Exam. Code : 107406

Subject Code : 2331

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

APPLICATIONS OF PLANT TISSUE CULTURE

Paper—BT-2

Time Allowed—3 Hours] [Maximum Marks—40

Note :- (1) Attempt **ALL** parts from Section—A. Each question carries **1** mark. Answer to any part should not exceed **1/3** of a page.

(2) Attempt any **five** questions from Section—B. Each question carries **4** marks. Answer to any question to any part should not exceed **2** pages.

(3) Attempt any **two** questions from Section—C. Each question carries **6** marks. Answer to any question to any part should not exceed **5** pages.

SECTION—A

1. (i) Hardening

(ii) Somatic embryogenesis

(iii) Haploids

(iv) Embryo rescue

(v) Protoplast

(vi) Somatic hybrids

(vii) Cell suspension culture

(viii) Secondary metabolites.

SECTION—B

2. Stages of micropropagation.
3. Modes of regeneration.
4. Somatic embryogenesis vs organogenesis.
5. Ovule culture.
6. Factors affecting protoplast isolation.
7. Somatic hybrids vs cybrids.
8. Role of bioreactors in secondary metabolite production.
9. Discuss transgenic approaches in secondary metabolite production.

SECTION—C

10. What is micropropagation ? Describe various factors that affect micropropagation and the technical problems.
11. What is somaclonal variation ? Write down the factors that affect the production of somaclonal variants and its application.
12. What is somatic cell hybridization ? Write down the method of selection of heterokaryons and the application of somatic hybrids.
13. Discuss the production of secondary metabolites by tissue culture and their applications.

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B.Sc. (Bio Technology) 6th Semester

BT-3 : ANIMAL BIOTECHNOLOGY

Time Allowed—3 Hours] [Maximum Marks—40

Note :— Section A (1×8 marks) is compulsory. Section B (5×4 marks). Attempt any **5** questions. The answer should not exceed **two** pages. Section C (6×2 marks). Attempt any **2** questions. The answer should not exceed **five** pages.

SECTION—A

(Compulsory)

Write a brief account of the following :

1. Full form of BHK and B 16 cell line
2. Differentiation
3. Transfection
4. Transgenics
5. Monoclonal antibody
6. Marker on stem cells
7. How to cut the DNA at particular sites ?
8. Define regulatory protein.

SECTION—B

1. Which characteristic features of the cell line are studied and described while labeling it. Explain these features of WI-38 and 3 T3.
2. Which changes are brought in a cell after differentiation ?
3. How to perform Lipofaction ?
4. What are expression vectors ?
5. Materials used for microcarrier cultures and how to make them.
6. How embryonic stem cells are better than adult stem cells for culturing ?
7. Give the role of genetic engineering in production of vaccines.
8. How to raise transgenic cattle for milk production ?

SECTION—C

1. Define organ culture and cell culture. Describe the methods to raise organ cultures.
2. Describe the DEAE Dextran mediated and reteroviral infection method of transfection.
3. How to scale up anchorage dependent cultured cells ?
4. Write a note on Animal cloning and ethics involved in it. And also Embryo transfer technology.

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B.Sc. (Bio Technology) 6th Semester

INTELLECTUAL PROPERTY RIGHTS AND ENTREPRENEURSHIP

Paper — BT-4

Time Allowed—3 Hours] [Maximum Marks—40

Note :— Section A is compulsory. The candidates are required to attempt **five** questions from Section B and **two** questions from Section C.

SECTION–A
(1×8=8)

1. (a) What is A copyright ?

   (b) Give two examples of GI

   (c) What is the purpose of GATT ?

   (d) Highlight the importance of Uruguay Round of negotiations.

   (e) Discuss FDI in relation to trade

   (f) What is the major outcome of Budapest treaty ?

   (g) Define traits of an entrepreneur

   (h) What is project feasibility report ?

SECTION–B

(4×5=20)

2. What are patent claims ?
3. How IPR can promote business ?
4. What are the benefits and limitations of trade secret ?
5. How TRIMs influence trade at global level ?
6. How dumping Effects local trade ?
7. Discuss Berne Convention
8. What is the advantage of PCT system ?
9. Discuss the role of entrepreneurs in boosting economy.

SECTION–C

(6×2=12)

10. What are the major functions of WTO ?
11. Discuss the major amendments of Indian Patent Law.
12. Explain the principle of Most favoured Nation and its implication.
13. Discuss various costs involved in starting a pharma company.

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

BIOPROCESS ENGINEERING—B

Paper—BT-5

Time Allowed—3 Hours] [Maximum Marks—40

Note :– Attempt the questions as directed.

SECTION—A

Note :– Attempt **all** the questions. 1×8=8

1. Write short notes on the following in about **50** words :

   (i) CSTBR

   (ii) Batch

   (iii) Plug flow

   (iv) Fed batch

   (v) D.O. Probe

   (vi) DSP

   (vii) Slug

   (viii) Effluent.

SECTION—B

Note :– Attempt any **five** questions. 5×4=20

2. Discuss the CSTBR.
3. Discuss the air loop bioreactor.
4. Explain the functioning of pH probe.
5. Explain the functioning of DO probe.
6. Discuss the agitation system.
7. Explain the down stream processing.
8. What is fermentation economics ? Discuss.
9. What is effluent treatment ? Discuss.

SECTION—C

Note :– Attempt any **two** questions. 2×6=12

10. Discuss the steady state kinetics of CSTBR.
11. Discuss the structure and functioning of galvanic DO probe.
12. Discuss the principle and procedure of super critical fluid extraction method for bio product recovery with an example.
13. Discuss the aerobic slug treatment process.

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

BIOPHYSICAL AND BIOCHEMICAL TECHNIQUES—B

Paper—BT-6

Time Allowed—3 Hours] [Maximum Marks—40

SECTION—A

Note :– Attempt **All** questions. Each question carries **1** mark.

I. What is the role of matrix in MALDI ? What are the criteria for selection of matrix ?

II. What are the salient characters of fluors used in fluorescence spectroscopy ? Give two examples.

III. What is meant by electro-endosmosis and how it affects the separation of components during gel electrophoresis ?

IV. List different solubilizers used in PAGE and mention about their significance.

V. How capillary electrophoresis is different from gel electrophoresis ?

VI. Comment on nature of ampholytes and their role in electrophoresis.

VII. What is half life of a radioactive element ? Comment on its significance.

VIII. What is scintillation counting and how it is important in radioactivity studies ?

SECTION—B

Note :– Attempt **five** questions. Each question carries **4** marks.

I. What are the different types of TOF analysers ? Comment on merit and demerits of each.

II. How instrumental set up for a visible spectrophotometer and a spectrofluorometer differ ?

III. What are the different solubilizers used in electrophoresis ? Briefly discuss about their mechanism of action and give a suitable example.

IV. What is the principle of immuno-electrophoresis ? List different types and comment on their applications.

V. What is the working principle of capillary electrophoresis ? How it achieves separation of components ? Give a suitable example of application of this technique.

VI. What is meant by isoelectric point of a protein and how it could be determined ? Comment on its role in isoelectric focussing.

VII. How presence of radioactive materials can be detected ? Why proportional counters are preferred over other instruments for detecting radioactivity ?

VIII. Briefly explain components and working design of liquid scintillation system ? Support your answer with a suitable example.

SECTION—C

Note :– Attempt **two** questions. Each question carries **6** marks.

I. How amino acid sequence of a protein can be determined by mass spectrometry ? Explain with an illustrated flow chart of the protocol.

II. How poly-acrylamide (PA) gel is prepared ? List the components along with their significance in gel formation. How PA gels of different strength are prepared ?

III. Describe in detail the protocol and components to perform 2,D-electrophoresis ? Comment on its significance in proteomics ?

IV. (a) What is meant by rate of radioactive decay and what are units of radioactive decay ?

(b) What are the different modes of radioactive decay ? Give a suitable example of each.

29/5/18 (EVE)

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B.Sc. (Bio Technology) 6th Semester

PHYSICAL, ORGANIC & INORGANIC ASPECTS OF SPECTROSCOPY–B

Paper–BT-7

Time Allowed—3 Hours] [Maximum Marks—40

Note :– Attempt all questions of Section A and it is compulsory. Do any **five** questions from Section B and do any **two** questions from Section C.

SECTION–A

(Compulsory, do **all** questions)

1. Write three main requirements for observing ^1H NMR spectrum. 1
2. How many ^1H NMR signals are shown by the reference compound $Si(CH_3)_4$? 1
3. Depict ^1H NMR spectrum of ethyl bromide. 1
4. Name at least two solvents used for recording ^1H NMR spectrum of a compound. Give suitable reasons for your choice. 1
5. What is the major information we can get from the mass spectrum of a compound ? Explain with a suitable example. 1

6. From the mass spectrum of toluene, discuss three major ions you can identify. 1

7. Explain Nitrogen rule as used in mass spectrometry. 1

8. ^{79}Br and ^{81}Br have nearly equal abundance, then suggest various molecular ions obtained from Mass spectrum of methyl bromide. 1

SECTION–B

(Do any **five** questions)

9. Benzonitrile (C_6H_5CN) showed three major mass peaks at : m/z = 103 (100 %); 77(10 %) and 76(35 %) positions. Suggest which are possible species formed. The values in brackets are relative abundances of ions formed (Atomic masses : C = 12, H = 1; N = 14). 4

10. Ethylamine showed three major mass peaks at : m/z = 45(20 %); 21(21 %) and 30 (100 %) positions. Suggest which are possible species formed. The values in brackets are relative abundance of ions formed. 4

11. How metastable ions are generated ? What is their importance in mass spectrometry ? 4

12. Illustrate Mc Lafferty rearrangement using one example. 4

13. It is found that in proton NMR spectrum of a compound, there are only a small number of nuclei more in the ground state as compared to that in the excited state when NMR spectrum is recorded. How then this number is maintained and no saturation of the NMR system occurs ? Discuss relaxation phenomena which do this job. 4

14. Suppose ^1H NMR spectrum of compound **A** shows one triplet in intensity ratio (1 : 2 : 1) at ö = 2.5 ppm; one quartet of doublets in intensity ratio (1 : 3 : 3 : 1) at ö = 3.5 ppm and one triplet in intensity ratio (1 : 2 : 1) at ö = 5.5 ppm. Suggest structure of compound with suitable justification. 4

15. The OH proton NMR signal of p-nitrophenol undergoes shift to highfield when concentration of p-nitrophenol is decreased, while OH proton of o-nitrophenol did not change its position with concentration. Explain this behaviour of two compounds. 4

16. Predict ^1H NMR spectrum of ethyl acetate

$\{CH_3–C(=O)–O–CH_2–CH_3\}$ 4

SECTION–C

(Do any **two** questions)

17. Explain briefly : electron ionization (EI) and chemical ionization (CI) techniques used for formation of ions in mass spectrometry. 6

18. Give applications of mass spectrometry to :

(a) alcohols and

(b) aromatic compounds.

Describe main species and their relative abundance. 6

19. How will you distinguish the following three compounds using proton NMR spectroscopy ?

CH_3–OH; CH_3–C(=O)H and $(CH_3)_2C$=O 6

20. How proton NMR spectrum of a compound is recorded ? Give main components of a NMR spectrometer in the form of a sketch ? How CW and FT NMR techniques are different ? 6