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Your Roll No.....

1348

**B.Sc. (Hons.)/III A**

**ZOOLOGY—Paper VII**

**(Genetics, Genomics and Biotechnology)**

**(Admissions of 2004 onwards)**

*Time : 3 Hours*

*Maximum Marks : 55*

*(Write your Roll No. on the top immediately on receipt of this question paper.)*

Attempt *five* questions in all, including

Q. No. 1 which is compulsory.

1. (a) Define the following : 5

- (i) Pleiotropy
- (ii) Frameshift mutations
- (iii) Gene therapy
- (iv) Subunit vaccines
- (v) Polygenes.

P.T.O.

- (b) Differentiate between the following : 5
- (i) Auxotrophs and Prototrophs
  - (ii) Southern blot and Western blot
  - (iii) Genomics and Proteomics
  - (iv) Phenylketonuria and Alkaptonuria
  - (v) Global alignment and Local alignment.
- (c) Expand the following abbreviations : 5
- (i) NTG
  - (ii) RAPD
  - (iii) SDS
  - (iv) FISH
  - (v) VNTR.
- (d) What is the contribution of the following : 4
- (i) Alec Jeffreys
  - (ii) Smith, Nathans and Arber
  - (iii) Kary Mullis
  - (iv) Barbara McClintock.

2. In *Drosophila*, curled wings, ebony body and scarlet eyes are recessive to straight wings, gray body and red eyes respectively. A female fly heterozygous at three loci was test crossed to homozygous recessive male. The following progeny were produced :

Cu e + — 732      + + st — 760

Cu e st — 48      + + + — 60

+ e st — 178      Cu + + — 210

Cu + st — 4      + e + — 8

- (a) How do you say these genes are linked ?
- (b) What is the order of the genes ?
- (c) Determine the map distances and construct the chromosomal map.
- (d) Calculate the coefficients of coincidence and interference. 1,1,5,2
3. (a) What are the attributes of a cloning vector ? Give an account of prokaryotic vectors.
- (b) Explain briefly how do you construct a c-DNA library. 7,2

4. (a) Give an account of DNA sequencing by Frederick Sanger's Dideoxy method.
- (b) What are the applications of transgenic animals ? 7,2
5. (a) Describe H.J. Muller's CIB method to demonstrate that X-rays cause sex linked recessive lethal mutations in *D. melanogaster*.
- (b) Briefly explain how human genes are mapped by somatic cell hybridization. 5,4
6. (a) What is a biological database ? Briefly describe the various types of databases.
- (b) Briefly discuss the scientific significance and therapeutic implication of the sheep Dolly. 6,3
7. Write short notes on any *three* of the following : 3,3,3
- (i) Multiple alleles
  - (ii) Transduction
  - (iii) DNA microarrays
  - (iv) Retroposons
  - (v) Turner's syndrome
  - (vi) Cystic fibrosis
  - (vii) Human Somatic Cell Gene Therapy.