Indian Forest Service Examination-2012

D-GT-M-APB

ZOOLOGY

Paper – II

Time Allowed : Three Hours | *Maximum Marks : 200*

INSTRUCTIONS

Candidates should attempt questions 1 and 5 which are compulsory, and any THREE of the remaining questions, selecting at least ONE question from each Section.

All questions carry equal marks.

The number of marks carried by each part of a question is indicated against each.

Answers must be written in ENGLISH only.

Neat sketches are to be drawn, wherever required, to illustrate the answers.

IMPORTANT NOTE :

All parts/sub-parts of a question must be answered contiguously. That is, where a question is being attempted on the answer-book, all its constituent parts/sub-parts must be attempted before moving on to the next question.

Pages left blank in the answer-book(s), if any, must be clearly struck out. Answers that follow pages left blank may not be given credit.

SECTION A

1. Answer the following, keeping your answers brief and to the point. *8×5=40*

   (a) Describe the mechanism of RNA splicing.

   (b) What are COP coated vesicles ? Explain their function.

   (c) What are frame-shift mutations ?

   (d) Calculate the allele frequencies from the following population data :

Genotype	Numbers
AA	68
Aa	42
aa	24
Total	134

   (e) What is the current understanding of the evolution of man ?

2. (a) Answer the following sub-parts about the genetic code : *4×8=32*

   (i) The genetic code is a triplet code. Explain why.

   (ii) What is meant by the degeneracy of the genetic code ?

(iii) How many different amino acid sequences are possible in a polypeptide 146 amino acid long ?

(iv) How many different amino acids are specified by the genetic code ?

(v) What is Wobble hypothesis and what is its significance ?

(vi) The human α globulin chain is 141 amino acid long. How many nucleotides in mRNA are required to encode the human α globulin ?

(vii) Out of A, G, U, C, I (inosine), which base can pair with 3 different bases at the 3′ position of codons in mRNA ?

(viii) (1) Write an initiation and a termination codon.

(2) Which amino acid is specified by a single codon ?

(3) Which amino acid is coded for by the starter codon ?

(b) What is random genetic drift ? Describe how genetic drift acts as a disruptive factor for the Hardy – Weinberg genetic equilibrium. *8*

3. (a) What are G-proteins ? Describe in detail their role in signal transduction across membrane receptors. *25*

(b) Give details of any 5 signals, the affected cell type and the physiological effect mediated by G-proteins in each case. *10*

(c) What are introns and exons ? How are introns different from spacer DNA ? *5*

4. (a) Explain Stabilising, Directional and Disruptive selection and their role in adaptive evolutionary change. *25*

(b) What is selection pressure ? *5*

(c) Distinguish co-translational modification from post-translational modification experimentally. Cite an example for each. *10*

SECTION B

5. Distinguish between the following pairs : *8×5=40*

   (a) Extrinsic and Intrinsic clotting mechanisms

   (b) Animal and Vegetal gradients

   (c) Amylose and Amylopectin

   (d) Adenohypophysis and Neurohypophysis

   (e) Ligases and Lyases

6. (a) Diagrammatically explain the interrelationship between the metabolism of proteins, fats and carbohydrates. List the salient features. *30*

   (b) 'Patients of arthritis are more prone to peptic ulcers.' Comment. *5*

   (c) Patients with diseased exocrine pancreas have steatorrhoea (fatty stools). Explain. *5*

7. (a) Describe the mechanism of action of epinephrine and estradiol-17β. *20*

   (b) Describe the metabolic consequences of insulin binding to its receptors. *10*

   (c) What are bottle cells and what is their significance ? *5*

   (d) What is an exogastrula ? *5*

8. (a) Explain the process of spermatogenesis and spermatolcosis. *20*

(b) What are germ cell determinants ? *10*

(c) What would be the consequence of the differentiating spermatid losing its centrioles ? *5*

(d) How is acrosome formed in the sperm ? What is its function ? *5*