

Roll No.

92072

**B. Sc. (Bio-Technology) 3rd Sem.
(New Scheme)
Examination – December, 2022**

MEDICAL MICROBIOLOGY

Paper : BT-301

Time : Three Hours]

[Maximum Marks : 40

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. 1 is *compulsory* and attempts *four* more questions by selecting *one* question from each unit given below. All questions carry equal marks.

1. Write the short notes on the following : $1 \times 8 = 8$

- (a) Pathogen
- (b) Toxin
- (c) Chemotherapy

- (d) Mycoplasma
- (e) COVID-19
- (f) Difference between bacteria & viruses
- (g) Amoebiasis
- (h) Black fungus

UNIT – I

2. Describe the importance of our normal microflora in detail. 8
3. Write the short notes on any *two* : $4 \times 2 = 8$
- (a) M. tuberculosis
 - (b) Bio-safety levels
 - (c) Nosocomial infection

UNIT – II

4. Describe the morphology, symptoms, diagnosis and treatment for the causative agent for Syphilis in detail. 8
5. Write the short notes on any *two* : $4 \times 2 = 8$
- (a) Prevention & treatment of Typhoid
 - (b) Tetanus
 - (c) Chlamydia

UNIT – III

6. Describe the causes, symptoms, diagnosis and prevention of Rabies viruses. 8

7. Write the short notes on any *two* : $4 \times 2 = 8$

- (a) HIV/AIDS
- (b) Reoviruses
- (c) Smallpox virus

UNIT – IV

8. Describe the vector, symptoms, diagnosis and treatment for the causative agent for Malaria in detail. 8

9. Write the short notes on any *two* : $4 \times 2 = 8$

- (a) Systemic infection (fungi)
- (b) Economical importance of protozoa
- (c) Opportunistic fungal infections

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**B. Sc. (Bio-Technology 3rd Sem.)
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BIO ANALYTICAL TOOLS

Paper : BT-302

Time : Three Hours]

[Maximum Marks : 40

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. 1 is *compulsory* and attempts any *four* questions selecting one question from each unit given below. All questions carry equal marks.

1. Write the short notes on the following : $1 \times 8 = 8$
- (a) pH Meter
 - (b) Florescent dye
 - (c) Photon
 - (d) Harmful effects of UV light

- (e) Illusion buffer
- (f) Injector system
- (g) Nano-gel
- (h) Biosensor

UNIT – I

2. What is electron microscopy ? Describe its principle and various applications. 8
3. Write the short notes on any *two* : 4 × 2
- (a) Light Microscope
 - (b) Absorption spectroscopy
 - (c) Phase Contrast Microscopy

UNIT – II

4. How the isolation of the sub-cellular organelles and particles ? 8
5. Write the short notes on any *two* : 4 × 2
- (a) Application of Colorimeter
 - (b) UV-visible Spectroscopy
 - (c) Principle of Fluorimetry

UNIT – III

6. What is ion exchange chromatography ? Describe its principle and applications. 8

7. Write the short notes on any *two* : 4 × 2

(a) Column chromatography

(b) HPLC

(c) Paper chromatography

UNIT – IV

8. What is the Nanotechnology ? Describe its various applications. 8

9. Write the short notes on any *two* : 4 × 2

(a) SDS-PAGE

(b) Immune Electrophoresis

(c) Isoelectric focusing

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**B. Sc. Bio-Technology
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PLANT PHYSIOLOGY

Paper : BT-303

Time : Three hours]

[Maximum Marks : 40

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt five questions in all, selecting one question from each Unit. Question No. 1 is compulsory.

Compulsory questions

1. Answer the following : 1 × 10 = 10
- (a) What is the role of apical meristems in root ?
 - (b) Define permanent tissues.
 - (c) Define Guttation.
 - (d) Define Kranz anatomy.
 - (e) Who discovered photo-periodism phenomenon ?
 - (f) Full form of IAA and 2,4-D.
 - (g) What is osmotic pressure ?

- (h) What are the different types of transpiration ?
- (i) What are the *two* main parts of chloroplast ?
- (j) What is a quantasome ?

UNIT – I

- 2. What are meristems ? What are their chief characters ? Describe different types of meristems on the basis of their position in the plant. 7.5
- 3. What are permanent tissues ? What are the different types of permanent tissue and also write down their function ? 7.5

UNIT – II

- 4. What is the importance of water to plant life ? Write down the properties of water. 7.5
- 5. Discuss the metabolic role and deficiency symptoms of following elements in plants : Phosphorus, Sulphur, Calcium and Potassium. 7.5

UNIT – III

- 6. What is photophosphorylation ? Explain in detail about non-cyclic photophosphorylation. 7.5

7. Define nitrogen assimilation. Describe various sources of nitrogen to plants. 7.5

UNIT – IV

8. Name few natural and synthetic auxin. Where are they synthesized in the plants and write down their physiological role. 7.5
9. Write note on : 7.5
- (a) Growth hormones
 - (b) Vernalization
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**B. Sc. (Bio-Technology) 3rd Sem.
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PLANT DIVERSITY - II

Paper : BT-304

Time : Three Hours]

[Maximum Marks : 40

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt five questions in all. Question No. 1 is compulsory. Attempt four other questions i.e. one from each Unit.

1. Write short notes on :

2 × 5 = 10

- (a) Strobilus
- (b) Archegonia
- (c) Mesozoic era
- (d) Microsporophy II
- (e) Nucellus of Pinus

UNIT – I

2. Give a detailed account on the Engler's system of classification of pteridophytes. Explain how this system of classification is different from other system of classification of pteridophytes ? 7½
3. Write a short note on :
- (i) Affinities of pteridophyta with bryophyta and gymnosperms. 4½
- (ii) Economic importance of pteridophytes. 3

UNIT – II

4. Describe the life history of *Equisetum* with the help of labelled diagrams. 7½
5. Give a detailed description of life history of *Lycopodium* with the help of labelled diagrams. 7½

UNIT – III

6. What do you know about Geological time scale of years ? Describe different geological era in details. 7½
7. Write a short note on the following :
- (a) *Williamsonia* 4
- (b) *Glossopteris* 3½

UNIT – IV

8. Describe life cycle of *Cycas* with the help of labelled diagram. 7½

9. Write a short note on :

(i) Megasporophyll of *Cycas* 4

● (ii) Embryogeny in *Pinus* 3½

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PHYSICAL CHEMISTRY

Paper : BT-305

Time : Three Hours]

[Maximum Marks : 40

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt five questions in all, selecting one question from each Section. Question No. 1 is compulsory.

- 1 (a) Define Thermodynamics.
- (b) Give an example of Path Function.
- (c) Define Bond Energy.
- (d) Define Reversible Process.
- (e) Why Equilibrium is dynamic in nature ?

- (f) What is the unit of Equilibrium constant ?
- (g) Define Degree of dissociation.
- (h) Write the formula of Equilibrium constant when solute undergo association. $1 \times 8 = 8$

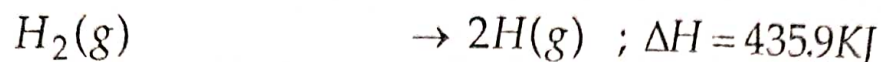
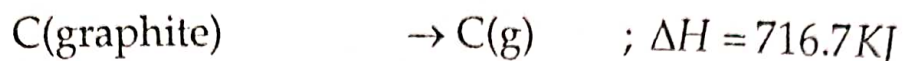
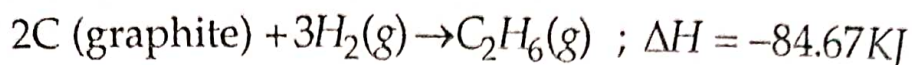
SECTION – I

2. (a) Explain and Derive First law of thermodynamics. 4
- (b) Explain in detail about the Joule's Law. 3
3. (a) Explain in detail about the Heat capacity, their types and relation between them. 3
- (b) Calculate the amount of work done when one mole of an ideal gas contained in a bulb of 10 litre capacity at 1 atmosphere is allowed to enter into an evacuated bulb of 100 litre capacity. 3
- (c) Define Zeroth law of thermodynamics with an example. 2

SECTION – II

4. (a) Explain in detail about the Kirchoff's Equation. 4
- (b) Derive an expression for Work done and Internal energy change for the expansion of ideal gases under isothermal reversible process. 4
5. (a) Derive an expression for Work done and Internal energy change for the expansion of ideal gases under adiabatic reversible process. 4

- (b) Calculate the C-C bond energy from following data : 4



Also C - H bond energy is 416 KJ.

SECTION - III

6. (a) Derive thermodynamic derivation for law of chemical equilibrium. 4
(b) Derive an expression for Van't Hoff reaction isotherm. 4

7. (a) To prove that : $\log \frac{(K_p)_2}{(K_p)_1} = \frac{\Delta H^\circ}{2.303R} \left[\frac{T_2 - T_1}{T_1 T_2} \right]$. 4

(b) To prove that $\frac{d \ln K_c}{dT} = \frac{\Delta E^\circ}{RT^2}$. 4

SECTION - IV

8. (a) State Nernst Distribution law. What are the conditions for their validity? 3
(b) Prove that Multi-step extraction is more economical than single step extraction. 3
(c) Derive Distribution law when solute undergo combination with one of the solute. 2

9. (a) Derive thermodynamic derivation of Nernst Distribution law. 4
- (b) Explain the conditions and application of distribution law. 4
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**B. Sc. Bio-Technology 3rd Semester
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ORGANIC CHEMISTRY

Paper : BT-306

Time : Three Hours]

[Maximum Marks : 40

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt five questions in all, selecting one question from each Section. Question No. 1 is compulsory.

1. (a) Name the reaction which occurs between Ethylene glycol and HIO_4 . $1 \times 8 = 8$
- (b) What is the general formula of Grignard Reagent ?
- (c) Write a reaction between Phenol and benzoyl chloride in presence of Pyridine.

- (d) Define Molar Absorptivity.
- (e) Name the product formed during heating of Phenol with Zinc dust.
- (f) What is the value of increment for an alkyl group in conjugated dienic system ?
- (g) What is the composition of Vinegar ?
- (h) What is the effect of $NaOH / CaO$ on Ethanoic acid ?

SECTION – I

- 2. (a) Explain the mechanism of Acid catalysed Ring opening reaction of Epoxides. 4
- (b) Explain the effect of : 2
 - (i) HIO_4 on Ethylene glycol
 - (ii) $Pb(CH_3COO)_4$ on Ethylene glycol.
- (c) Explain the reaction of Ethylene epoxide with : 2
 - (i) $RMgX$ followed by hydrolysis
 - (ii) RLi followed by hydrolysis.

- 3. (a) Give any *four* methods for the preparation of Ethanol. 4
- (b) Explain the mechanism of Pinacol-pinacolone rearrangement. 4

SECTION – II

4. (a) Explain the mechanism of : 6
(i) Fries rearrangement
(ii) Kolbe's reaction
- (b) Explain the acidic nature of Phenol. 2
5. (a) Explain the Halogenation reaction and Nitration reaction of Phenol. 4
- (b) Explain in detail about the coupling reaction of phenol. 4

SECTION – III

6. (a) Define U. V. –Visible spectra. Explain the different parts of U. V. – Visible spectra. 4
- (b) Define Electronic transition. Explain the different types of Electronic transition. 4
7. (a) Define Red shift and Blue shift with an example. 2
- (b) Explain Woodward-Fieser rules for Simple conjugated dienes with suitable examples. 6

SECTION – IV

8. (a) How can you prepare benzoic acid from ? 5
- (i) Salicylic acid
 - (ii) Benzonitrile
 - (iii) Acetophenone
 - (iv) Toluene
 - (v) Benzaldehyde
- (b) Explain the mechanism of hydrolysis of esters in acidic medium. 3
9. (a) Give any *two* methods for the preparation of : 4
- (i) Benzoyl Chloride
 - (ii) Benzamide
- (b) Explain the following : 4
- (i) Hell-Volhard-Zellinsky reaction
 - (ii) Mechanism of Decarboxylation of Ethanoic Acid.
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**B. Sc. (Bio-Technology) 3rd Semester
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Examination – December, 2022**

INORGANIC CHEMISTRY

Paper : BT-307

Time : Three Hours]

[Maximum Marks : 40

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt five questions in all, selecting one question from each Section. Question No. 1 is compulsory. All questions carry equal marks.

1. Explain the following :

(a) Write the electronic configuration of chromium. 1

(b) Explain the structure of $VOCl_2$. 1

- (c) What is anti-ferromagnetism ? 1
- (d) Give *one* example of catalytic properties of transition elements. 1
- (e) What is an effective atomic number ? 1
- (f) What is chelate effect ? 1
- (g) Write *two* advantages of liquid SO_2 over other solvents. 1
- (h) Differentiate between ionizing and non-ionizing solvents. 1

SECTION – A

2. (a) What are transition elements ? Describe the variation of oxidation state in transition elements. 4
- (b) Why transition metals form a large number of complexes ? 2
- (c) Why transition metals are less reactive than alkali metals ? 2
3. (a) Calculate the number of unpaired electrons in Mn^{2+} and Fe^{2+} . 2

- (b) Why Cu^{2+} is more stable than Cu^+ ? 2
- (c) Describe the structure and important properties of TiO_2 . 4

SECTION – B

4. (a) Describe the variation of ionic radii and oxidation state in 3d, 4d and 5d elements. 4
- (b) Compare the magnetic properties of 3d, 4d and 5d elements. 4
5. (a) Describe the general characteristics of second and third transition series. 4
- (b) Compare the stereochemistry and spectral properties in 3d elements with 4d and 5d elements. 4

SECTION – C

6. Describe with examples : 2, 2, 2, 2
- (i) Chelates
- (ii) High spin complexes

(iii) Hydrate isomerism

(iv) Linkage isomerism

7. (a) Explain Werner's coordination theory. 4
- (b) Describe the structure and magnetic properties of $[CoF_6]^{3-}$ on the basis of valence bond theory. 4

SECTION – D

8. Differentiate with examples : 4, 4
- (i) Solvation and solvolytic reactions
- (ii) Acidic and basic solvents
9. Describe the acid-base reactions in : 4, 4
- (i) Liquid ammonia
- (ii) Liquid SO_2
-