

2020

ZOOLOGY — HONOURS

Paper : CC-12

(Principle of Genetics)

Full Marks : 50

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

Answer **question no. 1** and **any four** from the rest.

1. Answer **any fifteen** questions :

2×15

- (i) What is Incomplete Dominance and Codominance? Give examples of both.
- (ii) What is criss-cross pattern of inheritance?
- (iii) ABO blood grouping is an example of multiple alleles but MN blood grouping is not. — Why?
- (iv) What is isoallele? Give example.
- (v) Which is called a pleiotropic gene? Give example.
- (vi) State location and function of SRY gene in man.
- (vii) What are Multiple alleles? How do they differ from Pseudoallele?
- (viii) What will be the sex of *Drosophila* with following genotypes— 2AXX, 3A2X, 3A3X and 2A3X?
- (ix) What is Gynandromorph?
- (x) Distinguish between Autopolyploidy and Allopolyploidy.
- (xi) Name the non-coding RNAs that have been implicated in Dosage compensation of *Drosophila* and Human.
- (xii) Distinguish between Pericentric and Paracentric Inversion.
- (xiii) What are Base analogs? Give two examples.
- (xiv) What is the characteristic feature of r mutant of T₄ bacteriophage used in Benzer's experiment?
- (xv) What is complementation test and why it is used?
- (xvi) When a gene is said to be epistatic? What is the difference between epistasis and dominance?
- (xvii) What are nutritional mutant? Give example.
- (xviii) *Drosophila* has four pairs of chromosomes. How many linkage groups does it have?
- (xix) Define Recombination frequency. What is 'CC'?

Please Turn Over

- (xx) What are XIST and XIC?
- (xxi) What are chemical mutagens? Give two examples.
- (xxii) What is P-element in *Drosophila*?
- (xxiii) State the characteristic features of prokaryotic IS elements.
- (xxiv) Distinguish between Transition and Transversion.
- (xxv) What are linked genes? How linked genes can be separated?
- (xxvi) Define Linkage Map. What is genetic map unit (m.u)?
- (xxvii) Two genes A and B are linked. The other homologous chromosome contain their a and b alleles. Give combinations of alleles in gametes with and without crossing over.
- (xxviii) Human males are constitutionally hemizygous and females are functionally hemizygous — Justify.
- (xxix) What is retrotranspon? Give example.
- (xxx) Compare LINE and SINE.
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2. How X chromosomal inactivation takes place in case of dosage compensation in human? 5
3. What is the role of PAR of human Y chromosome? State the role of SRY gene in human sex determination in brief. 2+3
4. What is Attached X-method? How it is used in *Drosophila* to detect sex linked visible mutation? 2+3
5. What is Prototroph and Auxotroph? Describe the steps of detection of biochemical mutation in *Neurospora* through suitable diagram. 2+3
6. Compare the sex determination mechanism of *Drosophila* and Human. State the role of SxI gene in *Drosophila* sex determination. 3+2
7. What is Cistron? Explain the phenomenon of complementation with special reference to Benzer's rII locus. 1+4
8. Define IS element in bacteria. Briefly describe AcDs elements in maize. 2+3
9. How is extra-chromosomal inheritance manifested in shell spiralling of snail? 5
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