

P.G. Diploma in Genetics Examination
November 2009
(Directorate of Distance Education)

GENETICS
Paper-I : Cytogenetics

Time : 3 Hours

Max. Marks : 75

Note : 1. Answer any Five questions.

2. All questions carry equal marks.

3. Illustrate wherever necessary.

1. Explain the method of linkage mapping.
2. Describe an ultrastructural organization of mitochondria.
3. Explain in detail the fine structure of the gene.
4. Discuss the extrachromosomal inheritance.
5. Write an account on any **THREE** of the following.
 - a) Crossing over
 - b) Anaphase movements
 - c) Lysosome
 - d) Nucleosome
 - e) Law of dominance
6. Discuss dosage compensation in man.
7. Describe in detail the deviations to Mendelian laws with suitable examples.
8. Give an account of chemistry and organization of microtubules.

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Paper - II : Developmental Genetics

Time : 3 Hours

Max. Marks : 75

Note : 1. Answer any Five questions.

2. All questions carry equal marks.

3. Illustrate wherever necessary.

1. Describe molecular mechanism of fertilization.
2. Explain the fate maps and their role in development.
3. Elucidate the early embryonic development of *Drosophila*.
4. Write critical notes on any **THREE** of the following.
 - a) Imaginal discs
 - b) Transgenic *Drosophila*
 - c) Bicoid and nanos
 - d) Oogenesis
 - e) Competence
5. Give a detailed account on embryonic membranes in placental mammals.
6. Explain the mechanism of Regeneration with suitable examples.
7. Elucidate the role of maternal genes in development.
8. Write a short notes on any **THREE** of the following.
 - a) Totipotency
 - b) Teratogens
 - c) Homeotic mutations
 - d) Organizers
 - e) Fate maps of *Amphioxus*

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Paper - III : Molecular Genetics

Time : 3 Hours

Max. Marks : 75

Note : 1. Answer any Five questions.

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3. Illustrate your answers wherever necessary.

1. Write an account on the mechanics of DNA replication. Explain the role of enzymes in this process.
2. Describe the steps and mechanism involved in translation.
3. 'The mRNA which is ready for translation is different from the primary transcript' - substantiate the statement. Explain how this difference is brought in.
4. Describe the structure-function relationship of tRNA.
5. Write critical notes on:
 - a) Central dogma
 - b) zDNA
 - c) Zinc finger
 - d) Enhancers and silencers
 - e) Antisense RNA
6. Describe the role of RFLP, RAPD and AFLP in genome analysis.
7. Give an account on the ultra-structural features of Lac Operon. Add a note on positive control.
8. Write short notes on any **THREE** of the following.
 - a) Mitochondrial DNA
 - b) Genome of Drosophila
 - c) Polyadenylation
 - d) P-Element
 - e) RNA polymerase II

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GENETICS
Paper - IV : Applied Genetics

Time : 3 Hours

Max. Marks : 75

Note : 1. Answer any Five questions.

2. All questions carry equal marks.

3. Illustrate the answers wherever necessary.

1. Explain the effects of ultraviolet radiation on biomolecules.
2. "Drosophila is a good genetic test system" - substantiate.
3. Write a note on the types of syndromes in human.
4. Explain the genetic basis of behaviour with suitable examples.
5. Write critical notes on any **THREE** of the following.
 - a) Inbreeding
 - b) Isozymes
 - c) Cancer therapy
 - d) Excision repair
 - e) Genetic counseling
6. Describe the technique of somatic-cell-hybridization. Add a note on its applications.
7. Enumerate the characteristic differences between the Non-cancerous and cancerous cells.
8. Write short notes on any **THREE** of the following.
 - a) Dominant lethals
 - b) Transition
 - c) Mitosis
 - d) Neoplasia
 - e) Speciation

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