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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: II - THEORY EXAMINATION (2022-2023)

Subject: Introduction to Biotechnology

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 fastest enzyme known is (CO1) | 1 |
| | (a) DNA polymerase | |
| | (b) carbonic anhydrase | |
| | (c) carbonic dehydrogenase | |
| | (d) DNA ligase | |
| 1-b. | The process of cell respiration is carried out by (CO1) | 1 |
| | (a) Mitochondria | |
| | (b) Chloroplast | |
| | (c) Nucleus | |
| | (d) None of the above | |
| 1-c. | Generation time represents period of (CO2) | 1 |
| | (a) Cell cycle | |
| | (b) Inter phase | |
| | (c) M-phase | |

- (d) S-phase
- 1-d. Who is known as the father of Microbiology? (CO2) 1
- (a) Leeuwenhoek
 - (b) John Butler
 - (c) Ferdinand Cohn
 - (d) Robert Koch
- 1-e. *Serratia marcescens* cells produce a red pigment at room temperature. The red color of the colonies is an example of which of the following? (CO3) 1
- (a) Genotype
 - (b) Phenotype
 - (c) Change in DNA base composition
 - (d) Adaptation to the environment
- 1-f. The first genetic material could be (CO3) 1
- (a) RNA
 - (b) DNA
 - (c) Carbohydrate/
 - (d) Protein
- 1-g. Which of the following statements is true about the IgM of humans (CO4) 1
- (a) IgM can cross the placenta
 - (b) IgM can protect the mucosal surface
 - (c) IgM is produced by high-affinity plasma cells
 - (d) IgM is primarily restricted in the circulation
- 1-h. Antibodies present in colostrum which protect the new born from certain diseases is of (CO4) 1
- (a) IgG type
 - (b) IgA type
 - (c) IgD type
 - (d) IgE type.
- 1-i. A transgenic food crop which may help in solving the problem of night blindness in developing countries is (CO5) 1
- (a) Golden Rice
 - (b) Flavr Savr tomatoes
 - (c) BT soybean

(d) Star link maize

- 1-j. The first ever human hormone produced by recombinant DNA technology is (CO5) 1
- (a) Insulin
 - (b) Progesterone
 - (c) Estrogen
 - (d) Lipase

2. Attempt all parts:-

- 2.a. Explain the main points of cell theory? (CO1) 2
- 2.b. Give an example of parasitic plants and insectivorous plants. (CO2) 2
- 2.c. What holds one strand against the other in the double helix? (CO3) 2
- 2.d. What does the term 'memory' of the Immune system mean? (CO4) 2
- 2.e. Name the first transgenic cow. Which gene was introduced in cow? (CO5) 2

SECTION B

30

3. Answer any five of the following:-

- 3-a. Explain the main steps in aerobic respiration? (CO1) 6
- 3-b. What are the advantages of multicellularity to an organisms? (CO1) 6
- 3-c. Draw the diagram of equational cell division? (CO2) 6
- 3-d. Discuss the importance of meiosis cell division in sexually reproducing organisms? (CO2) 6
- 3.e. What background information did Watson and Crick have made available for developing a model of DNA? What was their contribution? (CO3) 6
- 3.f. How do virus infected cells provide innate immunity to healthy cells (CO4) 6
- 3.g. How was insulin obtained before the advent of r-DNA technology? What were the problems encountered? (CO5) 6

SECTION C

50

4. Answer any one of the following:-

- 4-a. What are carbohydrates? Give the properties of monosaccharide and oligosaccharides? (CO1) 10
- 4-b. Describe the ultra structure of Golgi complex? Discuss the various functions of Golgi complex? (CO1) 10

5. Answer any one of the following:-

- 5-a. Why reductional cell division is essential in sexually reproducing organisms? 10

How does mitotic and meiotic anaphase differ? (CO2)

- 5-b. Enlist the main difference between meiosis and mitosis cell division? Meiosis cell division is also known as reductional division? Justify it. (CO2) 10

6. Answer any one of the following:-

- 6-a. Name the scientists, who proved experimentally that DNA is the genetic material. Describe their experiment. (CO3) 10
- 6-b. How does DNA replication in eukaryotes differ from prokaryotes? (CO3) 10

7. Answer any one of the following:-

- 7-a. What is lymph nodes? Explain the role of lymph nodes in providing immunity in humans? (CO4) 10
- 7-b. Enumerate the various factors which are necessary to maintain good health in humans? Discuss the role played by our immune system? (CO4) 10

8. Answer any one of the following:-

- 8-a. Differentiate between PCR and Gene cloning? Discuss the applications of polymerase chain reaction? (CO5) 10
- 8-b. Discuss the important steps in one complete cycle of PCR? What are the applications of PCR in biotechnology research? (CO5) 10

2022-23 Jan - Jun