

Roll No. _____

[Total No. of Pages : 2

PGIIS-1052 A-18
M.Sc. IInd Semester Examination
BIOCHEMISTRY
(Microbial Biotechnology) (CBCS)
Paper : SCT 2.1
(New)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

Answer Q.No. 1 and any four of the remaining.

1. Answer the following :

(10×2=20)

- a) Define the terms 'Downstream processing' and 'Scale up'.
- b) What is SSF? Mention its advantages.
- c) Give characteristics of industrial microorganisms.
- d) Depict diagrammatically the industrial production of glutamic acid. Name organisms that produce it.
- e) What are broad - spectrum antibiotics? Give structure of streptomycin.
- f) Differentiate between wine and beer.
- g) What are microbial polysaccharides? Give examples.
- h) What are bio filters? Mention their applications.
- i) Distinguish between SSF and SMF.
- j) What are biosurfactants? Give examples.

[Contd....

2. a) How are bioreactors grouped? Describe design and operation of a typical bioreactor. (7+8=15)
b) Give an account on production of microbial enzyme.
3. a) Describe fermentation production of penicillin. Explain its mechanism of action. (7+8=15)
b) What is biotransformation? Discuss biotransformation of steroids.
4. a) Describe industrial production of alcohol from molasses.
b) Discuss fermentative production of citric acid. Give applications of citric acid. (7+8=15)
5. a) What are methanogenic microbes? Discuss how is biogas produced from these organisms.
b) What is immobilisation? Discuss different methods of enzyme immobilisation. (7+8=15)
6. a) Describe microbial degradation of xenobiotics with suitable example. (7+8=15)
b) Describe various methods employed in wastewater treatment.
7. Write notes on any **THREE** of the following : (3×5=15)
a) SCP.
b) Downstream processing.
c) Microbial insecticides.
d) Bioleaching of copper.
-

Roll No. _____

PGIIS-1054 A-18
M.Sc. IInd Semester Examination
BIOCHEMISTRY
(Microbial Biotechnology)
Paper : SCT 2.1
(Old)

Maximum Marks : 80

Time : 3 Hours

Instructions to Candidates:

Answer Q No. 1 and any four of the remaining.

(10×2=20)

1. Answer the following :

- a) Differentiate primary metabolites from secondary metabolites with an example for each.
- b) What are fermenters? Give any two examples.
- c) Why are raw materials required? Mention any two features of a raw material.
- d) How is foam controlled during fermentation process?
- e) What are food additives? Mention any two beneficial effects of food additive.
- f) How are antibiotic producers screened?
- g) What is meant by microbiological mining?
- h) Enlist the matrices for the immobilization of cells.
- i) Why is dehalogenation anaerobic is more faster than aeorobic dehalogenation?
- j) What is meant by natural attenuation?

2. a) Write a note on industrially important microorganisms. (5+5+5=15)
b) Discuss the principle, advantages and disadvantages of solid - state fermentation.
c) Explain, how organism growth and product formation monitored during an industrial production process.
3. a) Describe the production and applications of Streptomycin. (5+5+5=15)
b) Write a note on production of single cell protein.
c) Explain the process of steroid biotransformation and beneficial products.
4. a) What is meant by biofuel? Describe the production of biogas. (5+5+5=15)
b) Write a note on microbial insecticides and their beneficial effects.
c) Explain, how is vinegar produced?
5. a) Discuss on methods for enzyme immobilization and applications of immobilized enzymes. (5+5+5=15)
b) Write a note on biosensors.
c) Describe the production of microbial polysaccharides and their advantages.
6. a) Discuss on advantages of using microbes for pollution control. (5+5+5=15)
b) Write a note on methods for the waste treatment.
c) What are surfactants? Describe the microbial degradation of surfactants with an example.
7. Write short note on any **THREE** of the following : (3×5=15)
a) Fermentation media.
b) Microbial mining.
c) Biofertilizers.
d) Production and application of Citric acid.



Roll No. _____

[Total No. of Pages : 2

PGIIS-1051 A-18
M.Sc. IInd Semester Examination
BIOCHEMISTRY
(Enzymology) (CBCS)
Paper : HCT 2.1
(New)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

Answer question No. 1 and any four of the remaining.

1. Answer the following :

(10×2=20)

- a) How are enzymes isolated from cells?
- b) What is the effect of pH on enzyme activity?
- c) What are multienzyme complexes? Mention their advantages.
- d) What is covalent catalysis? Give an example.
- e) What are substrate analogues? Mention their uses.
- f) What is active site of an enzyme?
- g) Give the coenzymic functions of biotin.
- h) Define k_m and V_{max} and mention their significance.
- i) How is a compulsory ordered enzyme reaction represented?
- j) What are secondary plots? Mention their uses.

2. a) Give the IUB classification of enzymes with suitable examples.

b) Discuss the methods available for disruption of cell mass for isolation of intracellular enzymes.

c) How are soluble enzymes stabilized?

(5+5+5=15)

3. a) Derive the rate expression for a single substrate enzyme catalyzed reaction based on equilibrium assumption.
b) Discuss the different methods used for identification of active site of an enzyme. (8+7=15)
4. a) Give an account of different types of reversible enzyme inhibitions'.
b) Explain the mechanism of action of RNase'.
c) Give an account on oligomeric enzymes. (5+5+5=15)
5. a) Describe the mechanism of action catalyzed by chymotrypsin.
b) How would you distinguish competitive, uncompetitive and noncompetitive enzyme inhibitions graphically? Explain. (8+7=15)
6. a) Discuss the regulation of enzyme activity by allosteric modulators with suitable example.
b) Discuss the clinical applications of enzymes. (8+7=15)
7. Write short note on any three of the following :
- a) Industrial application of enzymes.
b) Chymotrypsinogen activation.
c) Pyruvate dehydrogenase complex.
d) LDH (3×5=15)



Roll No. _____

[Total No. of Pages : 2

PGIIS-1086 A-18
M.Sc. IInd Semester Examination
BIOCHEMISTRY
(Enzymology)
Paper : HCT 2.1
(Old)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

Answer question 1 and any four of the remaining.

1. Answer the following : (10×2=20)
- a) What are hydrolases and lyases? Give example.
 - b) Define specific activity turnover number.
 - c) Explain the intracellular localization of enzymes.
 - d) What is K_m ? Give its importance.
 - e) What is pre - steady state kinetics? Give its importance.
 - f) What are suicide inhibitors? Give their importance.
 - g) What are multifunctional enzymes? Give example.
 - h) What are isoenzymes? How are they separated?
 - i) What are coupled enzyme assays? Give its importance.
 - j) Explain the analysis of active site amino acid residues using proteolytic enzymes.
2. a) Derive the Michaelis - Menten equation for a single substrate enzyme catalyzed reaction following rapid equilibrium assumption. How is this equation linearized?
- b) Describe the mechanism of action of chymotrypsin.
- c) Discuss the clinical applications of enzymes. (7+4+4=15)

3. a) What are reversible and irreversible inhibitors? How different types of reversible inhibitors are differentiated?
- b) Give the importance of primary and secondary plots in bisubstrate reactions.
- c) Describe various hypothesis proposed to explain the enzyme specificity. (7+5+3=15)
4. a) Define active site of an enzyme? How are amino acid residues cysteine, histidine and serine identified at the active site?
- b) Derive rate equation for a single substrate enzyme catalyzed reaction by King - Altman procedure.
- c) Discuss the regulation of enzyme activity by reversible covalent modification. (6+5+4=15)
5. a) What are allosteric enzymes? Describe the allosteric regulation of ATCase enzyme.
- b) Discuss the different types of feed back inhibition.
- c) Describe the assay of enzymes by spectrophotometric technique. (7+4+4=15)
6. a) Explain briefly the procedure employed for the purification of enzymes.
- b) What is general acid - general base catalysis. Describe the mechanism of action of RNase. (7+8=15)
7. Write short note on any **THREE** of the following :
- a) Criteria of purity of enzymes.
- b) Multienzyme complex.
- c) Immobilized enzymes.
- d) PDH complex. (3×5=15)
-

Roll No. _____

[Total No. of Pages : 2

PGIIS-1053 A-18
M.Sc. IInd Semester Examination
BIOCHEMISTRY
(Metabolism - I) (CBCS)
Paper : HCT 2.2
(New)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

Answer Q.No. 1 and any FOUR of the remaining.

1. Answer the following :

(10×2=20)

- a) Give the fate of pyruvate under aerobic condition.
- b) Write the significance of HMP pathway.
- c) How does galactose enters glycolysis?
- d) What is Hill reaction?
- e) Name the enzymes and their cofactors of PDC.
- f) What are futile cycles? Give an examples.
- g) How many ATPs are generated on complete oxidation of acetyl CoA through TCA cycle?
- h) How do antimycin -A inhibits ETS?
- i) What is Dark reaction?
- j) What is light harvesting complex?

2. a) Describe the reactions of glycogenolysis in muscle.
b) How the carriers of electron in ETC are identified? Explain the chemiosmotic hypothesis. (7+8=15)
3. a) Discuss the amphibolic nature of TCA cycle.
b) Describe the steps involved in the biosynthesis of glycogen. Briefly mention hormonal regulation of glycogen metabolism. (7+8=15)
4. a) Outline the reaction sequence of Glycerol - 3 - phosphate shuttle system. What is its significance?
b) Describe the structure of $F_0 F_1$ ATP synthase. (7+8=15)
5. a) Outline the reactions of gluconeogenesis? Discuss its energetics.
b) Distinguish between C_3 and C_4 pathways with reference to CO_2 fixation. (7+8=15)
6. a) Explain the reactions of peptidoglycan biosynthesis.
b) Describe the organization of photosystem - II and I. What is their function?(8+7=15)
7. Write notes on any **Three** of the following : (3×5=15)
- a) Photorespiration.
 - b) Entner - Duodoroff pathway.
 - c) Glyoxylate pathway.
 - d) Cori cycle
-

Roll No. _____

PGIIS 1057 A-18
M.Sc.IInd Semester Examination
BIOCHEMISTRY
(Metabolism-I) (CBCS)
Paper : HCT -2.2
(Old)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

Answer question no. **ONE** and any **FOUR** of the remaining

1. Answer the following : (10×2=20)
- a) How does fructose enter the glycolytic pathway in muscle ?
 - b) What is the metabolic fate of pyruvate ?
 - c) What is the importance of Pentose -Phosphate pathway ?
 - d) What is anaplerosis ? Give its significance .
 - e) Give the chemical features of ATP that makes it a high -energy compound .
 - f) What is oxidative phosphorylation ? How is it uncoupled ?
 - g) What is Hill reaction ?
 - h) Name hormones in the regulation of glycogen metabolism .
 - i) What are ketone bodies ? List them with their structure .
 - j) How does DNP uncouples the oxidative phosphorylation?
2. a) Discuss the mechanism of PDC and its regulation .
b) Give an account of glycogen storage diseases?
c) Discuss the biosynthesis of starch . (5+5+5=15)

3. a) What is glyoxylate cycle ? Discuss its reactions and importance .
b) What is gluconeogenesis ? Discuss the regulation of this process . (7+8=15)
4. a) Discuss the steps involved in the flow of electrons from water molecule to NADPH in the light reaction of photosynthesis .
b) Discuss the essential features of C4 pathway in plants . (7+8=15)
5. a) Describe the Mitchell hypothesis .
b) Discuss the electron transport in bacteria. (7+8=15)
6. a) What are the energy yielding steps in TCA cycle?
b) Discuss the regulation of glycolysis . (7+8=15)
7. Write notes on any **THREE** of the following . (3×5=15)
- a) Biosynthesis of peptidoglycan .
 - b) Bacterial photosynthesis .
 - c) HSK pathway .
 - d) Electron transport chain .
-