Roll No. .....

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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.)
(New Scheme)
Examination – December, 2022

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
3rd Semester (New Scheme)
Examination – December, 2022
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 : $1 \times 10 = 10$

   (a) What is the role of apical meristems in root ?

   (b) Define permanent tissues.

   (c) Define Gutation.

   (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 inplants : 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.
(New Scheme)
Examination – December, 2022

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 : $2 \times 5 = 10$

   (a) Strobilus

   (b) Archegonia

   (c) Mesozoyllic 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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B. Sc. Bio-Technology 3rd Semester

(New-Scheme)

Examination – December, 2022

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. (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

$2C\ (graphite) + 3H_2(g) \rightarrow C_2H_6(g)\ ;\ \Delta H = -84.67KJ$

$C(graphite) \rightarrow C(g)\ ;\ \Delta H = 716.7KJ$

$H_2(g) \rightarrow 2H(g)\ ;\ \Delta H = 435.9KJ$

Also $C-H$ bond energy is 416 KJ.

SECTION – III

6. (a) Deriv e 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 $\frac{d\,InK_c}{dT} = \frac{\Delta E^\circ}{RT^2}$. 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
(New Scheme)
Examination – December, 2022

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 benozyl 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 hodrolysis

(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 (New Scheme) 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