animal population.

18. How many DNA molecules are present in the nucleus of a human somatic cell in G₂ stage of cell cycle?

- a) 23 b) 46 c) 69 d) 92

19. The diagrammatic representation of karyotype (morphological representation of chromosomes) of a species is called:

- a) Cladogram b) Idiogram
c) Ecogram d) Chromogram

20. Patau's syndrome occurs due to:

- a) Trisomy of 13th chromosome b) Trisomy of 18th chromosome
c) Trisomy of 21st chromosome d) Trisomy of 22nd chromosome



University of Science and Technology, Meghalaya

Date Stamp: _____

SESSION 2016-17 COURSE _____ PAPER CODE: _____ NAME OF THE PAPER: _____ SEMESTER _____																																																		
Instructions to Candidates																																																		
1. This answer booklet has 4 pages. Please check before writing whether it is complete or in good condition. 2. Do not write your name anywhere in the answer booklet. 3. Write legibly on both sides of the paper 4. You may use some space for any rough notes or calculation on the answer booklet if you need. These rough notes, calculations must be scored out before submitting the answer booklet. 5. Do not bring any book or loose paper in the examination hall. 6. Do not tear any page from the answer booklet. 7. Do not write anything on the question paper or blotting paper or any pieces of paper while you are in the examination hall. 8. Any act of indiscipline or misbehavior in the examination hall will result in your expulsion. 9. No examinee is allowed to leave the examination hall until 30 minutes lapse after the commencement of the examination. 10. Additional answer sheet will be supplied after the main answer booklet is completed.	<table style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: center;">For Objective Type Questions</td> <td rowspan="10" style="vertical-align: top; padding: 5px;"> Session: 2016-17 Course _____ Roll No. _____ Enrollment No. _____ Semester _____ Name of the Paper _____ Paper Code _____ </td> </tr> <tr> <td style="width: 60%; text-align: center;">Page No.</td> <td style="width: 40%; text-align: center;">Marks</td> </tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr> <td colspan="2" style="text-align: center;">Total</td> </tr> <tr> <td colspan="2" style="text-align: center;">For Descriptive Type Questions</td> </tr> <tr> <td style="text-align: center;">Question No.</td> <td style="text-align: center;">Marks</td> </tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr> <td colspan="2" style="text-align: center;">Total</td> </tr> <tr> <td colspan="2" style="text-align: center;">Grand Total</td> </tr> </table>	For Objective Type Questions		Session: 2016-17 Course _____ Roll No. _____ Enrollment No. _____ Semester _____ Name of the Paper _____ Paper Code _____	Page No.	Marks																	Total		For Descriptive Type Questions		Question No.	Marks																			Total		Grand Total	
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