Printed Page:- 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 (2021 - 2022)

Subject: Genetics and Molecular Biology

Time: 03:00 Hours Max. Marks: 100

General Instructions:

1. All questions are compulsory. It comprises of three Sections A, B and C.

- Section A - Question No- 1 is objective type question carrying 1 mark each & Question No- 2 is very short type questions carrying 2 marks each.
- Section B - Question No- 3 is Long answer type - I questions carrying 6 marks each.
- Section C - Question No- 4 to 8 are Long answer type - II questions carrying 10 marks each.
- 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. Who is known as father of genetics? (CO1) 1

1. Gregor Mendel
2. Augustinian friar
3. Norman Borlaug
4. M.S Swaminathan

1-b. Name the chromosome found in the cells which are responsible for characters other than sex chromosomes? (CO1) 1

1. Autosomes
2. Genome
3. Mitochondrial chromosome
4. Y chromosome

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

1. Tandem repeats
2. Dinucleotide repeats
3. 100 bp units
4. Inaccurate duplicating

1-d. Telomere is not related to _____(CO2) 1

1. Maintenance
2. Chromosome degradation
3. Division

4. Replication

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

1. Located in chromosomes
2. Carries genetic information from parent to offspring
3. Abundantly found in cytoplasm
4. 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) 1

1. DNA as genetic material
2. RNA as genetic material
3. Protein as genetic material
4. Transforming principle

1-g. The codon is _____ (CO4) 1

1. Singlet
2. Duplet
3. Triplet
4. Quadruplet

1-h. The wobble hypothesis was proposed by _____ (CO4) 1

1. Arthur Kornberg
2. Francis Crick
3. James Watson
4. William Asbury

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

1. Reverse transcriptase
2. DNA polymerase
3. RNA polI
4. RNA polII

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

1. Allosteric protein
2. Heat shock protein
3. Denaturation protein
4. Ribonuclease

2. Attempt all parts:-

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

2 Explain the causes Down syndrome? (CO2) 2

2-c. DNA nature is Conservative, Semiconservative or Dispersive? Draw the diagram. (CO3) 2

2-d.	What do you understand by the term transcription and translation? (CO4)	2
2-e.	What is positive regulation of lac operon? (CO5)	2

SECTION B 30

3. Answer any five of the following:-

3-a.	What happen in F1 and F2 when a dextral (DD) female is crossed with sinistral (dd) male? (CO1)	6
3-b.	A fruit fly has XXXYY sex chromosomes; all the autosomal chromosomes are normal. What sexual phenotype will this fly have? (CO1)	6
3-c.	Explain ionizing and non-ionizing radiations as mutations. (CO2)	6
3-d.	Explain the factors which causes physical mutation. (CO2)	6
3-e.	List the different proteins and enzymes taking part in bacterial replication. Give the function of each in the replication process. (CO3)	6
3-f.	Give the elongation factors used in bacterial translation and explain the role played by each factor in translation. (CO4)	6
3-g.	Explain the trp operon that controls the biosynthesis the amino acid tryptophan in E. coli. (CO5)	6

SECTION C 50

4. Answer any one of the following:-

4-a.	Define the term sex linked inheritance. Explain the mechanism of color blindness pattern. (CO1)	10
4-b.	What do you understand by linkage? Explain repulsion and coupling hypothesis of linkages. (CO1)	10

5. Answer any one of the following:-

5-a.	How many techniques are proposed to detect mutation? Explain any one technique with suitable example. (CO2)	10
5-b.	Explain the difference between autopolyploidy and allopolyploidy. How does each arises? (CO2)	10

6. Answer any one of the following:-

6-a.	Explain the mechanism of cell cycle and its regulation. (CO3)	10
6-b.	Describe in detail the experiments which demonstrated that DNA is the genetic material. (CO3)	10

7. Answer any one of the following:-

7-a.	Describe the mechanism and regulation of prokaryotic transcription. (CO4)	10
7-b.	Explain the initiation, elongation and termination steps of prokaryotic translation. (CO4)	10

8. Answer any one of the following:-

8-a.	Define the term molecular chaperone. Explain their functions with examples in detail. (CO5)	10
8-b.	Define the concept of the lac operon model. Explain in detail the regulation of lac operon with the help of diagram. (CO5)	10