

Seat No. : _____

DE-104

December-2013

B.Sc. (Sem.-V)

305 : Bio-Chemistry

(A : Elective Vocational Biotechnology Genetics)

Time : 3 Hours]

[Max. Marks : 70

1. (a) Discuss Extensions to Mendel's Laws. (8)
(b) What is Gene Lethality ? (6)
OR
(a) Write a note on Epistasis with example. (7)
(b) Discuss the second law of inheritance and independent assortment. (7)
2. (a) Write a note on Mitochondria! genetic system. (8)
(b) What are auxotrophs ? Explain replica plating technique for isolation of auxotrophs. (6)
OR
(a) Discuss Hardy Weinberg theory and factors affecting it. (7)
(b) How mutations are analyzed in Biochemical pathways ? Explain with example. (7)
3. (a) Write a note on Packaging of eukaryotic chromosomes. (7)
(b) Discuss Polytene chromosomes. (7)
OR
(a) Discuss Chromosome Banding techniques. (7)
(b) Write a note on Non Disjunction. (7)
4. (a) Define polyploidy. Illustrate polyploidy with an example. (7)
(b) Discuss genetic mapping. (7)
OR
(a) Write a note on Down's syndrome. (7)
(b) Discuss Linkage with a suitable example. (7)
5. Short questions : (any **seven**) (14)
 - (1) State Mendel's first law.
 - (2) What are Induced mutation ? List its benefits.
 - (3) Explain Genotypic frequency.
 - (4) State One gene one enzyme hypothesis.
 - (5) Define: Interference and Coincidence.
 - (6) Define Structural chromosomal aberrations and list its types.
 - (7) What are lampbrush chromosomes ?
 - (8) Write the Karyotype and frequency of Turner syndrome.
 - (9) Define Centromere and Telomere.

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305 : Bio-Chemistry
(B.Techniques in Biotechnology)

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1. (A) Discuss stepwise isolation of chromosomal DNA from E.coli cells. (08)
 (B) Write a note on : Restriction endonucleases. (06)
 OR
 (A) Write a note on any **two**: (14)
 1. Basic steps of gene cloning
 2. Plasmid as an Ideal vector
 3. Agarose gel electrophoresis for separation of DNA bands

2. (A) Write a note on any **two**: (14)
 1. Southern blotting technique
 2. DNA sequencing by Sanger's method.
 3. Restriction mapping

3. (A) Discuss the steps and working of PCR. (08)
 (B) Variations of PCR. (06)
 OR
 (A) Write a note on: Applications of PCR (06)
 (B) Compare PCR and Gene cloning with respect to its advantages. (08)

4. (A) Discuss: Double diffusion immunodiffusion technique. (07)
 (B) Explain ELISA technique and state its applications. (07)
 OR
 (A) What is SIRD ? Explain. (07)
 (B) Discuss: Rocket Immuno electrophoresis and its advantages. (07)

5. Answer the following : (any **seven**) (14)
 1. Define: 1.Vector.2.Genetic engineering. (02)
 2. State principle of agarosegel electrophoresis. (02)
 3. An O.D. of A_{260}/A_{280} of DNA sample in spectrophotometer is 1.8 . Comment. (02)
 4. What is the role of DNA Ligase ? (02)
 5. How the nomenclature of restriction Enzyme is done ? (02)
 6. State two disadvantages of Maxam Gilbert method of DNA sequencing. (02)
 7. What is the full form of RIA ? (02)
 8. Name the radioactive compound which is used in RIA. (02)
 9. Define: 1.Antigen. 2.Antibody (02)

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(C : Clinical Genetics)**

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1. (A) State and prove the first and second laws of inheritance using examples. (14)

OR

(B) What is mono hybrid and dihybrid test cross ? Explain using examples. (14)

2. (A) i. Define and explain the terms with suitable examples: Genes, alleles and mutations. (07)

ii. Write a note on gene lethality. (07)

OR

(B) Explain incomplete dominance, overdominance and codominance using suitable examples. (14)

3. (A) What is Epistasis and give examples showing different epistatic interactions. (14)

OR

(B) Explain linkage and gene mapping. (14)

4. (A) Explain the structural aberrations in chromosomes. (14)

OR

(B) Describe the numerical aberrations in chromosomes. (14)

5. Answer **all** questions. (14)

i. Give two applications of Mendel's laws.

ii. A 'homozygous' is defined as _____

iii. In drosophila, the law of segregation was studied by _____

iv. _____ is an example of epistasis.

v. All the genes in a genome makes a _____

- vi. _____ is an example of point mutation.
 - vii. What is map distance ?
 - viii. What is Chiasma type theory ?
 - ix. What do you understand by pleiotropy ?
 - x. New combinations are not produced in complete linkage. Why ?
 - xi. What are multiple alleles ?
 - xii. What is the significance of a test cross ?
 - xiii. Why Mendel selected pea plants for his research ?
 - xiv. How will you denote a mutant and a wild type ?
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