

**2025/FYUG/ODD/SEM/
ZOODSM-301/302T (A/B)/342**

FYUG Odd Semester Exam., 2025

ZOOLOGY

(5th Semester)

Course No. : ZOODSM-301/302T

Full Marks : 70

Pass Marks : 28

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

Candidates have to answer *either*
ZOODSM-301T or ZOODSM-302T

OPTION—A

Course No. : ZOODSM-301T

(Genetics and Molecular Biology)

UNIT—I

Answer any *two* of the following : 2×2=4

- (a) What is meant by allele? Elucidate.
- (b) State Mendel's law of segregation.

(Turn Over)

(2)

- (c) What is meant by pleiotrophic genes? Cite one example.
2. Answer any *one* of the following questions : 10
- (a) What is multiple allelism? Write the characters of multiple allelic genes. Discuss the phenomenon with inheritance of ABO blood group of man. $2+2+6=10$
- (b) What is meant by inter-allelic genetic interactions? Discuss the phenomenon of dominant and recessive epistatic gene interactions with suitable illustrations. Add a note on co-dominance. $2+3+3+2=10$

UNIT—II

3. Answer any *two* of the following : $2 \times 2 = 4$
- (a) Who advanced the concept of linkage? What is meant by linkage groups?
- (b) Define mutation. Who coined the term mutation?
- (c) Differentiate between Aneuploidy and Euploidy.

(3)

4. Answer any *one* of the following questions : 10
- (a) Define crossing-over. When does it occur? Describe the mechanism of crossing-over and the theories related to the phenomenon. $1+1+4+4=10$
- (b) What is meant by gene mutation? Discuss different types of gene mutation. Add a note on mutagenic agents. $2+4+4=10$

UNIT—III

5. Answer any *two* of the following : $2 \times 2 = 4$
- (a) What is meant by sex-linked inheritance?
- (b) Briefly describe the genic balance mechanism of sex determination.
- (c) What is meant by extra-nuclear inheritance? Cite examples.
6. Answer any *one* of the following questions : 10
- (a) What are sex-chromosomes? Discuss different types of sex chromosomal mechanisms of sex determination. Add a note on hormonally controlled sex determining mechanism with suitable illustrations. $1+6+3=10$

(Continued) 26J

(Turn Over)

(4)

- (b) What is criss-cross pattern of inheritance? Discuss inheritance of X-linked recessive genes in humans in relation to colour blindness and haemophilia. What are holandric genes?

1+8+1=10

UNIT—IV

7. Answer any two of the following questions : $2 \times 2 = 4$

- (a) Write the chemical composition of DNA.
(b) What are the functional significances of DNA? Explain briefly.
(c) Differentiate between nucleosides and nucleotides.

8. Answer any one of the following questions : 10

- (a) Give an account on Watson and Crick model of structure of DNA with necessary diagrams. Add a note on types of DNA.
(b) Discuss the molecular structure of RNA. What are the types of non-genetic RNA? Mention their functional significances.

7+3=10
5+5=10

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(continued)

(5)

UNIT—V

9. Answer any two of the following questions : $2 \times 2 = 4$

- (a) What is meant by semi-conservative mode of DNA replication?
(b) "RNA-dependent RNA synthesis." Briefly explain the statement.
(c) What is transcription? Explain briefly.

10. Answer any one of the following questions : 10

- (a) Give an account of the process of replication of DNA in prokaryotes with necessary diagrams.
(b) Write notes on the following : $4+6=10$
(i) Polymerase enzymes
(ii) Genetic code

(Turn Over)

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(6)

OPTION—B

Course No. : ZOODSM-302T

(Evolution and Adaptation)

UNIT—I

1. Answer any two of the following questions : $2 \times 2 = 4$
- (a) What do you mean by biogeny?
 - (b) What are transitional forms?
 - (c) What is fitness according to Darwin?

2. Answer any one of the following questions : 10
- (a) Explain Darwin's theory of natural selection with suitable examples. Add a note on RNA world hypothesis. $7+3=10$
 - (b) Describe the endosymbiotic theory for the evolution of Eukaryotes. Add a note on fossil records as evidence of evolution. $5+5=10$

UNIT—II

3. Answer any two of the following questions : $2 \times 2 = 4$
- (a) Define gene pool.
 - (b) Differentiate between gene frequency and genotype frequency.
 - (c) What do you mean by genetic drift?

(7)

Answer any one of the following questions : 10

- (a) State Hardy-Weinberg law. Mention its assumption. Add a note on bottleneck phenomenon and Founder's effect principle. $4+2+2+2=10$
- (b) Discuss the roles of migration and mutation in changing allele frequencies. $5+5=10$

UNIT—III

Answer any two of the following questions : $2 \times 2 = 4$

- (a) Define cline with an example.
- (b) What do you mean by adaptive radiation?
- (c) What is speciation?

6. Answer any one of the following questions : 10

- (a) Discuss biological species concept with its merits and limitations. Add a note on evolutionary and phylogenetic species concept. $6+2+2=10$
- (b) Describe different types of isolating mechanisms and explain how they contribute to speciation.

(Turn Over)

(8)

UNIT—IV

7. Answer any two of the following questions :

(a) Name two unique hominid characteristics that distinguish humans from apes. $2 \times 2 = 4$

(b) What is phylogenetic tree?

(c) Write the differences between rooted and unrooted trees.

8. Answer any one of the following questions : 10

(a) Discuss the different evolutionary stages of horse. Add a note on adaptive significance of morphological changes in horse evolution. $7+3=10$

(b) Describe the origin and evolution of man, tracing important fossil forms from *Dryopithecus* to *Homo Sapiens*.

UNIT—V

9. Answer any two of the following questions :

(a) What is cursorial adaptation? $2 \times 2 = 4$

(b) What is mimicry?

(c) Give two examples of protective colouration.

(9)

Answer any one of the following questions : 10

(a) Explain volant adaptations with special reference to birds and bats.

(b) Describe different types of colouration in animals. Explain their adaptive significance. $7+3=10$
