

PGIS-O-1054 B-17
M.Sc. I Semester (CBCS) Degree Examination
BIOCHEMISTRY
(Food and Nutrition)
Paper : SCT 1.1
(Old)

Time : 3 Hours

Maximum Marks : 80

Instruction to Candidates :

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

1. Answer the following.

(10×2=20)

- a) What is meant physiological fuel value? Mention these values for carbohydrates, fats and proteins.
- b) Write the structure and importance of cholesterol in body.
- c) What is meant by specific dynamic action of foods?
- d) Outline nutritional classification of amino acids with examples.
- e) Name the vitamin whose deficiency causes beriberi. Give its structure.
- f) Mention any two biochemical role of Na and K.
- g) What are anti nutrients? Give examples.
- h) What is food fortification? Give example.
- i) What is composition of ORS?
- j) What are common adulterants of milk? How are they identified?

2. a) What is proximate analysis of food? How is it determined?
b) Give an account on different methods employed for determination of energy value of food. (8+7=15)
3. a) What are digestible and indigestible carbohydrates? Discuss their food sources and functions.
b) What are PUFAs? Give their structure, sources and deficiency symptoms. (8+7=15)
4. a) Outline classification of dietary proteins. Add a note on methods to evaluate nutritive value of proteins.
b) Describe PCM and its prevention. (8+7=15)
5. a) Discuss the role of Vitamine A in visual cycle. Add a note on its structure, sources and RDA.
b) Describe the chemistry, biological functions sources, RDA and deficiency symptoms of riboflavin. (8+7=15)
6. a) State importance of trace element with reference to iron.
b) Give sources, functions and deficiency symptoms of calcium and phosphorus. (8+7=15)
7. Write notes on any **Three** of the following. (3×5=15)
- a) Food toxins
 - b) Geriatric nutrition
 - c) Dehydration and Rehydration
 - d) Food additives



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Instructions to the Candidates :

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

1. Answer the following : **(10 × 2 = 20)**
- a) What is dehydration and rehydration?
 - b) What are macro and micro nutrients? Give example.
 - c) What are dietary fibers? Give its importance.
 - d) What are PUFAs? Give their importance.
 - e) What are essential amino acids? Give example.
 - f) What are fermented foods? Give example.
 - g) What are food additives? Give their importance.
 - h) What is GMP? Give its importance.
 - i) What is fortification? Give an example.
 - j) What is SDA
2. a) Discuss the protein sparing action of carbohydrates.
- b) Explain the functions of iodine, zinc and iron in human physiology. **(6+9)**
3. a) Explain the methods employed in the evaluation of protein quality.
- b) Describe the role of lipids in the development of atherosclerosis. **(9+6).**

4. a) What is BMR? Explain the various factors which influence BMR.
b) Enlist the metabolic functions of Folic acid, Vitamin B12 and Vitamin B6. Add a note on their deficiency symptoms. (6+9)
5. a) Discuss the involvement of microorganisms in food spoilage.
b) Explain different methods employed in food preservation. (8+7)
6. a) Give the recommended dietary allowances required for pregnant and lactating women.
b) Discuss different food fortification programmes. (8+7)
7. Write notes on any **three** of the following : (3×5=15)
- a) Kwashiorkor and Marasmus
 - b) Role of diet in cancer
 - c) Proximate analysis of foods
 - d) BIS and AGMARK



PGIS-1051-A B-17
M.Sc. Ist Semester (CBCS) Degree Examination
BIOCHEMISTRY
(Biomolecules)
Paper : HCT 1.1

Time : 3 Hours

Maximum Marks : 80

Instructions to the Candidates :

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

1. Answer the following : (10 × 2 = 20)
- a) What is the relationship between p^H and pK_a ?
 - b) Give the conformational formulas of pyranoses.
 - c) Give the structure of any two homopolymers.
 - d) Write the structures of TAG.
 - e) What are liposomes? How are they formed?
 - f) How does amino acid react with ninhydrin?
 - g) Write the features of peptide bond.
 - h) What is the role of 2, 3 BPG in hemoglobin?
 - i) Give the structure of phosphodiester linkage of 5' ATGC 3'.
 - j) Define denaturation and renaturation of DNA.
2. a) Derive the Henderson-Hasselbalch equation and give its application.
b) Draw the projection formulas for 5 and 6 carbons of aldoses.
c) Write the structural features of any two hetero polysaccharides. (4+5+6=15)
3. a) Give the structure and functions of glycerophospholipids.
b) What are the glycosphingolipids? Give their functions.
c) Give the structure and functions of cholesterol. (5+5+5=15)

4. a) Draw the titration curve for alanine and indicate its p^{Ka} values.
b) Explain the role of Edman reagent, CNBr and proteases in establishing Primary structure of a protein.
c) Explain the structural properties of alpha keratins. (5+5+5=15)
5. a) Discuss the structural features of myoglobin.
b) Describe the allosteric properties of hemoglobin.
c) Explain the secondary structures found in globular proteins. (5+5+5=15)
6. a) Describe the structural features of B-DNA of E.Coli.
b) Explain the sequencing of DNA by dideoxy method.
c) Give the structure and functions of tRNA. (5+5+5=15)
7. Write short notes on **any three** of the following : (3×5=15)
- a) Ramachandran plot
 - b) Prostaglandins
 - c) Abnormal hemoglobins
 - d) Super helix topology



PGIS-O-1053 B-17
M.Sc. I Semester (CBCS) Degree Examination
BIOCHEMISTRY
(Cell Biology and Microbiology)
Paper : HCT - 1.3
(Old)

Time : 3 Hours

Maximum Marks : 80

Instructions to the Candidates :

Answer question no. One and four of the remainings.

1. Answer the following: (10 × 2 = 20)
- a) Give a neat diagram of a retinal rod cell.
 - b) Define active and passive transport.
 - c) What is pasteurization?
 - d) How is endospore staining performed? Name the bacteria that produce endospores.
 - e) Mention the different types of membrane proteins.
 - f) Differentiate between bacteriostatic and bactericidal agents.
 - g) Name any two neuro transmitters with their action.
 - h) Write the chemical composition of a bacterial cell wall.
 - i) What are viroids? How do they differ from viruses.
 - j) What is endocytosis?
2. a) Write the factors that influence the membrane fluidity.
- b) Describe the operation of Na⁺/K⁺ ATPase. (8+7=15)
3. a) Discuss the importance of soil flora in maintaining soil fertility. (8+7=15)
- b) Explain the mechanism of bacterial motility.

4. a) What are bacterial toxins? Explain their mechanism of action.
b) What is sterilization? Describe different methods of sterilization.
c) Discuss identification of bacteria by ERIC-REP. (5+5+5=15)
5. a) Describe the structure and function of microtubules and intermediate filaments.
b) Describe the regulation of visual cycle by light. (8+7=15)
6. a) Discuss biochemical basis of gram staining.
b) Discuss the factors that influence the bacterial growth. (8+7=15)
7. Write short note on any **three** of the following. (3×5=15)
- a) Regulation of muscle contraction.
b) Ligand gated ion channel.
c) Chemostat
d) Viral replication.



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BIOCHEMISTRY
(Cell Biology and Microbiology)
Paper : HCT 1.3
(New)

Time : 3 Hours

Maximum Marks : 80

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

1. Answer the following : (10 × 2 = 20)
- a) Give the functions of Golgi complex.
 - b) What are histones? Mention different types.
 - c) What is plasmodesmata? Give its function.
 - d) How do substances actively diffuse across membranes?
 - e) What are neurotransmitters? Give an example.
 - f) Define generation time. Give generation times for any two microorganisms.
 - g) Distinguish between eubacteria and archaeobacteria.
 - h) Define BOD. Mention its importance.
 - i) What is MIC? How do you determine it?
 - j) Give the structure of Flagella.
2. a) Give an account on the regulation of cell cycle.
b) Explain the salient features of Singer and Nicolson model of cell membrane. (8+7=15)
3. a) Discuss the structure and function of Na⁺K⁺ATPase
b) Explain the biochemistry of vision. (8+7=15)

4. a) Discuss the structure and functions of microtubules.
b) Describe the mechanism of muscle contraction.
c) Write a note on different methods for the isolation of pure cultures of bacteria. (5+5+5=15)
5. a) Give an account on physical and chemical methods of sterilization.
b) Write a note on bacterial staining techniques. (8+7=15)
6. a) Discuss the factors affecting the bacterial growth.
b) By taking a suitable example, explain the principle behind bio control of crop pests.
c) Give an account on the epidemiology of hospital associated bacterial and viral diseases. (5+5+5=15)
7. Write short notes on any **THREE** of the following : (3×5=15)
- a) Sub-cellular fractionation
 - b) Chemostat
 - c) Bacterial endotoxins
 - d) Bacterial photosynthesis



PGIS-O-1052 B-17
M.Sc. I Semester (CBCS) Degree Examination
BIOMOLECULES
(Analytical Biochemistry)
Paper : HCT - 1.2
(Old)

Time : 3 Hours

Maximum Marks : 80

Instructions to the Candidates :

Answer question no. One and any four of the remainings.

1. Answer the following: (10 × 2 = 20)
- a) What is half life of a radioactive element?
 - b) What is RCF, How it is related to *g*?
 - c) What is affinity chromatography?
 - d) What are ion exchangers? Give examples.
 - e) What is the principle of IEF?
 - f) Name the initiator and catalyst of crosslinking reactions of acrylamide/bis acrylamide
 - g) What is liquid scintillation? Name the fluid used in scintillation.
 - h) Write the working principle of confocal microscopy.
 - i) How IR Spectroscopy is different from Vis spectrophotometer? Give applications of IR spectrometry.
 - j) Write the principle of ionization of chemicals in MALDI.
2. a) What is the principle of centrifugation? Describe the working and applications of density gradient centrifugation.
- b) What is autoradiography? Describe the detailed working process of autoradiography and give its applications. (7+8=15)

3. a) Describe the method of labeling of S^{35} in Methionine.
b) Describe the process and of separation of proteins by ion-exchange chromatography?
c) Write the principle and application of Dialysis? (6+6+3=15)
4. a) What is the principle of PAGE? Explain the working and application of PAGE.
b) What is the working principle of SEM? Outline the construction and applications of SEM.
c) Write the principle and applications of paper chromatography. (6+6+3=15)
5. a) Explain the method of isotope dilution technique and discuss its applications.
b) Discuss the principle and application of Automatic Absorption Spectroscopy. (7+8=15)
6. a) Describe the methods of preparation of Density gradient solutions.
b) Describe the process of separation of sub-cellular components by differential centrifugation.
c) What is Beer-Lambert law? Explain the working and applications of uv/vis spectrophotometer. (6+6+3=15)
7. Answer any **three** of the following. (3×5=15)
- a) Ultrafiltration
b) HPLC
c) GLC detectors
d) Biological applications of NMR.



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BIOCHEMISTRY
(Analytical Biochemistry)
Paper : HCT 1.2

Time : 3 Hours

Maximum Marks : 80

Instructions to the Candidates :

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

1. Answer the following :

(10 × 2 = 20)

- a) Distinguish between TEM and SEM.
- b) What is Svedberg coefficient?
- c) Give the principle of affinity chromatography.
- d) What is equilibrium dialysis?
- e) What are ion exchangers? Give any two examples of ion exchangers.
- f) What is pulse field electrophoresis?
- g) Write the principle of IR spectroscopy.
- h) Define the terms "Half-life" and "specific activity" of a radioactive sample.
- i) What is isoelectric focusing?
- j) Mention the biochemical application of NMR.

2. a) Give the principle and applications of fluorescence microscopy.

b) Describe the sub-cellular fraction by differential centrifugation.

(7+8=15)

3. a) Discuss the principle and applications of density centrifugation.

b) What is gel filtration chromatography? How is it helpful in determination of molecular weight of an unknown protein.

(7+8=15)

4. a) Describe the principle and applications of GLC.
b) Discuss the principle and applications of SDS-PAGE.
c) Give an account of ultrafiltration. (5+6+4=15)
5. a) Describe the detection and measurement of radioactivity by GM counter.
b) Discuss the applications of radioactive tracers in biological sciences.
c) Give an account of capillary electrophoresis. (6+5+4=15)
6. a) Describe the principle, construction and application of UV-Vis spectrophotometer.
b) Discuss the principle and applications of ORD and CD. (7+8=15)
7. Write notes on any three of the following : (3×5=15)
- a) Types of rotors used in centrifuges
 - b) HPLC
 - c) Agarose gel electrophoresis
 - d) Mass spectrometry

