

**PGIIS-N 1566 B-2K13****M.Sc. IIIrd Semester(CBCS) Degree Examination****Biochemistry****(Immunology)****Paper - HCT - 3.2****(New)**

Time : 3 Hours

Maximum Marks : 80

**Instructions to Candidates:***Answer question No.1 & any four of the remaining.*

1. Answer the following:- (10×2=20)
- a) Define active and passive immunity.
  - b) What is secondary immune response?
  - c) Define the terms adjuvant and hapten. Give examples.
  - d) What is immunological tolerance?
  - e) What is opsonization? What are its consequences?
  - f) What is meant by somatic mutations? Give an example.
  - g) What is immunologic memory? What are its advantages?
  - h) Distinguish between allotypic and idiotypic variation.
  - i) Why does monoclonal antibody to myoglobin fail to precipitate?
  - j) Write the principle of RIA
2. a) Describe the structure and functions of lymph node.
- b) Give an account of physiological and anatomical barriers of innate immunity.
- c) Describe the Burnet's clonal selection. (5+5+5=15)

3. a) What is immunogen? Describe the properties that contribute to the immunogenicity of it.
- b) What is precipitation reaction? Give an account of its application.
- c) Explain the principle and application of ELISA. (5+5+5=15)
4. a) Describe the classical and alternative pathway of compliment activation.
- b) Explain any two hypersensitive reactions and their significance. (8+7=15)
5. a) Explain the production and application of monoclonal antibodies
- b) What is MHC? Describe the processing and presentation of antigens on MHC. (8+7=15)
6. a) Describe the process of activation of B-cells.
- b) Discuss the methods of preparation of vaccines
- c) What are Natural Killer cells? What is their role in immune system? (5+5+5=15)
7. Write notes on any **three** of the following (3×5=15)
- a) Cytokines
- b) Blood group antigens.
- c) Graft versus host reactions.
- d) Disorders of immune response.
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**PGIIS-N 1565 B-2K13**  
**M.Sc. IIIrd Semester(CBCS) Degree Examination**  
**Biochemistry**  
**(Clinical Biochemistry and Nutrition)**  
**Paper - HCT - 3.1**  
**(New)**

Time : 3 Hours

Maximum Marks : 80

**Instructions to Candidates:**

*Answer question No.1 & any four of the remaining.*

1. Answer the following:- (10×2=20)
- a) Define hematocrit. How is it related to weight of an individual?
  - b) Give clinical symptoms of microcytic anaemia.
  - c) What is beta lipoproteinemia? Give its significance
  - d) Depict a scheme for non-enzymatic glycation of proteins.
  - e) What are clinical manifestations of type-I diabetes?
  - f) State the metabolic defect in acute intermitant porphyria.
  - g) Give the clinical symptoms of gouty arthritis.
  - h) Why Pellagra is seen even when adequate intake of niacin and tryptophan?
  - i) Give the RDA and sources of Mg and K.
  - j) Give the diagnostic importance of LDH.
2.
  - a) Discuss the symptoms, biochemical defects and epidemiology of lactose intolerance.
  - b) Explain the importance of total and differential blood counts
  - c) Describe the conditions leading to formation of kidney stones. (3×5=15)

3. a) Explain pre-hepatic and post hepatic jaundice. How are they diagnosed?  
b) Explain etiology and remedy for glycogen storage disorders. (8+7=15)
4. a) Discuss how renal clearance tests are employed to assess kidney functions.  
b) Give an account of plasma lipoproteins. Comment on lipoproteinemas (8+7=15)
5. a) Describe the methods employed in determination of energy value of nutrients.  
b) Discuss methods of nitrogen balance study and their significance  
c) Explain the special aspects of nutrition during lactation and infancy. (3×5=15)
6. a) How is BMR determined? Comment on the BMR for different age groups.  
b) Explain the methods of fractional gastric analysis.  
c) Explain the role of dietary fiber and PUFA in nutrition. (3×5=15)
7. Write notes on any **three** of the following (3×5=15)
- a) GTT
  - b) Dialysis
  - c) Disorders of haemoglobin
  - d) Atherosclerosis
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**PGIIS-N 1567 B-2K13****M.Sc. IIIrd Semester(CBCS) Degree Examination****Biochemistry****(Microbial Biotechnology)****Paper - SCT 3.1****(New)**

Time : 3 Hours

Maximum Marks : 80

**Instructions to Candidates:***Answer question No.1 & any four of the remaining.*

Answer the following:-

**(10×2=20)**

1.
  - a) Differentiate between primary and secondary metabolites
  - b) How can feedback inhibition by lysine overcome to improve the yield?
  - c) What are extremophiles? Give two examples.
  - d) What are the disadvantages of enzyme immobilization?
  - e) What are the characteristics of high vinegar yielding bacteria?
  - f) What are the differences between an industrial fermenter and a laboratory culture vessel?
  - g) Addition of which metal to the fermentation medium improves the production of vitamin B<sub>12</sub> and why?
  - h) What are mutagens? Name any two mutagens applied for microbial strain improvement.
  - i) Distinguish between fed-batch and continuous fermentation processes.
  - j) Why is sterilization of fermentation air important? How is it carried out?
2.
  - a) Discuss the isolation and screening of antibiotic producing microbes
  - b) Discuss the production of commodity ethanol with a neat flow chart. **(8+7=15)**

3. a) Explain the influence of different parameters on the industrial fermentation.  
b) Discuss the down-stream processes available for industrial processes. (7+8=15)
4. a) Discuss the production and applications of mold enzymes.  
b) Describe the biosynthetic pathways and production of acetic acid and butanol. (8+7=15)
5. a) Discuss the biodegradation of pesticides.  
b) Explain the industrial scale production of SCP.  
c) Give an account of microbiological mining. (3×5=15)
6. a) Describe the methods used for industrial waste treatment.  
b) Discuss the production of biogas. (8+7=15)
7. Write notes on any **three** of the following (3×5=15)
- a) SSF  
b) Peptide antibiotics  
c) Biofertilizers  
d) Industrial raw materials.
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**PGIIS-N 1568 B-2K13**  
**M.Sc. IIIrd Semester(CBCS) Degree Examination**  
**Biochemistry**  
**(Fundamentals of Enzymology)**  
**Paper - OET - 3.1**  
**(New)**

Time : 3 Hours

Maximum Marks : 80

**Instructions to Candidates:**

*Answer question No.1 & any four of the remaining.*

1. Answer the following:- (10×2=20)
- a) Define turnover number and specific activity of an enzyme.
  - b) Depict ping-pong - bi and random order mechanism using Cleland's formulations.
  - c) Differentiate between hydrolases and lyases? Give EC No. and examples.
  - d) What is general acid-general base catalysis? Give example
  - e) What is photo-oxidation? Give example.
  - f) What is substrate inhibition? Give example
  - g) What are coupled enzyme assays? Give example
  - h) What are isoenzymes? How are they separated?
  - i) Give the free energy diagram for an enzyme-catalyzed reaction
  - j) What is  $K_m$ ? Give its significance.
2. (3×5=15)
- a) Discuss the clinical applications of enzymes.
  - b) Describe the different methods of enzyme immobilization. Give its application.
  - c) Describe the assay of dehydrogenases by spectrofluorimetric method.

3. a) What are allosteric enzymes? Discuss the regulation of ATCase? (3×5=15)
- b) Describe various hypothesis proposed to explain the enzyme specificity.
- c) Describe the structure of PD complex. Give the reaction mechanism.
4. a) Derive the Michaelis-Menten equation for a single substrate enzyme catalyzed reaction. How is this equation linearized? (7+4+4=15)
- b) Describe the coenzyme action of PLP and Biotin with suitable examples.
- c) Explain the regulation of enzymes by reversible covalent modification.
5. a) How are reversible and irreversible inhibitors distinguished? Give an account of graphical method to distinguish reversible inhibitors. (3×5=15)
- b) Define active site of an enzyme? How are amino acid residues cysteine, methionine and histidine identified at the active site?
- c) Give a brief account of various methods employed to purify enzymes.
6. a) Describe the catalytic triad of chymotrypsin and mechanism of action.(6+5+4=15)
- b) Discuss the applications of enzymes in food industry.
- c) Give the importance of primary and secondary plots in bisubstrate reactions
7. Write notes on any **three** of the following (3×5=15)
- a) Processing of chymotrypsin
- b) Enzyme Assays
- c) Trapping of ES-complex
- d) Mechanism of action of RNase
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**PGIIS-O 1569 B-2K13**  
**M.Sc. IIIrd Semester(Non-CBCS) Degree Examination**  
**Biochemistry**  
**(Metabolism-I)**  
**Paper - BC-3.1**  
**(Old)**

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) Why is ATP considered as a high energy compound?
  - b) What are anaplerotic reactions? Give an example.
  - c) Mention the significance of carnitine cycle
  - d) How is propionyl CoA converted to succinyl CoA?
  - e) What is phenylketonuria?
  - f) What are ketone bodies? Give an example with its structure.
  - g) Why every metabolic pathway has a first committed step?
  - h) Give the biochemical basis for gout
  - i) What are couplers? Give an example
  - j) What is galactosemia?
2. a) Discuss the salient features of Chemiosmotic theory
- b) Explain the reactions of HMP shunt pathway
- c) Discuss the fate of pyruvate in carbohydrate metabolism (5+5+5=15)

3. a) Discuss the biosynthesis of long chain fatty acids with a suitable example  
b) What is P/O ratio? How is it determined? Give its significance.  
c) Discuss the regulation of cholesterol biosynthesis (5+5+5=15)
4. a) Explain the process of transfer of mitochondrial acetyl CoA into cytosol  
b) Explain the hormonal regulation of glycogen metabolism  
c) Explain how glucose residues of glycogen enter into glycolytic pathway?(5+5+5=15)
5. a) Explain the dark reactions of photosynthesis  
b) Discuss the mechanism of photophosphorylation  
c) Give an account on photosynthetic apparatus (5+5+5=15)
6. a) Discuss the mechanism of electron transport system  
b) Describe the shuttle system used for the transportation of cytosolic NADH  
c) Discuss the irreversible reactions of glycolysis (5+5+5=15)
7. Write notes on any **three** of the following (3×5=15)
- a) TCA cycle
  - b) Hormonal regulation of fatty acid metabolism
  - c) Glycogen degradation in muscle
  - d) Biosynthesis of prostaglandins
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**PGIIS-O 1570 B-2K13****M.Sc. IIIrd Semester(Non-CBCS) Degree Examination****Biochemistry****(Metabolism - II)****Paper - BC - 3.2****(Old)**

Time : 3 Hours

Maximum Marks : 80

***Instructions to Candidates:****Answer question No.1 & any four of the remaining.***1. Answer the following:-****(10×2=20)**

- a) How is ammonia transported from muscle to liver?
- b) What is oxidative deamination? Give one example
- c) What are 'glucogenic' and 'ketogenic' amino acids? Give examples.
- d) How is Gly catabolised?
- e) Give the structures of spermidine and spermine. Write their significance.
- f) How is val synthesized from pyruvate. Name the amino acids belonging to pyruvate family.
- g) How is epinephrine formed from Tyr?
- h) Write the structure of purine ring system and indicate the metabolic sources of its atoms.
- i) How is ADP converted to dADP?
- j) What are the products of heme degradation in the body?

**2. a) How is glutathione synthesized? Add a note on  $\gamma$ -glutamyl cycle****b) What is transamination? Explain the role of PLP in such reactions (7+8=15)**

3. a) Trace the reaction pathways involved in the degradation of branched chain amino acids.  
b) Give the reactions of urea cycle and explain its regulation (7+8=15)
4. a) Describe the biosynthetic pathway of Lys in bacteria and Fungi  
b) Discuss the steps involved in the biosynthesis of aromatic amino acids. (7+8=15)
5. How are following conversions brought about?  
a) Met to succinyl-CoA  
b) Trp to Auxin and Serotonin  
c) Arg to  $\alpha$ -ketoglutarate. (3×5=15)
6. a) Give an account of intermediates and enzymes involved in the biosynthesis of inosinic acid from ribose-5-phosphate  
b) Give the steps involved in the degradation of purine. Add a note on gout. (7+8=15)
7. Write notes on any **three** of the following (3×5=15)  
a) Antifolate drugs  
b) PKU  
c) Types of feedback control  
d) Conversion of dUMP to dTMP
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**PGIIS-O 1571B-2K13****M.Sc. IIIrd Semester (Non-CBCS) Degree Examination****Biochemistry****(Clinical Biochemistry and Hormones)****Paper -BC-3.3****(Old)**

Time : 3 Hours

Maximum Marks : 80

***Instructions to Candidates:***Answer Question. No. 1 and any **Four** of the remaining.

1. Answer the following (10x2=20)
- a) What is erythrocyte sedimentation rate? How is it useful?
  - b) What is HbA<sub>1c</sub>? What is its importance in diagnosis?
  - c) What is the cause of steatorrhea? How is it detected?
  - d) What is the metabolic defect of lactose intolerance? How is it treated?
  - e) Name the major blood groups and their importance in blood transfusion
  - f) What is the cause of ketosis?
  - g) What is the significance of choline esterase assay?
  - h) What are the constituents of the globulin fraction of blood?
  - i) What are pheromones? How are they different from Hormones?
  - j) What is the role of ACTH?
2. a) Give the classical pathway of blood coagulation. Name two disorders of this Pathway
- b) What are abnormal hemoglobins? Give an account of thalassemiias.
- c) What is TC/DC? What is its significance? (6+6+3=15)

3. a) Explain the metabolic defects in Type 1 and 2 diabetes.  
b) Explain the diagnostic criteria used in the detection of diabetes and its classification  
c) Give an account of lipoproteinemias (4+5+6=15)
4. a) What is atherosclerosis? What are the risk factors for atherosclerosis?(6+5+4=15)  
b) Explain the physiological roles of HDL and LDL.  
c) What enzymes are used in the diagnosis and prognosis of heart diseases?
5. a) Explain the role of kidney in maintaining acid-base balance. (6+5+4=15)  
b) Distinguish between kidney stones and Gall stones. How are they formed? How are they treated?  
c) What is Gout? Give the causes and remedies.
6. a) Name the hormones of the pituitary and explain their function. (6+6+3=15)  
b) How are thyroid hormones synthesized? What is their metabolic role? Add a note on hypo-and hyper thyroidism.  
c) How does adrenaline regulate the "fight or flight" response?
7. Write notes on any three of the following. (3x5=15)
- a) Hyperacidity.  
b) Kidney clearance tests.  
c) Jaundice.  
d) Gastrointestinal hormones.

**PGIHS -O 1572 B-2K13****M.Sc III Semester(Non-CBCS) Degree Examination****Biochemistry****(Immunology)****Paper -BC-3.4****(Old)**

Time : 3 Hours

Maximum Marks :80

***Instructions to Candidates :***

Answer question No.1 and four of the following.

**Section - A**

1. Answer the following

**(10x2=20)**

- a) How are haptens antigens prepared? Give an example.
- b) Write the importance of Bursa Fabricius in immunity
- c) Name any two immune suppressive agents with their action
- d) What is immunological tolerance?
- e) What are adjuvants? Give two examples
- f) Give the etiology of Grave's disease
- g) Give the difference between type - I & type - II hypersensitivity reactions.
- h) What is graft vs host reaction?
- i) What are colony stimulating factors?
- j) How are antigens processed?

2. a) Explain the mechanism of non-specific immunity  
b) Discuss the preparation and applications of hybridomas (7+8=15)
3. a) Explain the characteristic features and functions of T-cells (8+7=15)  
b) Describe the signal transduction path associated with activation of T-cells
4. a) How is complement involved in the immune response to antigen.  
b) Discuss any two applications of precipitation reactions in which antigen and antibody is involved. (7+8=15)
5. a) Describe the organization of immunoglobulin genes  
b) Describe the structure and functions of major histocompatibility complexes. (7+8=15)
6. a) Give an account of blood group substances.  
d) Describe the types of grafting. Explain different tests performed while performing the grafting. (8+7=15)
7. Write notes on any **three** of the following. (3x5=15)  
a) Cytokines  
b) Antibody diversity.  
c) Immuno blotting  
d) Clonal selection theory.
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