Roll No. .....

94171

B. Sc. (Biotechnology) 6th Semester (New Scheme) Examination – May, 2024

I. P. R. ENTREPRENEURSHIP BIO-ETHICS & BIO-SAFETY

Paper : BT-601

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 paper has nine questions in all. Question No. 1 is ***compulsory*** and attempt ***four*** more questions selecting at least ***one*** question from each Unit. All questions carry equal marks.

1. Describe the following : $1 \times 10 = 10$

(a) What is the duration of a patent in India, and how can it be renewed ?

(b) How do IP considerations influence collaborative research ?

(c) How do biotechnology patents influence competition in the market ?

(d) Discuss the importance of continuous innovation and product improvement.

(e) Discuss the risks associated with overstocking or under stocking.

(f) Evaluate the factors that determine the export potential of a product.

(g) What is the role of academic institutions in capacity-building in bioethics ?

(h) How can ethical considerations be integrated into molecular technologies ?

(i) Define containment levels in the context of bio safety ?

(j) Identify the health hazards associated with materials used in biotechnology ?

UNIT – I

2. (i) What is a patent, how it can be renewed or extended and what purpose does it serve in India's legal system ? 3.5

(ii) What is the World Trade Organization (WTO), and what is its primary purpose ? 4

3. What is the difference between Intellectual Property (IP) and Industrial Property and how do they differ in terms of legal protection in the context of research, design and development ? 7.5

UNIT – II

4. Explain the steps involved in the design and development of a new product, from ideation to prototype creation and testing. What are the challenges entrepreneurs may face during the product development stage ? 7.5

5. Discuss the financial aspects involved In manufacturing a product, including capital investment, operating costs, and return on investment (ROI) calculations. 7.5

UNIT – III

6. Explain the significance of bioethics in the modern era, where scientific and technological advancements in biomedicine and biotechnology pose complex ethical dilemmas. 7.5

P. T. O.

7. What are the ethical concerns surrounding genetic manipulation and engineering using molecular technologies and their potential impact on future generations ? 7.5

UNIT – IV

8. Define bio-safety and its significance in the context of biotechnology, laboratory research, and industrial applications. 7.5

9. Write notes on the following :

   (a) Good Laboratory Practices (GLP) 3.5

   (b) Good Manufacturing Practices (GMP) 4

Roll No. .....

94172

B. Sc. (Biotechnology) 6th Semester (New Scheme) Examination – May, 2024

ANIMAL BIOTECHNOLOGY

Paper : BT-602

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 paper has nine questions in all. Question No. 1 is ***compulsory***. The ***compulsory*** question is of 10 marks. Students should attempt ***four*** other questions selecting ***one*** question from each unit.

1. Write short notes on these : $2 \times 5 = 10$

   (a) Which vector is most commonly used in gene transfer in animal cell ?

   (b) What are transconjugant colonies ?

(c) What is the help of biotechnology against Coccidiosis ?

(d) What do you understand by transgenic sheep ?

(e) What is embryo transfer in livestock ?

UNIT – I

2. What is microinjection and how is it used for gene transfer in animals ? What are the advantages and disadvantages of microinjection ? 7.5

3. How does embryonic stem cell gene transfer work and what are its applications ? 7.5

UNIT – II

4. What are transgenic mice and how are they created ? What are the advantages and disadvantages of using transgenic mice in research ? 7.5

5. What are the potential benefits of using animal biotechnology to prevent and treat theileriosis and foot and mouth disease ? 7.5

UNIT – III

6. What is artificial insemination and how is it used in animal propagation ? 7.5

7. What are the different types of embryo transfer techniques and how these are useful in animal breeding ? 7.5

UNIT – IV

8. What is gene therapy and how is it used to treat genetic diseases in humans ? What are the challenges of gene therapy ? 7.5

9. What is human genetic engineering and how is it used in medicine ? What are the ethical and legal concerns about human genetic engineering ? 7.5

Roll No. .....

94174

B. Sc. (Biotechnology) 6th Semester (New Scheme) Examination – May, 2024

PLANT BIOTECHNOLOGY & ENVIRONMENTAL BIOTECHNOLOGY

Paper : BT-604

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 paper has nine questions in all. Question No. 1 is ***compulsory*** and attempt ***four*** more questions selecting at least ***one*** question from each Unit. All questions carry equal marks.

1. Write short notes on these : $1 \times 10 = 10$

(a) What are haploids ?

(b) What are Somaclonal variations ?

(c) What is wide hybridization ?

(d) What are cybrids ?

(e) What is androgenesis ?

(f) What is suspension cultures ?

(g) What is water treatment and why is it necessary ?

(h) How do microorganisms degrade pesticides ?

(i) What is ore enrichment ?

(j) What are cry proteins ?

UNIT – I

2. What are the processes of embryogenesis and organogenesis in plants and what are the applications of embryogenesis and organogenesis ? 7.5

3. Describe the different types of micro-propagation techniques, including auxillary bud, shoot-tip, and meristem culture and explain the advantages and applications. 7.5

UNIT – II

4. What is endosperm culture and how is it used in the production of triploid plants ? Explain the practical applications in agriculture and horticulture. 7.5

5. What is somatic hybridization and how is it used to produce new plant hybrids with desirable traits ? Explain the different types of markers used for selection of hybrid cells. 7.5

UNIT – III

6. What is the microbiological quality of food and water, and why is it important for public health ? Describe the various microorganisms that can contaminate food and water. 7.5

7. Describe the different types of microorganisms that can be used for bioremediation, including bacteria, fungi and algae and explain how they break down toxic chemicals. Explain the factors that affect bioremediation. 7.5

Roll No. .....

94175

B. Sc. Bio-Technology 6th Semester
(New Scheme)
Examination – May, 2024

PHYSICAL CHEMISTRY

Paper : BT-605

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. (a) Why molality is preferred over molarity ? 1

(b) Explain the main reason for quenching ? 1

(c) What is difference between concentration and activity ? 1

(d) What is photosensitizer ? 1

(e) What is meant by reduced phase rule. 1

(f) Which of the electronic transition have weakest intensity ? 1

(g) What are gerade and ungerade orbitals ? 1

(h) What are eutectic systems ? 1

SECTION – A

2. (a) Express potential energy curve for bonding and antibonding molecular orbitals. 5

(b) State and explain Franck Condon principle. 3

3. (a) Discuss various types of electronic transition in electronic spectrum. 4

(b) Write selection rule for transitions in electronic spectroscopy. 4

SECTION – B

4. (a) (i) Explain Jablonski diagrmas. 2

(ii) What is Stark-Einstein Law of photochemical equivalence ? 3

(b) Discuss Grotthus-Draper law of chemical activation. 3

5. (a) What do you mean by quantum yield of Photochemical reaction ? Express the factors influencing the quantum yield. 5

(b) Differentiate between thermochemcial and photochemcial reaction. 3

SECTION – C

6. (a) Define colligative properties. Explain how osmosis and osmotic pressure are colligative properties ? 4

(b) Why there is depression in freezing point when a nonvolatile solute is dissolved into a solvent ? 4

7. (a) What are Azeotropes mixture ? Discuss its types. 3

(b) Define elevation in boiling point of the solvent and derive the relation between elevation in boiling point of solution and molecular mass of solvent. 5

SECTION – D

8. (a) Discuss the phase diagram of sulphur systems. 4

(b) Derive Gibbs phase rule and explain the various terms involved. 4

9. (a) Draw well labelled phase diagram of lead-silver system and discuss desilverisation of lead. 5

(b) What is metastable state ? Explain. 3

Roll No. .....

94176

B. Sc. (Bio-Technology) 6th Semester (New Scheme) Examination – May, 2024

ORGANIC CHEMISTRY

Paper : BT-606

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***. All questions carry equal marks.

Compulsory Questions

1. (a) Draw the different resonating structures of pyrrole. 1

   (b) How does thiophene react with diazomethane ? 1

(c) Convert quinoline into nicotinic acid. 1

(d) Why sulphonic acids are stronger acids than carboxylic acids ? 1

(e) Explain the acidity of α-hydrogen in enolates. 1

(f) Differentiate between natural and synthetic rubber. 1

(g) What are conjugated proteins ? Give example. 1

(h) Give *two* examples of essential amino acids. 1

SECTION – A

2. (a) Explain the molecular structure of pyrrole, furan and thiophene and compare their aromatic character. 4

(b) Describe important methods of preparation of pyrrole derivatives. 4

3. (a) Explain the Chichibabin reaction. 2

(b) Compare the basic character of pyrrole, pyridine and piperidine. 2

(c) Compare the reactivity of pyrrole, pyridine and benzene towards electrophilic substitution reactions. 4

SECTION – B

4. Describe : 4, 4

(a) Fischer indole synthesis

(b) Skraup synthesis

5. (a) How thiols are prepared ? 2

(b) Explain the preparation and use of sulphaguanidine. 2

(c) Describe the types and cleansing action of synthetic detergents. 4

SECTION – C

6. Convert : 4, 4

(i) Diethylmalonate to glutaric acid

(ii) Accteacetic ester to succinic acid

7. (a) Describe the preparation and use of urea-formaldehyde resins. 2

(b) Describe Ziegler-Natta polymerization. 6

SECTION – D

8. (a) Explain : 2, 2

(i) Acidic and basic amino acids

(ii) Electrophoresis

(b) Describe the secondary structure of proteins. 4

9. (a) Differentiate between fibrous and globular proteins. 2

(b) Describe the Merrifield solid phase peptide synthesis. 6

Roll No. .....

94177

B. Sc. Bio-Technology 6th Semester
(New Scheme)
Examination – May, 2024

INORGANIC CHEMISTRY

Paper : BT-607

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. (a) What are Sandwich Compounds ? 1

(b) Give IUPAC name of $C_6H_6Cr(CO)_3$. 1

(c) What is the conjugate base of $H_2PO_4^-$? 1

(d) Which one is stronger base NH_3 *or* $(CH_3)_3N$? 1

(e) What are Nitrogenases ? 1

(f) What is the role of $Na^+ - K^+$ pump ? 1

(g) What are Silicones ? 1

(h) How you will prepare $(NPBr_2)_n$? 1

SECTION – A

2. What are the applications of organoaluminium compounds ? Give methods of preparation of organoaluminium compounds. 8

3. (a) What is EAN rule ? Give examples of organometallic compounds where the rule is obeyed. 4

(b) Give IUPAC name of : $1 \times 4 = 4$

(i) $CO(CO)_3\ (\pi - C_5H_5)$

(ii) $K[PtCl_3(C_2H_4)]$

(iii) $M_n(CO)_5(CH_2 - CH = CH_2)$

(iv) $Cr(C_6H_6)_2$

SECTION – B

4. (a) What is meant by the solvent system definition of acid-base behaviour ? Give examples. 4

   (b) Name the factors that governs the relative strength of Lewis acids. 4

5. (a) Discuss the characteristics of Soft acids and Soft bases. 4

   (b) What is Symbiosis ? Give examples. What are its applications ? 4

SECTION – C

6. Describe in detail the biological role of Ca^{2+} ions. How does it differ from that of Mg^{2+} ions ? 8

7. What are haemoglobin and myoglobin ? Discuss and draw their structures. 8

SECTION – D

8. What ate phosphazenes ? Describe methods for preparation and structures of phosphazenes. 8

9. (a) Silicones and phosphagenes are isoelectronic. Explain and comment on the consequences. 4

(b) Write note on Silicone Resins. 4
