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H-6521

M.Sc. (Semester-II) Examination, 2022

ZOOLOGY

(Genetics and Cytogenetics)

Time Allowed : Three Hours

Maximum Marks : 70

Minimum Passing Marks : 25

Note : This question paper is divided into four sections. All sections are **compulsory**. Attempt questions as per given instruction in each section.

SECTION-A

(Objective Type Questions)

Note : Attempt **all** questions. Each question carries **1** marks.

[1x10=10]

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(1)

[P.T.O.]

1. (i) The normal human female cells can be identified by the presence of:
- (a) Microbody
 - (b) C-banding
 - (c) G-banding
 - (d) Barrbody
- (ii) Mutation that arises from the insertion or the deletion of a single base causing the rest of the message downstream to be read out of phase is called :
- (a) Frameshift
 - (b) Chemical
 - (c) Suppressor
 - (d) Non-sense
- (iii) RNA can sometimes be copied into DNA. This process is facilitated by :
- (a) Ribozyme
 - (b) RNA primase
 - (c) Reverse transcriptase
 - (d) RNA polymerase

- (iv) How dosage compensation is achieved in *Drosophila*?
- (a) One of the X-chromosome in females is inactivated
 - (b) The activity of the single X-chromosome in males is upregulated
 - (c) The activity of the two X-chromosomes in females is downregulated
 - (d) The activity of the autosomes in females is downregulated
- (v) The intervening sequences of 'gene' are known as:
- (a) Introns
 - (b) Exons
 - (c) Cistrons
 - (d) Codons
- (vi) Which one among the following RNA viruses carries oncogenes?
- (a) Hepatitis
 - (b) Human papilloma virus
 - (c) Adenovirus
 - (d) Rous sarcoma virus

- (vii) Visible characteristics of an organism are called _____.
- (viii) Due to incomplete dominance a cross between blue and white Andalusian fowls results into :
- (a) 50% blue and 50% black fowls
 - (b) 25% blue and 75% white fowls
 - (c) 25% black and 75% white fowls
 - (d) 50% blue and 50% white fowls
- (ix) Phenomenon in which an allele of one gene suppresses activity of an allele of another gene is known as _____.
- (x) Inheritance of skin colour in mammals is usually:
- (a) Monogenic
 - (b) Multiple allelism
 - (c) Polygenic
 - (d) Pseudoallelism

SECTION-B

(Very Short Answer Type Questions)

Note : Attempt **any five** questions. Each question carries **02** marks. [5x2=10]

2. Write short notes on the following in 25-30 words:

- (i) Epistasis
- (ii) Allele
- (iii) Gene mutation
- (iv) Oncogenes
- (v) Leukemia
- (vi) Retinoblastoma
- (vii) X-linked genes
- (viii) Pleiotropy

SECTION-C

(Short Answer Type Questions)

Note : Attempt **any five** questions. Each question carries **04** marks. [5x4=20]

3. Write short notes on the following in **250** words:

- (i) Illustrate incomplete dominance with suitable example.
- (ii) Non-coding genes
- (iii) Burkitt's lymphoma
- (iv) Dosage compensation
- (v) Karyotype
- (vi) Sex-linked genes
- (vii) Chromosomal anomalies
- (viii) Suppressor genes

SECTION-D

(Essay Type Questions)

Note : Attempt **any three** questions. Each question carries **10** marks. (Word limit: more than **500** words) [3x10=30]

4. (i) Describe the different mechanisms known for regulation of gene activity at post-transcriptional level in eukaryotes.
- (ii) Discuss the role of 'enhancers and silencers' in regulation of activity of genes.
- (iii) Discuss the various syndromes in humans that are known to result from chromosomal anomalies.
- (iv) What is Dosage Compensation? How is this achieved? Describe different genes involved in dosage compensation in mammals and fruitfully and discuss the difference in the mechanisms involved in humans and drosophila.
- (v) What are 'tumour suppressor genes' and how do they check growth of cancerous cells in normal tissues and allow an uncontrolled division of cells in a cancerous tissue?

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