

First Semester B.Sc. Degree Examination, August 2021

First Degree Programme Under CBCSS

Biochemistry for Botany and Zoology

BC 1131 : BIOPHYSICAL CHEMISTRY

(2020 Admission Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions short answer type. **Each** question carries **1** marks.

1. ✓ What is ionic product of water?
2. ✓ Name the radioactive isotope of hydrogen.
3. ✓ What is an isotonic solution?
4. ✓ Define osmotic pressure.
5. ✓ Name an emulsifying agent.
6. ✓ Name an adsorbent used in TLC.
7. ✓ State Beer-Lambert law.
8. ✓ Which type of macromolecules have peptide bonds?
9. ✓ Define R_f value.
10. ✓ Give two examples for non-covalent bonds.

(10 × 1 = 10 Marks)

P.T.O.

SECTION – B

Answer **any eight** questions – not exceeding one paragraph. **Each** question carries 2 marks.

11. Write the equation for the ionization of H_2CO_3 and identify the conjugate acid and base pairs.
- ✓ 12. What is half life? What is the half life of ^{14}C ?
- ✓ 13. Why is phosphoric acid called triprotic?
14. Spell out any four unique properties of water.
- ✓ 15. Differentiate between diffusion and osmosis.
- ✓ 16. Make a brief note on reverse osmosis.
- ✓ 17. Distinguish between lyophilic and lyophobic colloids.
18. Explain the mechanism of action of buffers.
- ✓ 19. What are emulsions? Give two examples.
- ✓ 20. What is Svedberg? What is the value of one Svedberg?
21. What is meant by monochromatic light? How is it produced?
22. What is the principle of affinity chromatography?
23. What are the components of a pH meter?
24. What is electroendosmosis?
25. How is polyacrylamide gel prepared?
- ✓ 26. Distinguish between peptide bond and glycosidic bond.

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions – short essay; **each** question carries **4** marks.

27. Explain the unique properties of water.
28. Write briefly on Henderson – Hasselbalch equation.
29. Explain the fundamental principles of diffusion.
30. Discuss Vant-Hoff's law of osmotic pressure and its application.
31. Explain emulsions and emulsifying agents with examples.
32. With the help of a neat diagram describe the parts of a single beam spectrophotometer.
33. Discuss the principle and applications of density gradient centrifugation.
34. Explain the principle and applications of TLC.
35. Explain native PAGE and its applications.
36. What are non covalent bonds? Discuss the different types non-covalent bonds.
37. Comment on common functional groups in biomolecules and add a note on their significance.
38. Explain the principle of isoelectric focussing.

(6 × 4 = 24 Marks)

SECTION – D

(Answer **any two** questions – long essay type. **Each** question carries **15** marks)

39. Explain buffers, buffer action, buffer capacity and biological buffer systems.
40. Write the principle, procedure and applications of gelfiltration.
41. Discuss the biological significance of osmosis, surface tension and viscosity.
42. Describe the biological applications of radioisotopes.
43. Describe the principle and working of a pH meter.
44. Explain the principle, procedure and applications of SDS PAGE.

(2 × 15 = 30 Marks)

Reg. No. : 25019132043

Name : Lekshmi Pramod

First Semester B.Sc. Degree Examination, November 2019

First Degree Programme under CBCSS

(For Botany and Zoology)

Complementary Course I

BC 1131 : BIOPHYSICAL CHEMISTRY

(2014 Admission onwards)

Time : 3 Hours

Max. Marks : 80

SECTION - I

Very Short answer type. Maximum two sentences.

(Answer all questions)

1. Define P_{ka} value.
2. What is meant by hypertonic solution?
3. Define buffer with example.
4. What is Geometric isomerism?
5. State Van't Hoff's law.
6. What are the principle of Chromatography?
7. What is normality?

P.T.O.

- ✓ 8. What is Tyndall effect?
- ✓ 9. Define half life of a radio active compound.
- ✓ 10. How are peptide bonds formed?

(10 × 1 = 10 Marks)

SECTION - II

(Short answer questions not to exceed one paragraph)

(Answer any **eight** questions)

- ✓ 11. Define diffusion and osmosis.
- ✓ 12. Distinguish between true and colloidal solution.
13. What is osmosis and reverse osmosis?
- ✓ 14. Illustrate the significance of glycosidic bond.
- ✓ 15. Define : Viscosity and give the example.
- ✓ 16. How are disulphide bond formed?
- ✓ 17. What are optical isomers?
- ✓ 18. What is Iso electric focussing?
- ✓ 19. What is the significance of colorimeter?
20. Write the principle of HPLC.
21. List out the applications of density gradient centrifugation.
- ✓ 22. What is the significance of radio isotopes?

(8 × 2 = 16 Marks)

SECTION - III

(Short essay not to exceed 120 words)

(Answer any six questions)

- ✓ 23. List out the properties and functions of colloids.
24. What is the significance of phospho diester linkage? Explain with examples.
- ✓ 25. Write the types of emulsion.
- ✓ 26. Derive the Henderson Hassel balch equation.
- ✓ 27. Give an account of classification of isomers.
- ★ 28. State Beer-Lambert's law and its applications.
- ✓ 29. Define an acid and a base according to Arrhenius concept.
30. Write the principle and applications of TLC.
- ✓ 31. Differentiate between colloids and crystalloids.

(6 × 4 = 24 Marks)

SECTION - IV

(Long Essay)

(Answer any two questions)

- ✓ 32. Explain Donnan membrane equilibrium and its biological significance.
33. Discuss SDS - PAGE as a suitable technique for the separation of proteins.
- ✓ 34. Explain the parts of a spectrophotometer with a help of neat diagram.
35. Give an account of the biological applications or radio active isotopes.

(2 × 15 = 30 Marks)



Reg. No. : 25017132002

Name : Ahalya U.V.

First Semester B.Sc. Degree Examination, February 2018
First Degree Programme under CBCSS
(For Botany and Zoology)
COMPLEMENTARY COURSE – I
BC 1131 : BIOPHYSICAL CHEMISTRY
(2014 Adn. Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – I

(Very short answer type – maximum two sentences)

Answer all questions :

(10x1=10 Marks)

- 1. pH of a solution is 6. Find out the pOH of the solution.
2. Write down Henderson – Hasselbalch equation.
3. Define osmosis.
4. What is an isotonic solution ?
5. What is Tyndall effect ?
6. What are emulsifying agents ? Give one example.
7. Define :
a) Transmittance
b) Absorbance.
8. What is Svedberg constant ?
9. Define electrophoresis.
10. Name two radioactive isotopes used in biochemical research.

SECTION – II

(Short answer questions – not to exceed one paragraph)

Answer any eight questions :

(8x2=16 Marks)

- 11. What is a weak electrolyte ? Give one example.
12. What is a buffer ? What is its significance ?
13. Calculate the normality of a Na2CO3 solution obtained by dissolving 0.53 g anhydrous Na2CO3 in 100 ml water.

0.1N



14. State Van't Hoff's law for dilute solutions and mention its application.
15. Distinguish between a true solution and a colloidal solution.
16. Make a note on emulsions.
17. What is Beer Lambert law ?
18. What is a monochromator ? Name two monochromators.
19. Distinguish between a peptide bond and a glycosidic bond.
20. What are the applications of affinity chromatography ?
21. Name the functional groups in glyceraldehyde.
22. Make a note on alpha rays.

SECTION – III

(Short essay – **not** to exceed 120 words)

Answer **any six** questions :

(6×4=24 Marks)

23. Properties of colloids.
24. Effect of ionisation and molecular size on osmotic pressure.
25. Any four parameters used to express concentration of a solution.
26. Radio immune assay.
27. SDS-PAGE.
28. Colorimetry.
29. Principle and application of density gradient centrifugation.
30. Technique of isoelectric focussing.
31. Non-covalent interactions in biological systems.

SECTION – IV

(Long essay)

Answer **any two** questions :

(2×15=30 Marks)

32. Discuss the principle, procedure and applications of TLC.
33. Explain the biological applications of radioactive isotopes.
34. Give an account of common functional groups and their significance in biomolecules.
35. Explain the principle, procedure and applications of affinity chromatography.



Reg. No. :

Name :

First Semester B.Sc. Degree Examination, November 2018
First Degree Programme under CBCSS
BIOCHEMISTRY (For Botany and Zoology)
Complementary Course – I : BC 1131
Biophysical Chemistry
(2014 Adm. Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – I

Very short answer type – maximum **two** sentences.

(Answer **all** questions) :

(10×1=10 Marks)

1. What is meant by isotonic solution ?
2. Define Rf value.
3. What is the principle of gel filtration ?
4. How will you prepare percentage solution ?
5. State Vant Hoff's law.
6. What is molar extension co-efficient ?
7. How are covalent bonds formed ?
8. What are optical isomers ?
9. Define diffusion.
10. What is meant by buffer capacity ?

SECTION – II

Short answer questions - **not** to exceed **one** paragraph.

(Answer **any eight** questions) :

(8×2=16 Marks)

11. Differentiate between strong and weak electrolyte.
12. What is meant by hyper and hypotonic solution ?
13. Define half life of a radio active element.
14. List out any two applications of radio active element.

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15. What is Tyndall effect ?
16. Define molarity and molality.
17. What is Keto-enol tautomerism ?
18. Write the principle of PAGE.
19. What is sved berg unit ?
20. Write the applications of ultra centrifuge.
21. Define surface tension.
22. What is the principle of ion exchange chromatography ?

SECTION – III

Short essay - **not** to exceed **120** words;

(Answer **any six** questions) :

(6×4=24 Marks)

23. What is the significance of peptide linkage ?
24. Explain briefly biological buffer system.
25. What are emulsions and emulsifying agents ?
26. Differentiate between lyophobic and lyophilic colloid.
27. What is osmosis and reverse osmosis ?
28. Explain the technique of isoelectric focussing.
29. Describe the instrumentation of colorimeter.
30. Define an acid and a base according to Lewis concept.
31. Explain two dimensional gel electrophoresis.

SECTION – IV

Long essay (Answer **any two** questions) :

(15×2=30 Marks)

32. Give an account of the biological applications of radio active isotopes.
 33. Discuss high performance liquid chromatography as a technique for the separation of macro molecules.
 34. Explain the classification of isomerism with examples.
 35. Define colloids and discuss the types and properties of colloids.
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B - 3089

Reg. No. : 245 16 132 003

Name : Akshaya K.

First Semester B.Sc. Degree Examination, December 2016
First Degree Programme under CBCSS
BIOCHEMISTRY (For BOTANY & ZOOLOGY)
Complementary Course - I : BC 1131
Biophysical Chemistry
(2014 Adm. Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION - I

Very short answer type maximum **two** sentences (answer **all** questions).

(10×1=10 Marks)

1. Define isoelectric pH of a solution. Mention its significance.
2. What are the main factors affecting the osmotic pressure ?
3. Define Tyndall effect.
4. Distinguish between an ionic bond and a covalent bond.
5. Define the terms
 - a) Normality
 - b) Molarity.
6. Write the basic principle of thin layer chromatography.
7. How a buffer system is formed ?
8. Define optical isomerism.
9. Distinguish between colorimetry and spectrophotometry.
10. Define half life period of a radio active substance. How the radioactivity is expressed ?

SECTION - II

(Short answer questions **not** to exceed **one** paragraph. Answer **any eight** questions).

(8×2=16 Marks)

11. Water is an excellent solvent. why ?
12. Distinguish between a glycosidic bond and a phosphodiester bond.
13. What are the Vant Hoff's laws of osmotic pressure ?

B - 3089

14. Write any two characteristic reactions of the NH_2 group.
15. Write the Henderson Hasselbalch equation. Mention the significance.
16. How emulsions are formed? What is the action of an emulsifying agent?
17. What is isoelectric focusing? Mention its significance.
18. What are the application of gas liquid chromatography?
19. Write short note on bicarbonate buffer system of plasma.
20. What are the hazards of radioactivity?
21. If the pH of blood is 7.1 and the HCO_3^- concentration is 8 mm, what is concentration of CO_2 in blood (pK' for $\text{HCO}_3^- / \text{CO}_2 = 6.1$)?
22. At 75°C , the K_W of water is 16.9×10^{-14} . Find the pH.

SECTION - III

Short essay **not** to exceed **120** words. (Answer **any six** questions). (6×4=24 Marks)

23. What are the types of radioactive decay?
24. What are the components of a photometer?
25. Write the significance of OH, SH, CHO and COOH groups in biomolecules.
26. Write an account on Donnan membrane equilibrium.
27. Write a note on viscosity and its measurement.
28. Summarize the principle and application of Gel filtration chromatography.
29. Write an account on hydrophobic interactions.
30. What are the properties of a colloidal systems?
31. Describe the components of the HPLC system.

SECTION - IV (Long Essay)

Answer **any two** questions.

(15×2=30 Marks)

32. Discuss the principle, procedure and applications of ion exchange chromatography.
33. Write an essay on polyacrylamide gel electrophoresis.
34. Summarize the biological applications of radioactive isotopes.
35. Give an account of classification of isomerism with examples.



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9868

Reg. No. :

Name :

Paper lesson from

critical cases
Mcgregor

CVC: 13/04/16

First Semester B.Sc. Degree Examination, January 2016
First Degree Programme under CBCSS
Complementary Course for Botany and Zoology
BC1131 : BIOPHYSICAL CHEMISTRY
(2014 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION - I

Very short answer type – Maximum **two** sentences. Answer **all** questions.

(10×1=10 Marks)

1. Broasted's theory of acids.
2. If pH of a solution is 5, what will be the value of pOH ?
3. Which is the emulsifying agent in milk ?
4. What you mean by physiological saline ?
5. How covalent bond is formed ?
6. Write example for optical isomerism.
7. Name the thin layer materials used in TLC.
8. Write the principle of isoelectric focussing.
9. Use of light filters in calorimeter.
10. Use of P³² in biology.

0.9% NaCl

Silica gel, Al₂O₃, cellulose

M

P.T.O.

SECTION – II

Short answer questions – **not** to exceed **one** paragraph. Answer **any eight** questions. (8×2=16 Marks)

11. What are buffers, give examples.
12. The importance of pKa value of weak acids.
13. Differentiate lyophilic and lyophobic colloids.
14. How will you prepare IM solution of a solute ?
15. Common functions of CHO and CO groups.
16. Describe peptide bond.
17. What are anomers ?
18. What type of ion exchangers are used for Amino acid separation ?
19. Name different types of rotors used in centrifugation.
20. Write the application of density gradient centrifugation.
21. Differentiate calorimeter and spectrophotometer.
22. Describe Beer'- Lambert's law.

SECTION – III

Short essay – **not** more than **120** words. Answer **any six** questions. (6×4=24 Marks)

23. Explain buffer capacity.
24. Calculate the pH of a buffer containing 1 molar sodium acetate and 1 M. acetic acid.
25. Explain the mechanism of osmotic pressure.
26. Differentiate simple diffusion and osmosis with example.
27. Detailed note on hydrogen bond.



28. Short note on disulphide linkage and its importance.
29. Note on isoelectric focusing.
30. Note on ultra centrifugation.
31. Write note on biological applications of isotopes.

SECTION – IV
Long Essay

Answer **any two** questions.

(2×15=30 Marks)

32. Derive Henderson-Hasselbalch equation and the conditions at which a buffer shows maximum buffering capacity.
 33. Explain different electrophoretic techniques.
 34. Donnan membrane equilibrium equation and membrane hydrolysis.
 35. Essay on isomerism, classification with examples.
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