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(18)

Your Roll No. 2023

Sr. No. of Question Paper : 4504

Unique Paper Code : 32161601

Name of the Paper : Plant Metabolism

Name of the Course : B.Sc. (Hons) Botany

Semester : VI

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. All questions carry equal marks.
3. Question No. 1 is compulsory.
4. Attempt **five** questions in all including Question No. 1.

1. (a) Fill in the blanks (any five) (5×1=5)

P.T.O.

- (i) If respiratory quotient is 1, the respiratory substrate is _____ .
- (ii) The enzyme first isolated and purified in the crystalline form was _____ .
- (iii) _____ received the noble prize for tracing the path of carbon in photosynthesis.
- (iv) Bacteroids are surrounded by _____ membrane in nodules.
- (v) _____ number of molecules of Acetyl Co A are produced after β -oxidation of 14 carbon fatty acid.

(vi) The breakdown of complex molecules into simpler molecules with the release of energy is called _____ .

(b) Define the following (**any five**) (5×1=5)

(i) Absorption spectrum

(ii) Isoenzymes

(iii) Uncouplers

(iv) Triglycerides

(v) Hill reaction

(vi) Anaerobic respiration

(c) State True or False (**any five**)

(5×1=5)

- (i) Pepsin is a non-proteinaceous enzyme.
 - (ii) Manganese is the central atom in the porphyrin head of the chlorophyll molecule.
 - (iii) Starch biosynthesis begins with production of ADP glucose.
 - (iv) Oxidative phosphorylation occurs in inner membrane of mitochondria.
 - (v) The nitrate reductase is an inducible enzyme.
 - (vi) Glycolate cycle is also known as EMP pathway.
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2. Write explanatory notes on (any three)

(3×5=15)

(a) Cyanide resistant respiration

(b) Sucrose synthesis in plants

(c) Enzyme classification

(d) Tricarboxylic acid

3. Differentiate between the following (any three)

(3×5=15)

(a) Synthesis and degradation of fatty acids

(b) CAM and C₄ cycle

(c) Competitive and Non competitive inhibition

(d) Respiration and Photorespiration

4. Write short notes on the following (any five)

(5×3=15)

(a) Emerson enhancement and its significance

(b) Effect of pH on enzyme activity

(c) Leghemoglobin

(d) Role of acetyl CoA in cellular metabolism

(e) Nitrate assimilation

(f) Kranz anatomy

5. (a) Explain β -oxidation pathway of breakdown of fatty

acids?

(7)

(b) Explain the process of rhizobial infection and root nodulation in legumes. (8)

6. (a) What is gluconeogenesis ? Write an account of the glyoxylate pathway. (7)

(b) Explain the structure and mechanism of action of ATP synthase. (8)

7. (a) Schematically represent and explain Z-scheme of electron transport. (7)

(b) Give the contributions made by the following scientists (**any four**) (4 × 2 = 8)

(i) Blackman

(ii) Hans Krebs

(iii) Emil Fischer

(iv) Beijerinck

(v) Peter Mitchell

(vi) Stephen Hales

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Your Roll No.....

Sr. No. of Question Paper : 4705



Unique Paper Code : 32167601

Name of the Paper : DSE-III (Industrial and Environmental Microbiology)

Name of the Course : B.Sc. (Honours) Botany

Semester : VI

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **five** questions in all including Question number 1 which is compulsory.
3. All parts of a question must be answered together.
4. Draw well labelled diagrams wherever necessary.

1. (a) Expand the following (**any five**) : (1×5=5)

- (i) BOD (ii) MPN (iii) UASB (iv) HFCS
(v) PDA (vi) CFU

P.T.O.

(b) Fill in the blanks (**any five**) : (1×5=5)

- (i) In trickling filters _____ forms a slime matrix, that can accommodate heterogenous microbial community.
- (ii) _____ are plates in the bioreactor that enhance aeration efficiency and prevent vortexing.
- (iii) _____ fungi catalyses the breakdown of cellulose.
- (iv) Process of fermentation was first described by _____
- (v) _____ is a method used to reduce the concentration of a substance in a solution by repeatedly diluting it with a solvent.
- (vi) _____ fungal species are used for alcohol production as they can tolerate high levels of alcohol.

(c) Read the following statements carefully and write *True* or *False*. (1×5=5)

- (i) Gravimetric method is used to measure TOC.
- (ii) Millipore filters are used for sterilization.

- (iii) α -Amylase. is an endogenous enzyme of *Bacillus subtilis*.
- (iv) In liquid state surface fermentations, no agitation is carried out and thus the moulds grow as mycelial mats on the surface of the medium.
- (v) Cell disruption is a mandatory step in intracellular product recovery.

2. Write short notes on the following (any three) :

(5×3=15)

- (i) Components of a Bioreactor
- (ii) Isolation of microbes from Air/water
- (iii) GRAS
- (iv) Algal Blooms

3. Differentiate between the following (any five) :

(3×5=15)

- (i) Enrichment medium and differential medium
- (ii) Solid state fermentation and Liquid state fermentation
- (iii) COD and BOD
- (iv) Lyophilization and Spray drying

- (v) Extracellular microbial enzymes and Intracellular microbial enzymes
- (vi) Laminar air flow and Autoclave
4. (a) Discuss in detail the production and estimation of amylase using microorganisms. (8)
- (b) Discuss various methods of down stream processing. (7)
5. (a) What do you understand by enzyme immobilization? What are the different methods of enzyme immobilization? (8)
- (b) What is the industrial importance of glucose isomerase? What are the advantages of semisynthetic penicillin over natural penicillin? (7)
6. (a) What are coliforms? Discuss methods (**any three**) for detecting coliforms in drinking water. (8)
- (b) Discuss the secondary methods for treatment of sewage water. (7)
7. (a) Discuss the scope of microbes in Industry. (8)
- (b) What are the different components of synthetic culture media? (7)

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2023
Your Roll No



Sr. No. of Question Paper : 4784

Unique Paper Code : 32161602

Name of the Paper : Plant Biotechnology

Name of the Course : B.Sc. (H) Botany

Semester : VI

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt five questions in all.
3. Question No. 1 is compulsory.

1. (a) Expand the abbreviations (any five) : (1×5=5)

(i) PAGE

P.T.O

(ii) Ti-plasmid

(iii) scFv

(iv) PEG

(v) BAC

(vi) Taq

(b) Define (**any five**)

(1×5=5)

(i) Superbug

(ii) Phagemid

(iii) Somaclonal variations

(iv) Genetically modified crop

(v) Probe

(vi) Restriction endonucleases

(c) Fill in the blanks (any five) (1×5=5)

- (i) Synthetic insulin developed using recombinant DNA technology was called _____ .
- (ii) The bacterial cells which are modified for the uptake of foreign DNA are called _____ cells.
- (iii) The gene which was silenced in Flavr Savr^R is _____ .
- (iv) _____ is an example of biofortified transgenic crop.
- (v) The plant-based antibodies developed for dental caries is against bacteria _____ .
- (vi) High cytokinin and low auxin ratio promotes _____ production in plant tissue culture.

2. Draw labelled diagrams of **(any three)** (5×3=15)
- (a) Gene gun
 - (b) Polymerase chain reaction
 - (c) Gene construct of Golden rice
 - (d) BAC
3. Differentiate between **(any five)** (3×5=15)
- (a) Selectable marker gene and reporter gene
 - (b) Somatic Hybridization and cybridization
 - (c) Haploid and Triploid plantlets
 - (d) cDN library and genomic DNA Library
 - (e) Primary and Secondary metabolites
 - (f) RAPD and RFLP
 - (g) Zygotic and somatic embryogenesis

4. Write short notes on (any three) (5×3=15)

(a) Molecular markers

(b) Anther culture

(c) Round Up ready Soyabean

(d) Applications of tissue culture

5. (a) What are osmoprotectants? Provide examples of any two osmoprotectants and their role in abiotic stress tolerance in plants. (5)

(b) Discuss the role of plants as bioreactors from the view point of production of biopolymers (5)

OR

A linear molecule of DNA was cut with the following restriction enzymes : (5)

EcoRI - 2 fragments produced - 3.7 kb, 2.3 kb

SmaI - 3 fragments produced - 4.3 kb, 1.2 kb, 0.5 kb

Double digestion with both enzymes – 4 fragments produced: 2.5 kb, 1.8 kb, 1.2 kb, 0.5 kb

- (i) What is the size of DNA? (0.5)
 - (ii) Draw a gel profile from the data provided (1)
 - (iii) Make a restriction map (2)
 - (iv) What can you conclude from this data? (1.5)
- (c) Describe the mechanism of action of cry gene in Bt cotton. What were the advantages of Bt crop over the traditionally grown crops? (5)

6. Answer the following :

- (a) Describe the *Agrobacterium*-mediated method of gene transfer in plants with the help of suitable illustrations (binary and co-integrate methods). (5)

(b) Give a detailed account of purpose and strategy used in developing Golden rice. (5)

(c) Provide any one (Key) application of following : (1×5=5)

(i) Lipase

(ii) Cryopreservation

(iii) Meristem culture

(iv) Recombinant DNA technology

(v) Phytohormones in Plant tissue culture

7. (a) Give a brief account of any two prokaryotic vectors. (8)

(b) Describe the biosafety and bioethical concerns in development of transgenic plants. (7)

OR

Give role of genetic transformation in changing the floral characters in carnations.

(7)

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Your Roll No.

Sr. No. of Question Paper : 4828

Unique Paper Code : 32167608

Name of the Paper : Bioinformatics

Name of the Course : B.Sc. (H) Botany

Semester : VI

Duration : 3 Hours

Maximum Marks : 75

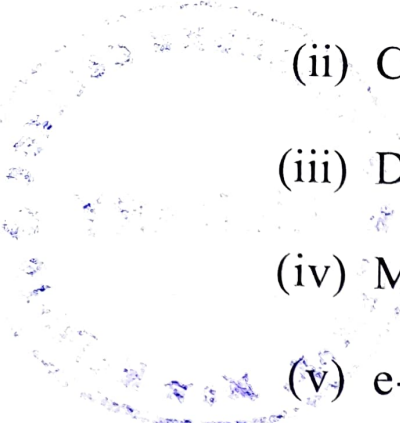


Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **five** questions in all.
3. Question No. **1** is compulsory.
4. **All** parts of the question must be answered together.

1. (a) Define the following (**any five**) : (1×5=5)

(i) Gene annotation

- 
- (ii) Conserved domain
 - (iii) Database
 - (iv) Metabolomics
 - (v) e-value
 - (vi) Dendrogram

(b) Expand the following (**any five**) : (1×5=5)

- (i) SNP
- (ii) NGS
- (iii) PDB
- (iv) NCBI
- (v) MEGA
- (vi) OMIM

(c) Fill in the Blanks (**any Five**) (5×1=5)

- (i) The term genome was used by German botanist _____
- (ii) _____ is an integrated search engine which allows users to search and retrieve different data.
- (iii) A web server designed for identifying protein

coding region in expressed sequence tag-derived sequences is _____

(iv) A graphical method for comparing two sequences to identify region of similarity is _____

(v) The first protein database was generated by _____

(vi) _____ is a tool used to align mRNA sequence and gene sequence.

2. Write short note on (any five) : (5×3=15)

(i) Python in bioinformatics

(ii) Swiss Modelling

(iii) RasMol

(iv) Transcriptomics

(v) Microarray

(vi) Whole Genome Sequencing

3. Differentiate between the following (any three) : (3×5=15)

(i) GenBank and FASTA file format

- (ii) Secondary and composite database
 - (iii) Webin and Sequin
 - (iv) Structural and functional genomics
4. (a) DDBJ is a widely used bioinformatic resource. Discuss the various tools available at DDBJ.” (8)
- (b) Explain the main features of PDB and PIR. How the PDB and PIR protein databases different from each other. (7)
5. (a) What is a phylogenetic tree. Discuss the three methods used in construction of phylogenetic tree. (8)
- (b) Briefly discuss the role of bioinformatics in microbial genomics and crop improvement. (7)
6. (a) Explain the key points of Local and Global sequence alignment and describe various methods used for alignment. (8)
- (b) Discuss the main features of computer aided drug design and its role in medical science. (7)