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63/1(SEM-5)SEC3/ZOOHC5126

2024

ZOOLOGY

Paper : ZOOHC5126

(Principle of Genetics)

Full Marks : 60

Pass Marks : 24

Time : 3 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) A gamete generally contains

(i) One allele of a gene

(ii) Two alleles of a gene

(iii) Three alleles of a gene

(iv) Many alleles of a gene

(b) The protein coat of viruses That encircle the DNA or RNA is called

- (i) Capsomere
 - (ii) Virion
 - (iii) Prion
 - (iv) Capsid
- (c) Homozygocity and heterozygocity of an individual can be determined by
- (i) Back cross
 - (ii) Test cross
 - (iii) Self-fertilization
 - (iv) Parthenogenesis
- (d) The percentage of crossing over is more when
- (i) genes are located close to each other.
 - (ii) Linked genes are located for apart from each other
 - (iii) genes are located in different cell
 - (iv) genes are present in non sister chromatial of non homologous chromosome.
- (e) Marriages between close relatives should be avoided as it causes more

- (i) Mutations
 - (ii) Abnormalities in child birth
 - (iii) Recessive alleles to came together
 - (iv) Multiple births
- (f) Which of the following damages is not directly caused by ultraviolet radiation?
- (i) Thymine dimer
 - (ii) Purine dimmers
 - (iii) Single Strand break
 - (iv) Double Strand break
- (g) Base analogs are mutagenic because
- (i) They distoxt the structure of DNA
 - (ii) They produce changes in DNA polymerase.
 - (iii) The chemically modify the normal bases
 - (iv) They are similar in structure to the normal bases
- (h) When two or more non allelic gene pairs affect the same character in the same way is called

- (i) Pleiotropy
 - (ii) Polygenic inheritance
 - (iii) Codominance
 - (iv) Additive expressivity
- (i) The possible role of transposons in genome evolution of organisms is
- (i) DNA repair
 - (ii) Genome stability
 - (iii) Increasing genetic diversity
 - (iv) Enhancing protein synthesis.
- (j) Which of the following is a well-known DNA transposon in maize corn?
- (i) P element
 - (ii) LINE-1
 - (iii) Ac-Ds element
 - (iv) Alu element.

2. Answer the following questions: **(any five)**

2×5=10

- (a) Define "Law of segregation of Mendel".

- (b) Write a note on "Epistasis."
- (c) What is crossing over? Write its significance.
- (d) What do you mean by maternal inheritance?
- (e) Write two differences between Down's syndrome and Turner's syndrome.
- (f) Write a note on recombination of DNA viruses.
- (g) What is the molecular basis of mutation in relation to UV light?

3. Answer **any five** the following questions :

5×5=25

- (a) Explain pleiotropy with the help of an example. 5
- (b) Write a short note on 'Multiple alleles'. 5
- (c) Explain chromosomal mechanism of sex determination in man. 5
- (d) Compare linkage and recombination. How are they similar and different from each other? 2+3=5

(e) Write briefly on somatic cell hybridization. 5

(f) Discuss The relationship between chiasma and crossing over. 5

(g) Explain The CLB method of detection of mutations. 5

(h) Describe mitochondrial mutations in Saccharomyces. 5

(i) Explain transposons in bacteria. 5

4. Answer **any two** of the following questions:

10×2=20

(a) Explain two experimental innovations did Mendel use to discover the principle of inheritance. 10

(b) Explain the different modes of sex determination in animal. 10

(c) What is gene mutation? Discuss the mechanism of actions of any two classes of chemical mutagens. 1+9=10

(d) Discuss molecular mechanisms of crossing over including models of recombination. 10