

**402015**

**COMBINED COMPETITIVE EXAMINATION (MAIN)**

**ZOOLOGY**

**Paper-II**

**Time : 3 Hours**

**Full Marks : 200**

- Note :** (1) *The figures in the right-hand margin indicate full marks for the questions.*  
(2) *Attempt five questions in all.*  
(3) *Question No. 1 is compulsory.*  
(4) *Suitable diagrams may be drawn, whenever required.*

- 1. Answer any *ten* questions from the following :** **4×10=40**
- (a) Differentiate between saturated and unsaturated fatty acids with suitable examples.
  - (b) Write about different stages of prophase I of meiotic cell division.
  - (c) Name the hormones produced from different parts of the adrenal gland.
  - (d) Differentiate between progressive metamorphosis and retrogressive metamorphosis.
  - (e) Calculate the number of net ATP production during glycolysis.
  - (f) Mention the name of hormones secreted from the *Corpora allata* and *Corpora cardiaca* of insect.
  - (g) Define balanced diet.
  - (h) Write about the Wobble hypothesis of genetic code.
  - (i) What is Shine-Dalgarno sequence in an mRNA?
  - (j) Write the basic structure of amino acids.
  - (k) What is telolecithal egg?
  - (l) What is operon concept?
- 2. Answer any *eight* questions from the following :** **5×8=40**
- (a) Write briefly about the composition of mitotic spindle.

- (b) Define polyploidy and write its significance.
- (c) Define biological species concept with suitable example.
- (d) Mention the names of major steroid hormones and their sources in mammal.
- (e) Define innate immunity and adaptive immunity.
- (f) Write briefly about the role of telomere in aging.
- (g) Classify chromosome based on the position of the centromere.
- (h) Write briefly about the Hardy-Weinberg law.
- (i) Write about the role of Loop of Henle in urine production.
3. Answer any *five* questions from the following : 8×5=40
- (a) What is binomial nomenclature? Write about the International Code of Zoological Nomenclature.
- (b) Define metamorphosis. Write about metamorphosis in frog with a note on the role of hormones.
- (c) Differentiate among B, A and Z forms of DNA.
- (d) Write about the mechanism of sex determination in mammal with a note on the role of Y-chromosome.
- (e) What is synapse? Write about the mechanism of nerve impulse conduction across the synapse.
- (f) Write about the concept of organizer and inducer in embryogenesis.
- (g) Define  $K_m$  and  $V_{max}$  in an enzyme catalyzed reaction.
4. Answer any *four* questions from the following: 10×4=40
- (a) Write about the structure and functions of different types of immunoglobulin.
- (b) Name the nitrogenous wastes in vertebrates. Write briefly about the biosynthesis of urea in mammal.
- (c) Write briefly about different types of placenta in mammal with a note on their functions.
- (d) What are fat-soluble vitamins? Briefly mention the biological functions of fat-soluble vitamins.
- (e) Write briefly the concept of multiple allele with suitable example.
- (f) Write, in detail, about the structure of thyroid gland and functions of the thyroid hormones.

5. Answer any *two* questions from the following : 20×2=40
- (a) Write about the mechanism of DNA replication in prokaryotes with suitable diagram.
  - (b) Mention the name of the hormones secreted from the pituitary gland and write briefly about their functions.
  - (c) Describe various stages of evolution of man.
6. Answer any *four* questions from the following : 10×4=40
- (a) Write briefly about the structure and function of different types of RNA.
  - (b) Write about the ultrastructure of a striated muscle with suitable diagram.
  - (c) Write about the mechanism of digestion of carbohydrate and fat components of food.
  - (d) Write about the countercurrent mechanism of urine concentration.
  - (e) Write a critical review on the Lamarck's theory of evolution.
  - (f) Briefly write the concept of linkage map with suitable example.
7. Answer any *two* questions from the following : 20×2=40
- (a) What is genetic code? Write briefly on the mechanism of protein synthesis with suitable illustrations.
  - (b) What is second messenger? Write about the mechanism of action of peptide hormone via second messenger.
  - (c) Write, in detail, about the development of eye in vertebrate.
8. Write short notes on the following : 10×4=40
- (a) Composition of blood
  - (b) Gastrointestinal hormones and their physiological functions
  - (c) Spermatogenesis
  - (d) Parathyroid hormones and their physiological functions
9. Discuss, in detail, about the following : 10×4=40
- (a) Mendel's law of independent assortment
  - (b) Electron transport system in mitochondria
  - (c) Isolating mechanism and their role in speciation
  - (d) Zoogeographical realms

10. Briefly explain the following :

4×10=40

- (a) Karyotype
- (b) Mimicry
- (c) Composition of ribosome
- (d) Oxidative phosphorylation
- (e) Mutation
- (f) Temperature regulation in mammals
- (g) Fate map of chick
- (h) Pineal organ
- (i) Mechanism of blood coagulations
- (j) Cytoplasmic inheritance

