*Roll No.* : .....

Total No. of Questions : **9** ] [ Total No. of Pages : **3**

# 92072

**B.Sc. 3rd Semester Examination, February-2022**

*(New Scheme)*

**BIO-TECHNOLOGY**

Paper-BT-301

**(Medical Microbiology)**

*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. Q. No. **1** is compulsory. All questions carry equal marks.

1. Write short notes on the following :

   (a) Tuberculosis

   (b) Antibiotics

   (c) Two causative agents of pneumonia

(d) Clinical symptoms of Typhoid

(e) COVID-19

(f) Dengue

(g) Two vector-borne infection

(h) Mycology 1×8=8

## Unit–I

2. Describe the importance of our normal microflora in detail. 8

3. Write short notes on any *two* of the following:

(a) Food poisoning

(b) Virulence factors

(c) Nosocomial infection 4×2=8

## Unit–II

4. Describe the morphology, symptoms, diagnosis and treatment for causative agent for Syphilis and Gonorrhea in detail. 8

5. Write short notes on any *two* of the following:

(a) *Mycoplasma*

(b) *Rickettsiaceae*

(c) *Chlamydia* 4×2=8

## Unit–III

6. Describe the cause, symptoms, diagnosis and prevention of HIV/AIDS. 8

7. Write short notes on any *two* of the following :

   (a) Polio virus

   (b) Viral hepatitis

   (c) Herpes virus $4\times2=8$

## Unit–IV

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

9. Write short notes on any *two* of the following :

   (a) *Giardiasis*

   (b) Economical importance of Fungi

   (c) Opportunistic fungal infections $4\times2=8$

Roll No. : .....

Total No. of Questions : 9 ] [ Total No. of Pages : 3

# 92074

## B.Sc. 3rd Semester Examination, February-2022

*(New Scheme)*

## BIO-TECHNOLOGY

Paper-BT-303

**(Plant Physiology)**

*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. Q. No. 1 is compulsory. All questions carry equal marks.

1. (i) Differentiate between Heart wood and Sap wood.

   (ii) What is Plasmolysis ? What is its significance ?

(iii) What is Photorespiration ?

(iv) Write a short note on vernalisation. 2×4=8

## Unit–I

2. (i) Give an account of components of xylem in vascular plants giving their function.

(ii) Describe the primary structure of a typical dicot stem. 4,4

3. (i) Differentiate between Anatomy of dorsiventral and isobilateral leaf with the help of diagrammes.

(ii) What are annual rings ? 6,2

## Unit–II

4. (i) What is Diffusion ? What is the significance of diffusion in plants ?

(ii) What is Transpiration ? Why transpiration is called necessary evil ? 4,4

5. (i) Write down the criteria laid down for essentiality of nutrients.

(ii) Give an account of active absorption of mineral ions. 2,6

## Unit–III

6. What is Photophosphorylation ? Give an account of non-cyclic photophosphorylation. 8

7. Give a detailed account of Biochemistry of nitrogen fixation. 8

## Unit–IV

8. Write notes on the following :

   (i) Growth curves

   (ii) Photoperiodism 3,5

9. What are Auxins ? Discuss Physiological role and mode of action of Auxins. 8

Roll No. : 8091883

Total No. of Questions : 9 ] [ Total No. of Pages : 3

# 92075

## B.Sc. 3rd Semester Examination, February-2022

*(New Scheme)*

## BIO-TECHNOLOGY

Paper-BT-304

**(Plant Diversity II)**

*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. Q. No. 1 is compulsory. All questions carry equal marks.

1. Write short notes on the following :

(a) Equisetum

(b) Prothalli

(c) Apogamy

(d) Annual rings

2×4=8

## Unit–I

2. Describe the general characteristics of pteridophytes and economic importance of pteridophytes. 8

3. What are the affinities of pteridophytes with gymnosperms and bryophytes ? 8

## Unit–II

4. Describe the life history of selaginella and Equisetum. 8

5. What do you understand by Pteris ? Explain the life history. 8

## Unit–III

6. Write short notes on the following :

   (a) Geological time scale and telome

   (b) Fossil Gymnosperm Williamsonia 4,4

7. Describe the theories of fossil formation. 8

## Unit–IV

8. Write short notes on the following :

(a) Corolloid roots of cycas

(b) Megasporophylls 4,4

9. Describe the life history of Pinus. 8

*Roll No.* : .....

Total No. of Questions : 9 ] [ Total No. of Pages : 4

# 92076

**B.Sc. 3rd Semester Examination, February-2022**

*(New Scheme)*

**BIO-TECHNOLOGY**

Paper-BT-305

**(Physical Chemistry)**

*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. Q. No. 1 is compulsory.

1. (a) Define path function.

(b) What is inversion temperature ?

(c) State Hess's law of constant heat summation.

(d) What do you mean by adiabatic expansion ?

(e) What is mechanical equilibrium ?

(f) Using Le Chatelier's principle, explain the effect of pressure on boiling point of liquids.

(g) Define degree of hydrolysis.

(h) Mention *two* conditions under which distribution law is valid. 1×8=8

## Section–A

2. (a) Define :

(i) Reversible process

(ii) Enthalpy

(b) Differentiate between extensive and intensive properties.

(c) Explain Joule-Thomson effect. 2,3,3

3. (a) Derive an expression for molar heat capacity $C_v$ and $C_p$.

(b) State and derive first law of thermodynamics. 4,4



C

## Section–B

4. (a) Explain :

(i) Bond energy

(ii) Standard enthalpy of formation

(b) Calculate the work done when 2 moles of an ideal gas expand isothermally and reversibly from 2 litre to 10 litre at 20°C. 4,4

5. (a) State and derive Kirchhoff's equation.

(b) Derive an expression for work done during adiabatic reversible expansion of an ideal gas. 4,4

## Section–C

6. Describe :

(i) Le Chatelier's principle

(ii) Chemical potential

(iii) Van't Hoff reaction isotherm 3,3,2

7. Derive Clausius-Clapeyron equation in integrated form. Discuss its applications. 8

## Section–D

8. (a) State and derive Nernst distribution law.

(b) Why multistep extractions are more economical than single step extraction ? 4,4

9. (a) Derive the modified expression of distribution law when solute undergoes dissociation.

(b) How dilution law can be applied to determine the degree of hydrolysis of aniline hydrochloride ? 4,4

Roll No. : 8091883

Total No. of Questions : 9 ] [ Total No. of Pages : 4

# 92077

## B.Sc. 3rd Semester Examination, February-2022

*(New Scheme)*

## BIO-TECHNOLOGY

Paper-BT-306

(Organic Chemistry)

*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. Q. No. 1 is compulsory.

X (a) What is epoxidation ?

(b) What is absolute alcohol ?

(c) Out of o- and p-nitrophenol, which one has higher boiling point ?

(d) Why phenol has smaller dipole moment than methanol ?

(e) What is hyperchromic shift ?

(f) What do you mean by forbidden transitions ?

(g) What is ortho effect ?

(h) Why benzoic acid is weaker than formic acid ?

1×8=8

## Section–A

2. (a) Describe the relative acidity of primary, secondary and tertiary alcohols.

(b) Explain the mechanism of Pinacol-Pinacolone rearrangement.

(c) Why dehydration of *n*-butyl alcohol mainly gives 2-butene rather than 1-butene ? 3,3,2

3. (a) Compare the mechanism of oxidative cleavage of 1, 2-glycols with periodic acid and lead tetraacetate.

(b) Explain the mechanism of base catalysed ring opening of epoxides.

6,2

## Section–B

4. (a) Discuss the effect of electron releasing and electron withdrawing groups on acidity of phenols.

(b) Describe the preparation of phenol from :

(i) Chlorobenzene

(ii) Isopropylbenzene 4,4

5. (a) Why phenols are more acidic than alcohols ? 2

(b) Explain with mechanism :

(i) Reimer-Tiemann reaction

(ii) Claisen rearrangement 3,3

## Section–C

6. (a) Describe :

(i) Beer-Lambert law

(ii) Molar absorptivity

(b) Explain the various types of electronic transitions in UV spectroscopy. 4,4

7. (a) Differentiate with examples :

(i) Chromophores and auxochromes

(ii) Red and blue shift 3,3

(b) Explain important applications of UV spectroscopy. 2

## Section–D

8. (a) Describe :

(i) Hell-Volhard-Zelinsky reaction

(ii) Mechanism of decarboxylation

(iii) Ortho effect

(b) Why carboxylic acids are stronger acids than phenols ? 6,2

9. (a) Compare the mechanism of ester hydrolysis under acidic and basic conditions.

(b) Explain Hunsdiecker reaction

(c) Why amides are least reactive of all acid derivatives towards nucleophilic acyl substitution reaction ? 4,2,2

Roll No. : 8091883

Total No. of Questions : **9** ] [ Total No. of Pages : **4**

# 92078

## B.Sc. 3rd Semester Examination, February–2022

*(New Scheme)*

## BIO-TECHNOLOGY

Paper–BT-307

**(Inorganic Chemistry)**

*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. Q. No. **1** is compulsory.

1. (a) Out of $Mn^{2+}$ and $Zn^{2+}$, which one is paramagnetic ?

   (b) What is Ferrimagnetism ?

   (c) Write the electronic configuration of chromium.

(d) Why $Cu^{2+}$ is more stable than $Cu^{+}$ ?

(e) Why tetrahedral complexes does not show geometrical isomerism ?

(f) What are chelates ?

(g) Define solvation reaction.

(h) What are aprotic solvents ? Give example. 1×8=8

## Section–A

2. (a) Explain the magnetic and catalytic properties of transition metals.

(b) Out of $Fe^{3+}$ and $Zn^{2+}$, which one is coloured and why ? 6,2

3. (a) Explain the structure and important properties of $TiO_2$.

(b) Give reason :

(i) The compounds of transition metals are generally coloured.

(ii) Transition metals froms a large number of complexes. 4,4

## Section–B

4. Compare the $3d$ elements with $4d$ and $5d$ elements with reference to :

(i) Oxidation state

(ii) Ionic radii

(iii) Stereochemistry 3,3,2

5. (a) Discuss the general characteristics and properties of second and third transition series.

(b) Why the electronic spectra of first transition series are easy to interpret as compared to second and third transition series ? 6,2

## Section–C

6. Differentiate with examples :

(i) Outer and inner orbital complexes

(ii) Linkage and ionization isomerism 4,4

7. (a) $[Co(NH_3)_6]^{3+}$ is diamagnetic whereas $[CoF_6]^{3-}$ is paramagnetic. Explain using valence bond theory.

(b) What is effective atomic number ? How is it calculated ? Explain with examples. 4,4

## Section–D

8. (a) What are acidic, basic or amphoteric solvents ? Explain with examples.

(b) What are the advantages of using liquid $SO_2$ as a solvent ? 6,2

9. Explain the acid-base and precipitation reactions in :

(i) Liquid $NH_3$

(ii) Liquid $SO_2$ 4,4

*Roll No.* : .....

Total No. of Questions : **9** ] [ Total No. of Pages : **3**

# 92072

**B.Sc. 3rd Semester Examination, February-2022**

*(New Scheme)*

**BIO-TECHNOLOGY**

Paper-BT-301

**(Medical Microbiology)**

*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. Q. No. 1 is compulsory. All questions carry equal marks.

1. Write short notes on the following :

   (a) Tuberculosis

   (b) Antibiotics

   (c) Two causative agents of pneumonia

(d) Clinical symptoms of Typhoid

(e) COVID-19

(f) Dengue

(g) Two vector-borne infection

(h) Mycology 1×8=8

## Unit–I

2. Describe the importance of our normal microflora in detail. 8

3. Write short notes on any *two* of the following :

(a) Food poisoning

(b) Virulence factors

(c) Nosocomial infection 4×2=8

## Unit–II

4. Describe the morphology, symptoms, diagnosis and treatment for causative agent for Syphilis and Gonorrhea in detail. 8

5. Write short notes on any *two* of the following :

(a) *Mycoplasma*

(b) *Rickettsiaceae*

(c) *Chlamydia* 4×2=8

## Unit–III

6. Describe the cause, symptoms, diagnosis and prevention of HIV/AIDS. 8

7. Write short notes on any *two* of the following : $4\times2=8$

   (a) Polio virus

   (b) Viral hepatitis

   (c) Herpes virus

## Unit–IV

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

9. Write short notes on any *two* of the following : $4\times2=8$

   (a) *Giardiasis*

   (b) Economical importance of Fungi

   (c) Opportunistic fungal infections