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B.Sc. (Bio-Technology) 6th Semester (New Scheme)

Examination, July–2022

BIO PROCESS TECHNOLOGY

Paper–BT-603

Time allowed : 3 hours] *[Maximum marks : 40*

Instructions :

Each question carries equal marks.

Question No. 1 is compulsory.

*Attempt total **five** questions choosing **one** from each unit.*

1. Define following :

(i) Fed batch culture

(ii) Baffles

(iii) Mass transfer coefficient

(iv) Single cell protein

Unit–I

2. Describe Monod's model of substrate limited growth. 8

3. Write notes on Continuous Cultivation. 8

Unit–II

4. Write notes on Air lift reactor. 8

5. Give an account of different components of microbial medium discussing their role and common sources. 8

Unit–III

6. What do you understand by mass transfer in bioreactor ? Discuss the oxygen transfer in bioreactor. 8

7. Give an account of different types of biosensors used in bioreactor. 8

Unit–IV

8. Write notes on microbial production of Lactic acid. 8

9. Describe the process of effluent treatment using microbes. 8

B.Sc. 6th Semester (New Scheme) Examination,

July–2022

BIO-TECHNOLOGY

Paper–BT-602

Animal Biotechnology

Time allowed : 3 hours] *[Maximum marks : 40*

Instruction : Question No. 1 is compulsory. *Students should attempt* ***four*** *other questions, i.e.,* ***one*** *from each unit.*

1. Write a short note on the following : 5×2

(a) Retroviral gene transfer

(b) Trypanosomiasis

(c) Adult stem cells

(d) Germline gene therapy

(e) Transgenic sheep

Unit–I

2. Write a note on microinjection mediated gene transfer in animals. 7.5

3. Write a note on embryonic stem cells-mediated gene transfer in animals. 7.5

Unit–II

4. Write a note on Foot and Mouth Disease in relation to Biotechnology. 7.5

5. What do you mean by transgenesis ? Discuss with the examples. 7.5

Unit–III

6. Write a note on artificial insemination techniques for animals. 7.5

7. Write a note on various techniques of embryo transfer. 7.5

Unit–IV

8. What do you mean by gene therapy and discuss its types and applications. 7.5

9. Write a note on molecular engineering and discuss problems associated with it. 7.5

(b) Write a note on electrophoresis. 2

8. (a) Describe the primary and secondary structure of proteins. 4

(b) Explain N-termial residue analysis of polypeptides. 4

B.Sc. 6th Semester New Scheme Examination,

July–2022

BIO-TECHNOLOGY

Paper–BT-606/BIN-606

Organic Chemistry

Time allowed : 3 hours] *[Maximum marks : 40*

Note : *Attempt **five** questions in all, selecting at least **two** questions from each section.*

Section–A

1. (a) Describe the Paal-Knorr synthesis for pyrrole and furan derivatives. 4

(b) Compare the reactivity of pyrrole and pyridine towards electrophilic substitution reactions. 4

2. (a) Out of pyrrole and thiophene, which one is more aromatic and why ? 3

(b) Explain the mechanism of nucleophilic substitution reactions in pyridine derivatives. 3

(c) Out of pyridine and pyrrole, which one is more basic and why ? 2

3. Describe with mechanism : 4,4

(i) Bischler-Napieralski synthesis

(ii) Fischer Indole synthesis 4

4. (a) Describe : 4

(i) Methods of preparation of thiols

(ii) Cleansing action of detergents

(b) Write the preparation and use of : 4

(i) Sulphaguanidine

(ii) Sulphonamides

Section–B

5. (a) What are enolates ? Describe the mechanism of Claisen Condensation. 4

(b) Explain the keto enol tautomerism in ethyl acetoacetate. 4

6. (a) Write a note on natural and synthetic rubber. 2

(b) Describe : 6

(i) Phenol formaldehyde resins

(ii) Urea formaldehyde resins

(iii) Dacron

7. (a) Describe with examples : 6

(i) Acidic and basic amino acid

(ii) Fibrous and globular proteins

9. Write the notes on any *two* : 2×4=8

(a) Different levels of bio-safety

(b) Elements of GMP

(c) Role of GLP in Bio-safety practice

B.Sc. 6th Semester (New Scheme) Examination,

July–2022

BIO-TECHNOLOGY

Paper–BT-601

I.P.R., Entrepreneurship, Bio-Ethics and Bio-Safety

Time allowed : 3 hours] *[Maximum marks : 40*

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

1. Write the short notes on following : 8×1=8

(a) Exclusive Marketing Rights

(b) WIPO

(c) Buffer stock

(d) Raw material

(e) Euthanasia

(f) Ethical Committee

(g) Heath hazardous

(h) Bioterrorism agent

Unit–1

2. What is the Patent ? Describe the role of patenting in the field of biotechnology ? 8

3. Write the notes on any *two* : 2×4=8

(a) IPR & WTO

(b) Various Rights of Patentee

(c) Procedure of Patenting

Unit–2

4. Describe the role of selection, design and development of a product in the Entrepreneurship ? 8

5. Write the notes on any *two* : 2×4=8

(a) Basic regulation of excise duty

(b) Elements of good entrepreneurship

(c) Effect of financial capability of entrepreneurship

Unit–3

6. Describe the roles of bio-ethics in the medical profession in detail. 8

7. Requirement of bio-ethics at national and international level. 8

Unit–4

8. What is Bio-sefety ? Why are we required to follow the bio-safety rules ? 8

(b) Silicones and phosphazenes are isoelectronic. Discuss consequences. 4

9. (a) Draw polymeric backbone of Silicones. 4

(b) What are Silicones ? How are cross linked Silicones prepared ? 4

B.Sc. 6th Semester (New Scheme) Examination,

July–2022

BIO-TECHNOLOGY

Paper–BT-607/BIN-605

Inorganic Chemistry

Time allowed : 3 hours] *[Maximum marks : 40*

*Note : Attempt **five** questions in all, selecting **one** question from each section. **Q. No. 1 is compulsory.***

1. (a) Write IUPAC name of

$[(CO)_3CO(CO)_2CO(CO)_3]$ 1

(b) Give two examples of π-acid ligands similar to CO. 1

(c) Give Lux-Flood concept of acids and bases. 1

(d) What is HSAB principle ? 1

(e) Give names of three essential elements in biological process. 1

(f) Define Nitrogen fixation. 1

(g) Complete the reaction

$$\text{Cyclic } (NPC\ell_2)_3 \xrightarrow[250°C]{} ? \qquad 1$$

(h) Write common structural unit of all phosphazenes. 1

Section–A

2. Write preparation, properties and bonding of organo aluminium compounds. 8

3. Describe the nature of bonding in linear metal carbonyls and also give evidence in support of bonding. 8

Section–B

4. (a) What is symbiosis ? Discuss theoretical basis of hardness and softness. 4

(b) Explain how electronegativity can be used to explain hardness and softness of acids and bases. 4

5. What is solvent system concept of acids and bases ? Write application of this concept. Also give limitation of this concept. 8

Section–C

6. What are metalloporphyrins ? Discuss the structure and role played by myoglobin as O_2 carriers. 8

7. (i) Discuss biological role of Calcium ions. 4

(ii) Explain the mechanism of $Na^+ - K^+$ pump. 4

Section–D

8. (a) Write a brief account of

(i) Silicone rubbers

(ii) Silicone resins 4

7. (a) Explain the following terms :

(i) Phase

(ii) Component

(iii) Degree of freedom 3

(b) Discuss Phase diagram of one component sulphur system. 5

8. (a) What is condensed system ? Explain the phase rule for condensed systems. 3

(b) Explain the following terms

(i) Stable equilibrium

(ii) Metastable state

(iii) Eutectic Point 3

(c) Discuss phase equilibria involving desilverisation of Lead. 2

B.Sc. (Bio-Technology) 6th Semester (New Scheme)
Examination, July–2022
PHYSICAL CHEMISTRY
Paper–BT-605/BIN-604

Time allowed : 3 hours] *[Maximum marks : 40*

Note : *Attempt **five** questions in all, selecting at least **two** questions from each section.*

Section–A

1. (a) State and explain Frank-Condon principle with diagram. 4

(b) Discuss molecular orbital diagram of carboyl group and explain the electronic transitions taking place between them. 4

2. (a) What do you mean by multiplicity of state ? Explain with a suitable example. 3

(b) State and explain Stark-Einstein law of photochemical equivalence. 3

(c) Define the term one Einstein ? How it is calculated in KJ/mol ? 2

3. (a) Write a short note on photosensitization and quenching. 3

(b) What is Born-Oppenheimer approximation ? Explain ? 3

(c) What do you mean by photochemical reactions ? Give at least two examples. 2

4. (a) Explain the following terms

(i) Quantum yield

(ii) Non-radiative processes

(iii) Fluorescence

(iv) Phosphorescence 4

(b) Discuss energy transfer processes in photosensitized reactions. 4

Section–B

5. (a) Explain the terms molarity, molality, normality and mole fraction. 2

(b) Explain Ideal and Non-ideal solutions with two example each. 3

(c) 0.1 M solution of KNO_3 has an osmotic pressure of 4.5 atmosphere at 300 K. Calculate the apparent degree of dissociation of the salt. 3

6. (a) What are term Azeotropes ? Explain the types of azeotropes. 4

(b) Explain osmosis law of osmotic pressure. Explain determination of molecular weight from osmotic pressure. 4

9. Describe in detail

(a) Ores enrichment by microorganisms 4

(b) Control of other insects swarming the agricultural fields using biological means. 4

B.Sc. (Bio-Technology) 6th Semester (New Scheme)
Examination, July–2022
PLANT BIOTECHNOLOGY AND
ENVIRONMENTAL BIOTECHNOLOGY
Paper–BT-604

Time allowed : 3 hours] *[Maximum marks : 40*

Note : *Attempt **five** questions in total **one** from each unit.*

Question No. 1 is compulsory.

1. Write short note on the following :

(a) Micropropagation

(b) Exillary bud

(c) Somatic hybrids

(d) Protoplast fusion

(e) Bioremediation

(f) Xenobiotic compounds

(g) Biofertilizers

(h) *Bacillus thuringiensis* 8×1

Unit–I

2. Write a detailed description on

(a) Meristem culture 3

(b) Somaclonal variations and its applications 5

3. What is embryogenesis in tissue culture ? Give a detailed description of its types and its applications ? 8

Unit–II

4. What is the principle of protoplast isolation ? Explain in detail its steps and application in plant biotechnology. 8

5. Give a detailed account on

(a) Hybrids and cybrids 4

(b) Endosperm culture 4

Unit–III

6. Write a detailed account on microbiological quality control of food and water. 8

7. Discuss in detail the treatment of municipal waste and industrial effuents using microbiology approach. 8

Unit–IV

8. Write a note on

(a) Nitrogen fixation by microorganism and its importance 4

(b) Natural pesticides 4