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63/1 (SEM-5) CC12/ZOOHC5126

2023

ZOOLOGY

Paper : ZOOHC5126

(Principles of Genetics)

Full Marks : 60

Pass Marks : 24

Time : Three hours

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

1. Choose the correct answer from the following : **(any five)** 1×5=5

(a) Alleles are

(i) Alternate form of genes

(ii) Linked genes

(iii) Chromosomes that have crossed over

(iv) Homologous chromosomes

Contd.

(b) When the activity of one gene is suppressed by the activity of a non-allelic gene, it is known as

- (i) Recessive epistasis
- (ii) Incomplete dominance
- (iii) Pseudo-dominance
- (iv) Pleiotropy

(c) Cystic fibrosis is

- (i) Sex-linked recessive disorder
- (ii) Autosomal dominant disorder
- (iii) Autosomal recessive disorder
- (iv) Sex-linked dominant disorder

(d) Homozygosity and heterozygosity of an individual can be determined by

- (i) Test cross
- (ii) Back cross
- (iii) Self-fertilization
- (iv) All of the above

(e) Turner's syndrome is characterised by _____ number of chromosome.

- (i) 46
- (ii) 45
- (iii) 47
- (iv) 48

(f) What is the substitution of a purine base known as?

- (i) Deletion
- (ii) Transition
- (iii) Addition
- (iv) Transversion

(g) Which of the following chemical mutagen affects only replicating DNA?

- (i) Acridine dye
- (ii) Alkylating agent
- (iii) Deaminating agent
- (iv) Base analog

(h) Which of the enzymes are used to cut recipient DNA ?

(i) Endonuclease

(ii) Exonuclease

(iii) Ligases

(iv) Polymerase

(i) Transfer of genetic material from donor to recipient bacterium through cell-contact is termed as

(i) Transduction

(ii) Recombination

(iii) Conjugation

(iv) Transformation

(j) Extra chromosomal inheritance involves genes passed on by the mother's

(i) Smooth ER

(ii) Cytoplasm

(iii) Mitochondria

(iv) Golgi bodies

2. Answer the following questions : **(any five)**
2×5=10

(a) Write a note on bacteriophage.

(b) Define missense mutation.

(c) What is Gene mutation ?

(d) Write the difference between transformation and transduction in bacteria.

(e) What is 'Okazaki fragment' ?

(f) What is transposon ?

(g) Define sex-linked inheritance. Give an example.

3. Answer **any five** of the following questions :
5×5=25

(a) Differentiate between epistasis and pleiotropy with suitable example.

2½+2½=5

(b) Write briefly on the cytological basis of crossing over.

(c) Define inversion. Explain different types of inversion and mention *one* genetic consequence of inversion. 1+3+1=5

- (d) Explain incomplete dominance and co-dominance with suitable example.
- (e) Write a note on the antibiotic resistance in *Chlamydomonas*.
- (f) Write briefly on somatic cell hybridization.
- (g) Explain polygenic inheritance with suitable examples.
- (h) Explain the CLB method of detection of mutations.
- (i) Write briefly on transposons in humans.

4. Answer **any two** of the following questions :
10×2=20

- (a) Write down the salient features of multiple allele. Explain this phenomenon taking 'A30' blood groups and their inheritance. 3+7=10
- (b) What is Linkage ? Describe complete and incomplete linkage with suitable examples. 2+4+4=10

- (c) Discuss the role of X any Y chromosome in the determination of sex in man.
- (d) Explain the process involved in recombination of genetic material in bacteria and virus. 5+5=10