Printed Page:-04 Subject Code:- ABT0303

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B, Tech.

SEM: III - THEORY EXAMINATION (2024 - 2025)

Subject: Genetics and Molecular Biology

Time: 3 Hours Max. Marks: 100

General Instructions:

IMP: Verify that you have received the question paper with the correct course, code, branch etc.

1. This Question paper comprises of three Sections -A, B, & C. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.
2. Maximum marks for each question are indicated on right -hand side of each question.
3. Illustrate your answers with neat sketches wherever necessary.
4. Assume suitable data if necessary.
5. Preferably, write the answers in sequential order.
6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION-A 20

1. Attempt all parts:-

1-a. The process of transfer of hereditary character from one generation to another is known as.....? (CO1, K1) 1

(a) Genes
(b) Mutation
(c) Variation
(d) Genetics

1-b. Who is known as father of genetics? (CO1, K1) 1

(a) Gregor Mendel
(b) Augustinian friar
(c) Norman Borlaug
(d) M.S Swaminathan

1-c. With respect to microsatellite DNA which of the following is correct? (CO2, K1) 1

(a) Tandem repeats
(b) Dinucleotide repeats
(c) 100 bp units
(d) Inaccurate duplicating

1-d. Why are chromosomes condensed? (CO2, K1) 1

(a) To facilitate accommodation
(b) Always condensed

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(c) To facilitate cell division

(d) To facilitate distribution in daughter cells

1-e. Which of the following statement is false about DNA? (CO3, K1) 1

(a) Located in chromosomes

(b) Carries genetic information from parent to offspring

(c) Abundantly found in cytoplasm

(d) There is a precise correlation between amount of DNA and number of sets of chromosomes per cell

1-f. Fredrick Griffith's experiment involving Streptococcus pneumoniae lead to the discovery of_____ (CO3, K1) 1

(a) DNA as genetic material

(b) RNA as genetic material

(c) Protein as genetic material

(d) Transforming principle

1-g. Which of the following is not a feature of the genetic code? (CO4, K1) 1

(a) Triplet

(b) Degenerate

(c) Non – overlapping

(d) Ambiguous

1-h. Which of the following is not a termination codon? (CO4, K1) 1

(a) UGA

(b) AGA

(c) AGG

(d) UAC

1-i. Which of the following enzyme is responsible for making a DNA copy from RNA? (CO5, K1) 1

(a) Reverse transcriptase

(b) DNA polymerase

(c) RNA polI

(d) RNA polII

1-j. Which of the following name is given to molecular chaperones? (CO5, K1) 1

(a) Allosteric protein

(b) Heat shock protein

(c) Denaturation protein

(d) Ribonuclease

2. Attempt all parts:-

2.a. Describe the Principle of segregation and its importance. (CO1, K2) 2

2.b. What is the most common chromosomal abnormality? (CO2, K2) 2

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2.c.	What is the genetic material in virus? (CO3, K2)	2
2.d.	What do you understand by the term transcription and translation? (CO4, K2)	2
2.e.	What does phosphorylation do to a protein? (CO5, K2)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	What is the difference between a genetic map and a physical map? (CO1, K3)	6
3-b.	What is dihybrid cross? Explain with examples. (CO1, K3)	6
3-c.	List at least three different types of DNA repair and briefly explain how each is carried out. (CO2, K3)	6
3-d.	What is the difference between a missense mutation and a nonsense mutation? A silent mutation and a neutral mutation? (CO2, K3)	6
3.e.	Draw the purines and pyrimidines structures (CO3, K3)	6
3.f.	What events bring about the termination of translation? (CO4, K3)	6
3.g.	Explain the trp operon that controls the biosynthesis the amino acid tryptophan in E. coli. (CO5, K3)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	What is extrachromosomal inheritance? Explain the coilling effect of snail. (CO1, K3)	10
4-b.	Define the term sex linked inheritance. Explain the mechanism of color blindness pattern. (CO1, K3)	10

5. Answer any one of the following:-

5-a.	What is the difference between primary Down syndrome and familial Down syndrome? How does each arise? (CO2, K3)	10
5-b.	What are the sex linked lethals and sex linked visible methods of mutation detection. (CO2, K3)	10

6. Answer any one of the following:-

6-a.	How did Meselson and Stahl demonstrate that replication in E. coli takes place in a semiconservative manner? (CO3, K3)	10
6-b.	List the different proteins and enzymes taking part in bacterial replication. Give the function of each in the replication process. (CO3, K3)	10

7. Answer any one of the following:-

7-a.	Give the names of the three RNA polymerases found in eukaryotic cells and the types of RNA that they transcribe. (CO4, K3)	10
7-b.	How is the process of transcription in eukaryotic cells different from that in bacterial cells? (CO4, K3)	10

8. Answer any one of the following:-

8-a.	What is catabolite repression? How does it allow a bacterial cell to use glucose in	10

preference to other sugars? (CO5, K3)

8-b. Briefly explain how transcriptional activator proteins and repressors affect the level of transcription of eukaryotic genes. (CO5, K3) 10

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