

**2022**

*Time - 3 hours*

*Full Marks - 60*

*Answer all groups as per instructions.  
Figures in the right hand margin indicate marks.  
Candidates are required to answer  
in their own words as far as practicable.  
Draw labelled diagrams wherever necessary.*

**GROUP – A**

1. Answer all questions and fill in blanks as required. [1 × 8]
- (a) All the pigment molecules except chlorophyll in a photosystem are called \_\_\_\_\_ molecules.
- (b) \_\_\_\_\_ pathway involves both anabolism and catabolism.
- (c) In preparatory phase of glycolysis, glucose is converted to \_\_\_\_\_.
- (d) Lipids are \_\_\_\_\_ in nature.

Express in one word :

- (e) Synthesis of ATP from ADP and iP –
- (f) Respiration in absence of atmospheric nitrogen –



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- (g) The specialised photosynthetic process of  $\text{CO}_2$  fixation –
- (h) Light induced reactions which lead to splitting of water –

**GROUP – B**

2. Answer any eight of the following questions within two to three sentences each. [1½ × 8

- (a) What is phosphorylation ?
- (b) Name the electron carriers in ETS.
- (c) What is reaction centre ?
- (d) What is fermentation ?
- (e) What is cyanide-resistant respiration ?
- (f) What is nitrogen fixation ?
- (g) What is redox signalling ?
- (h) What do you mean by Q-cycle ?
- (i) What is gluconeogenesis ?
- (j) Define Lipids.

**GROUP – C**

3. Write notes on any eight of the following within 75 words each.

[2 × 8

- (a) Photosynthetic pigments



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- (b) Isozymes
- (c) Proteolysis
- (d) Kranz anatomy
- (e) NADH shuttle
- (f) Transamination
- (g)  $\alpha$ -oxidation
- (h) Fate of pyruvate
- (i) Signal transduction pathway
- (j) Rhizobium

**GROUP – D**

*Answer any four questions within 500 words each.*

- 4. Give an account of regulation of metabolic pathways. [6]
- 5. Describe the role of regulatory enzymes. [6]
- 6. Give an account of Glycolysis. Write its importance. [6]
- 7. Narrate the factors affecting respiration. [6]
- 8. Give an account of Biological nitrogen fixation. [6]
- 9. Describe  $\beta$ -oxidation in plants. [6]
- 10. Give an account of  $C_3$  cycle. [6]



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**GROUP – A**

1. Fill in the blanks by choosing the correct answer given in the brackets and express in one word. (all) [1 × 8]
- (a) \_\_\_\_\_ is called father of tissue culture.  
(Crick, Haberlandt, Anber, Lederberg)
- (b) \_\_\_\_\_ are called genetic scissors.  
(Restriction endonucleases, Exonucleases, DNA polymerases, RNA polymerases)
- (c) Natural genetic engineer is \_\_\_\_\_.  
(Azotobacter, Rhizobium, Agrobacterium, Clostridium)
- (d) Bt cotton is resistant to \_\_\_\_\_.  
(insects, bacteria, viruses, fungi)



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Express in one word :

- (e) Capacity of a single plant cell to regenerate a complete plant.
- (f) Plants possessing foreign genes.
- (g) Recombinant human insulin.
- (h) Use of microorganisms to remove pollutants.

**GROUP – B**

2. Answer any eight of the following questions within two to three sentences each. [1½ × 8

- (a) What is tissue culture ?
- (b) What is cryopreservation ?
- (c) What is shuttle vector ?
- (d) What is pBR322 ?
- (e) What is electroporation ?
- (f) What are reporter genes ?
- (g) What is superbug ?
- (h) What is humulin ?
- (i) What is r-DNA ?
- (j) What is moondust carnation ?



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**GROUP – C**

3. Write notes on any eight of the following within 75 words each. [2 × 8]
- (a) Somatic Embryogenesis
  - (b) Micropropagation
  - (c) Restriction Endonucleases
  - (d) Cloning Vectors
  - (e) Selectable marker genes
  - (f) Microprojectile
  - (g) Flavr Savr Tomato
  - (h) Golden Rice
  - (i) Edible vaccines
  - (j) Role of hormones in tissue culture

**GROUP – D**

*Answer any four questions within 500 words each.*

- 4. Give an account of aseptic plant tissue culture technique. [6]
- 5. Describe the applications of plant tissue culture. [6]
- 6. Describe the steps of recombinant DNA technology. [6]
- 7. Describe PCR mediated gene cloning. [6]

P.T.O.



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8. Give an account of genomic and cDNA libraries. [6]
9. Describe Agrobacterium mediated gene transfer in plants. [6]
10. Describe the applications of biotechnology. [6]



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**GROUP – A**

1. Fill in the blanks by choosing the correct answer given in the brackets and express in one word. (all) [1 × 8]
- (a) Yeast contains an enzyme \_\_\_\_\_ responsible for alcoholic fermentation.  
(Lipase, Zymase, Sucrase, Protease)
- (b) The type of fermentation of tea and tobacco leaves to develop flavour and taste is called \_\_\_\_\_.  
(curing, canning, degradation, alcoholic fermentation)
- (c) Secondary treatment of Sewage in oxidation pond is a \_\_\_\_\_ process.  
(physical, chemical, biological, filtration)



- (d) Symbiotic nitrogen fixing bacterium present in the root nodules of legumes is \_\_\_\_\_.  
(Rhizobium, Clostridium, Penicillium, Azospirillum)

Express in one word :

- (e) Recovery and purification of biosynthetic products.
- (f) Amount of oxygen required by microorganisms to decompose organic wastes in a given water sample.
- (g) Use of microbes to remove contaminants and pollutants from water and soil.
- (h) Symbiotic association between plant roots and fungi.

### GROUP – B

2. Answer any eight of the following questions within two to three sentences each. [1½ × 8

- (a) What is a bioreactor ?
- (b) What is downstream processing ?
- (c) What is continuous fermentation process ?
- (d) What is enzyme immobilization ?
- (e) What is COD ?



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- (f) What is mycorrhiza ?
- (g) What is Bioremediation ?
- (h) What is VAM ?
- (i) What is diazotrophy ?
- (j) What is TDS ?

**GROUP – C**

3. Write notes on any eight of the following within 75 words each.

[2 × 8

- (a) Batch fermentation
- (b) Components of a typical bioreactor
- (c) Centrifugation
- (d) Lyophilization
- (e) Applications of immobilized enzymes
- (f) Sewage treatment
- (g) BOD
- (h) Microbial flora of water
- (i) Microbes as indicator of water quality
- (j) Root modulating bacteria

P.T.O.



GROUP – D

*Answer any four questions within 500 words each.*

4. Describe the role of microorganisms in industrial processes. [6]
5. Give an account of industrial fermentation processes. [6]
6. Describe the principle and procedure for microbial starch hydrolysis. [6]
7. Give an account of microbial enzymes and their applications in industries. [6]
8. Give an account of air borne microorganisms and their impact on living beings. [6]
9. Describe the role of microbes in sewage and domestic waste water treatment systems. [6]
10. Describe the process of biological nitrogen fixation. [6]