AFU

2007

ZOOLOGY - II (Optional)

100075

Standard : Degree

Total Marks : 200

Nature : Conventional

Duration : 3 Hours

Note :

(i) *Answers must be written in* ***English*** *only.*

(ii) *Question* ***No. 1*** *is* ***Compulsory.*** *Of the remaining questions, attempt* ***any four*** *selecting one question from* ***each section.***

(iii) *Figures to the* ***RIGHT*** *indicate marks of the respective question.*

(iv) *Number of optional questions upto the prescribed number in the order in which they have been solved will only be assessed. Excess answers will not be assessed.*

(v) *Credit will be given for orderly, concise and effective writing.*

(vi) *Neat line drawings are expected wherever necessary.*

(vii) *Candidate should not write roll number, any name (including their own), signature, address or any indication of their identity anywhere inside the answer book otherwise he/she will be penalised.*

(viii) *For each slab of 10, 15 and 20 marks, the examinee is expected to write answers in 125, 175 and 250 words respectively.*

1. Answer ***any Four*** of the following questions :

(a) With suitable diagram explain structure of Golgi complex. Describe functional roles of Golgi complex. **10**

(b) What is DNA fingerprinting ? Explain principle steps involved in making a DNA fingerprint from a DNA sample. Why every individual has a unique DNA fingerprint ? **10**

(c) Distinguish between cellular and humoral immune response. Explain the roles played by B lymphocytes in immune response. **10**

(d) Name three species of bees which are important in honey production. How is honey made by the bees ? Explain major steps involved in beekeeping and honey production at commercial level. **10**

(e) What is "Western Blotting" ? How is a Western blot obtained ? Give two situations where this technique can be used, and explain its usefulness. **10**

P.T.O.

Marks

SECTION - A

2. Answer the following sub-questions :

(a) Define the term 'cell-cycle'. Enlist different stages of the cell cycle and explain molecular events associated with each. Comment on the role of cyclin B and Cdc 2P. **10**

(b) What are polytene chromosomes ? Give their features and mechanism of their origin. What advantages are offered by polytenization of chromosomes ? **10**

(c) With reference to prokaryotic DNA replication explain the following : **10**

(i) Semidiscontinous replication

(ii) Lagging and leading strands

(iii) Primosome

(iv) Replicon

(v) Role of DNA ligase

(d) What is genetic code ? How was the code deciphered ? Give important properties of the code. **10**

3. Answer the following sub-questions :

(a) With suitable diagrams explain chromosomal behaviour at Prophase I stages, Anaphase I, metaphase II and Anaphase II when a cell with 2 N=4 undergoes meiotic cell division. **10**

(b) What is a chromosome ? Enlist all structural and functional elements of a eukaryotic chromosome. Give role of each of them. **10**

(c) Bring out the differences between DNA and RNA. Name different types of RNAs present in a cell. Give functional role of each of them. **10**

(d) Explain major steps involved in the process of translation of mRNA till release of a polypeptide. How does the process differ in pro and eukaryotes ? **10**

SECTION - B

4. Answer the following sub-questions :

(a) What is linkage ? With suitable crosses explain how linkage and its extent can be estimated for two genes A and B which are known to be present on one autosome. **15**

(b) What is gene cloning ? Explain steps involved in cloning a human gene in a plasmid vector. Give three applications of gene cloning. **10**

Marks

(c) What is bioinformatics ? Bring out its importance. Explain the following terms with reference to a protein : **15**

(i) Primary structure

(ii) Secondary structure

(iii) Tertiary structure

(iv) Quaternary structure and

(v) Quinternary structure.

5. Answer the following sub-questions :

(a) Define the terms "wild type" and "mutant". State different types of mutations observed at a DNA molecule level. **15**

(b) Give characteristics of a "Stem cell" as distinct from all other cells. Give three examples wherein stem cell technology has been applied. Comment on use and storage of embryonic stem cells in humans. **10**

(c) What are the features of a genome data base ? Explain the following terms in the context of genome data bases from NCBI. **15**

(i) Definition

(ii) Features

(iii) Source

(iv) Base Count and

(v) origin

SECTION - C

6. Answer the following sub-questions :

(a) What is glycolysis ? Give the steps involved in converting a glucose molecule into two pyruvates. Indicate the steps during which ATP is generated. What is the net gain of ATP when a glucose molecule is used up ? **15**

(b) What is an enzyme ? Give six classes into which these are classified with characteristics of each. Explain the terms Allosteric enzyme and Km. **15**

(c) Describe the principle behind the enzyme linked immunosorbent assay (ELISA). Give two applications of the technology. **10**

P.T.O.

Marks

7. Answer the following sub-questions :

(a) What are carbohydrates ? How are they classified ? Explain Primary and secondary structures of Amylose and Glycogen. Describe functions carried out by carbohydrates in a cell. **15**

(b) What is a vitamin ? Enlist different members of B group. Explain their sources, functions and deficiency diseases caused in mammals. **15**

(c) How does a monoclonal antibody differ from a polyclonal antibody ? How a monoclonal antibody is produced ? Give two situations where use of monoclonal antibody is made. **10**

SECTION - D

8. Answer the following sub-questions :

(a) Explain characteristics of different types of eggs on the basis of their yolk contents. Give one example of each type. Bring out the effect of yolk contents on clearage patterns. **10**

(b) What is gastrulation ? Explain the process of gastrulation in frog. What are the differences between a blastula and a gastrula ? **10**

(c) What is contraception ? Explain the mechanical and chemical intervention methods as practiced in human female contraception. **10**

(d) Explain with suitable labelled diagrams development of heart in frog. Add a note on contractile elements of the hearts. **10**

9. Answer the following sub-questions :

(a) Beginning with establishment of contact between a sperm and the egg surface, explain the steps leading to the process of fertilization, on part of sperm and egg at molecular level. **10**

(b) What is a placenta ? Explain with suitable diagrams different types of placentae, highlighting interaction between maternal and foetal tissues. Comment on the role of placenta as an endocrine organ. **10**

(c) What is a test tube baby ? How is it made ? In what situations option for a test tube baby is chosen ? What are the advantages and risks associated with this method ? **10**

(d) Explain the terms pronephros, mesonephros and metanephros. Explain origin and organogenesis of kidney in frog. **10**

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