Roll No. [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] Total No. of Pages : 02

Total No. of Questions : 11

M.Sc. (Biotechnology) (Sem-2)

BIOPROCESS ENGINEERING

Subject Code : MBT-205

M.Code : 76249

Date of Examination : 02-06-2023

Time : 3 Hrs. Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. **Write short note on the following :**

   a) Sterilization and pasteurization

   b) Generation time

   c) Biocolours and bioflavours

   d) Fermented foods with examples

   e) Liquid-liquid extraction

   f) Reverse osmosis

   g) VVM

   h) Pneumatic fermenters and their applications

   i) Primary and secondary metabolites.

   j) Submerged and surface fermentation with examples.

July-2023

SECTION-B

2. Principle and applications of centrifugation.
3. Explain the process of cryopreservation for maintenance of microorganisms.
4. How bio-transformation is better than chemical transformation? Explain with examples.
5. Describe batch, fed batch and continuous systems in detail.
6. Explain the construction of fermenter with the help of diagram.
7. Describe the principle of ultrafiltration and factors affecting it.
8. Describe the applications of bacteriocins in food preservation.

SECTION-C

9. What are up-streaming and down-streaming processes in bioprocesses? Explain different steps involved in up-streaming and down-streaming of any bioprocess:
10. Describe the different phases of microbial growth curve with the help of diagram in detail.
11. How industrial waste materials can be used as substrates for the production of useful products? Explain with the help of examples.

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SECTION-B

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July-2023

Roll No.

Total No. of Pages : 02

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M.Sc.(BT) (Sem-2)

IMMUNOLOGY AND IMMUNOTECHNOLOGY

Subject Code : MBT-202

M.Code : 76246

Date of Examination : 05-06-2023

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. **Write briefly :**

a) Phagocytes

b) Class switching

c) Oncogenes

d) Celiac disease

e) Agglutination

f) Antibody diversity

g) Receptors of cytokines

h) Phases of B-cell maturation

i) Cancer induction

j) Sandwitch ELISA.

SECTION-B

2. Discuss about types and functions of antibodies.
3. What are various receptors and co-receptors on T cell?
4. Explain any three cytokine related diseases and their therapies.
5. Describe cancer immunotherapy in detail.
6. Define Transplantation. What are the reasons of graft rejection?
7. Write a short note on Hybridomas technology.
8. Write down about principle and applications of immune electrophoresis.

SECTION-C

9. Explain molecular structures of antibodies. Discuss briefly purification of antibodies.
10. Give an account off genomic organization and regulation of MHC expression.
11. What are different types of immunodiagnostics? Give applications too.

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Roll No. [ ]

Total No. of Questions : 11 Total No. of Pages : 02

M.Sc Biotechnology (Sem-2)

MOLECULAR CARCINOGENESIS & THERAPY

Subject Code : MBT-213

M.Code : 76252

Date of Examination : 07-06-2023

Time : 3 Hrs. Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

a) What is mutation?

b) Define '*oncogene*' with two examples.

c) Why p53 is known as the '*Guardian of genome*'?

d) Mention the names of prominent human cancer genes.

e) What are secondary messengers?

f) Mention two cancer viruses.

g) What are carcinogens? Give examples.

h) What is lymphoma & sarcoma?

i) What are tumour promoters?

j) What is TCGF?

SECTION-B

2. Explain briefly morphological and ultra-structural alterations in cancer cells.
3. Write a note on oncogenes activity.
4. Explain the functions of proto-oncogene.
5. Explain the role of various human cancer genes.
6. Add a brief note on primary screening of anti-tumour compounds.
7. Why the mutations of Cyclin dependent kinase & MAP kinase are considered oncogenic?
8. How retrovirus infection increases the risk of developing cancer?

SECTION-C

9. Give a detailed account on growth factors and their role in cell proliferation.
10. Discuss in detail, about the stages of chemical carcinogenesis with suitable examples.
11. Write an exhaustive role on gene therapy of cancer.

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July-2023

Roll No.

Total No. of Questions : 11 Total No. of Pages : 02

M.Sc. (BT) (Sem-2)

ENZYME TECHNOLOGY

Subject Code : MBT-203

M.Code : 76247

Date of Examination : 09-06-2023

Time : 3 Hrs. **Max. Marks : 70**

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. **Describe briefly :**

   a) Pingpong reaction

   b) M-M equation

   c) Isomerase enzyme

   d) Coenzyme

   e) Serine protease

   f) Uncompetitive inhibition

   g) Oligomeric enzyme assay

   h) Allosteric enzyme

   i) Active site structure determination

   j) Briggs-Haldane modification.

SECTION-B

2. How are enzymes classified? Mention an example of each class.

3. Discuss briefly kinetics of multisubstrate reactions catalysed by an enzyme.

4. Give role of allosteric enzyme in metabolic regulation.

5. Write a short note on enzymes as reagents.

6. Write down about trapping of enzyme substrate complex.

7. Describe lactate dehydrogenase and its reaction mechanism.

8. How would you prepare an immobilized enzyme? Explain with an example.

SECTION-C

9. Discuss in detail about extraction and purification of an enzyme.

10. What are the different types of enzyme inhibition? Explain with examples.

11. Give an account of application of enzymes.

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Roll No.

Total No. of Pages : 02

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M.Sc. (Biotechnology) (Sem.-2)

CELL AND DEVELOPMENTAL BIOLOGY

Subject Code : MBT-201

M.Code : 76245

Date of Examinaton : 30-05-23

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1) **Attempt all parts :**

a) Give organization and role of golgi apparatus.

b) Draw structure of a typical eukaryotic chromosome.

c) What are peroxisomes?

d) What do you understand by cell lineage?

e) Discuss the importance of stem cell research.

f) What is embryogenesis?

g) What are gametes?

h) Briefly explain the importance of double fertilization in plants.

i) Explain the term phyllotaxy.

j) Write a brief note on cell aggregation in Drosophila melanogaster.

SECTION-B

2) Draw a well-illustrated diagram of plasma membrane. Explain its role in a living cell.

3) Describe the structural features and properties of endoplasmic reticulum.

4) What is programmed cell death? Explain its molecular mechanism and importance.

5) Explain the various mechanisms and applications of signal transduction cascades.

6) Define the term developmental biology. Explain the development of animal embryo from a fertilized egg.

7) Explain the process of seed germination in plants. What is the importance of abiotic factors in seed germination?

8) Compare features of shoot and root apical meristems.

SECTION-C

9) Explain the organization of eukaryotic cells using well labeled diagram.

10) What is cellular differentiation? Explain its molecular mechanism.

11) Explain the processes of limb development and regeneration in vertebrates.

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July-2023

Roll No. | | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 11

M.Sc Biotechnology (Sem.-2)

MOLECULAR CARCINOGENESIS & THERAPY

Subject Code : MBT-213

M.Code : 76252

Date of Examination : 23-12-22

Time : 3 Hrs. Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. **Write briefly :**

   a) Oncogenes

   b) Carcinoma

   c) Carcinogens

   d) Transformed cell lines

   e) Lymphosarcoma

   f) Chemotherapy

   g) Cancer Markers

   h) Tumour Suppressor genes

   i) Gene Replacement

   j) Retroviruses

SECTION-B

2. Discuss and differentiate between Normal and transformed cell lines.
3. Explain Cell cycle regulation and Growth Requirements during Carcinogenesis.
4. List important molecular features of Oncogenes.
5. Write a note on Human Cancer viruses.
6. What is the role of Large T antigen in molecular Carcinogenesis?
7. Write a note on chemotherapy in Hodgkin's disease.
8. Write a note on Cancer Gene Therapy.

SECTION-C

9. Discuss characteristic features of Cancer Cells and factors inducing Carcinogenesis.
10. Explain role of Oncogenes, Oncoviruses and Chromosomal abnormalitie in Human Cancers/tumours.
11. Deliberate on Primary screening of Antitumour compounds and their application in chemotherapy.

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DEC-2022

Roll No. [ ] Total No. of Pages: 02

Total No. of Questions: 11

M.Sc. (BT) (Sem. – 2)

CELL AND DEVELOPMENTAL BIOLOGY

Subject Code: MBT-201

M Code: 76245

Date of Examination: 12-12-2022

Time: 3 Hrs. Max. Marks: 70

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION - A

1. Write a brief account of:

   a) Morphogens

   b) Animal pole

   c) Potency

   d) Cot curve

   e) Wnt signal

   f) Peroxisomes

   g) Cell Cytoskeleton

   h) Stem cells

   i) Apoptosis

   j) Telomere shortening

SECTION - B

2. a) Differentiate between cell competence and specification. (3)

   b) Write about cell surface characteristics importantfor fertilization in Plants. (3)

3. Describe the process of oogenesis in animals. (6)

4. Explain the process of Root and shoot development in plants. (6)

5. Describe the structure and types of chromosomes. (6)

6. Write the importance of Induction in cell differentiation. (6)

7. Discus process of germination in plants. (6)

8. Describe role of Endoplasmic reticulum in secretion of proteins by cells. (6)

SECTION - C

9. Explain in detail Role of Gradients and cascades of protein during development of Drosophila. (10)

10. a) Describe the process of apoptosis. (5)

    b) Explain the Fluid mosaic model of plasma membrane. (5)

11. a) Discus signal transduction in animal cells. (6)

    b) Discus the process of fusion of genetic material during mammalian fertilization. (4)

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Dec-2022

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Total No. of Pages: 02

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M.Sc. (BT) (Sem. – 2)

IMMUNOLOGY AND IMMUNOTECHNOLOGY

Subject Code: MBT-202

M Code: 76246

Date of Examination: 14-12-2022

Time: 3 Hrs. **Max. Marks: 70**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Give a brief account of the following:

   a) Haptens

   b) What are the differences between effector and memory cells

   c) Idiotypes

   d) Discovery of MHC

   e) Pernicious anemia

   f) IL4

   g) Isograft

   h) Cancer induction

   i) Methods of isolation of lymphocytes from blood

   j) RID

SECTION-B

2. What type of interactions occur between antigens and antibodies?
3. What are the functions of macrophages?
4. Describe the structure of TCR.
5. Giving the genomic organization of Class II MCH antigens give their structure.
6. How immunotherapy can help in cancer management?
7. Write down the methods of purification of antibodies.
8. How to produce antibodies.

SECTION-C

9. How rearrangement of genes occurs to form an immunoglobulin gene?
10. What do you understand by immunosuppression? How immunosuppressive therapy is done and what is its significance?
11. Give the detail of fluorescence based assays in immunodiagnosis.

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M.Sc. (BT) (Sem. – 2)

ENZYME TECHNOLOGY

Subject Code: MBT-203

M Code: 76247

Date of Examination : 16-12-2022

Time: 3 Hrs. **Max. Marks: 70**

INSTRUCTIONS TO CANDIDATES:

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SECTION-A

1. Write briefly:

   a) How is enzyme activity assayed?

   b) What is enzyme engineering?

   c) What is turn over number of an enzyme?

   d) Define co-immobilization.

   e) What is an apoenzyme and holoenzyme?

   f) What are enzyme sensors? Give examples.

   g) What is ping-pong mechanism?

   h) What are multienzymes? Give an example.

   i) What is the significance of Michaelis-Menten equation?

   j) How can the formation of ES complex be detected?

SECTION-B

2. How are enzymes classified? Explain.
3. Describe the techniques for immobilization of enzymes.
4. How is enzyme activity regulated in cells?
5. What are inborn errors of metabolism?
6. Describe the mechanism of enzyme catalysed reactions with an example of lactate dehydrogenase.
7. Describe the application of enzymes in pharmaceutical industries.
8. Write a note on enzyme inhibition.

SECTION-C

9. Draw an outline on the large scale production of enzymes.
10. How can the structure of active site determined? Write a note on structure and properties of enzymes.
11. What are the factors affecting activity of enzymes? Explain.

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M.Sc. (BT) (Sem. – 2)

ENZYME TECHNOLOGY

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M Code: 76247

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Total No. of Pages: 02

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M.Sc (BT) (Sem. – 2)

PLANT TISSUE CULTURE

Subject Code: MBT-211

M Code: 76250

Date of Examination : 21-12-2022

Time: 3 Hrs. **Max. Marks: 70**

INSTRUCTIONS TO CANDIDATES:

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SECTION-A

1. Give a brief account of the following:

   a) Totipotency

   b) Macronutrients

   c) Green house

   d) Axillary bud stimulation

   e) Secondary metabolites

   f) Pollen embryogenesis

   g) Aneuploidy

   h) Somaclonal variation

   i) Browning

   j) Binary vector system

SECTION-B

2. Describe the basic steps involved in micro propagation.
3. Give the methods of protoplast fusion.
4. What are the basis of somaclonal variations?
5. What do you understand by chromosome elimination in crosses?
6. Give the method of Thawing a cryopreserved germplasm and determination of its viability by TTC method.
7. What is the role of cytokinins in Plant growth regulation?
8. In reactions of Biotransformations for the synthesis of various compounds, describe the Glycosylation and esterification reactions.

SECTION-C

9. Describe the method of embryo culture and applications of embryo culture.
10. Enlist and describe the vectorless Direct DNA transfer physical methods.
11. How to produce (*in vitro*) secondary metabolites?

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Dec-2022

Total No. of Pages: 02

11

M.Sc (BT) (Sem. – 2)

PLANT TISSUE CULTURE

Subject Code: MBT-211

M Code: 76250

Date of Examination : 21-12-2022

Max. Marks: 70

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SECTION-A

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M.Sc Biotechnology (2018 Batch) (Sem.-2)

MOLECULAR CARCINOGENESIS & THERAPY

Subject Code : MBT-213

M.Code : 76252

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

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2. SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. **Write briefly :**

   a) Differentiate between carcinogenesis and mutagenesis. Give suitable examples

   b) Write the role of TGF-beta in cancer.

   c) What is a tumor suppressor gene and its function

   d) How does HPV play an important role in cervical carcinogenesis?

   e) What is Knudson's two hit hypothesis?

   f) How does dysregulation of H-Ras play an important role in oncogenesis?

   g) What is lymphosarcoma?

   h) What interactions and modifications control cyclin dependent kinase activity?

   i) What is Hodgkin's lymphoma?

   j) Explain how does cisplatin help in killing of tumor cells.

Dec-2019

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SECTION-B

2. Describe the role of RB and cell cycle kinases in maintaining the G1 checkpoint.

3. Differentiate between physical carcinogenesis and chemical carcinogenesis. Give suitable examples.

4. Explain in detail about on tumor suppressor genes such as p53 and its role it plays for tumor development.

5. Explain how can cancer be treated using radiotherapy?

6. Give some example of oncogenes and its functions. Draw neatly the retrovirus life cycle and explain it?

7. What is Cancer? Briefly mention the risk factors and causes and preventive measures of cancer.

8. Write short notes on :

   a) Role of proteinases and tumour cell invasion.

   b) Tumor promoters and its role in carcinogenesis

SECTION-C

9. Discuss the importance of the immune system in the prevention of tumour initiation and growth.

10. What are carcinogens? Explain the mechanism of chemical carcinogenesis and what the factors that affect carcinogenesis are.

11. Give brief account on multi-drug resistance and cancer chemotherapy.

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(S38)-2585

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M.Sc. Biotechnology (2018 Batch) (Sem.-2)

PLANT TISSUE CULTURE

Subject Code : MBT-211

M.Code : 76250

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

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2. SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.
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SECTION-A

1. **Write briefly :**

   a) Callus

   b) Protoplast

   c) Genetic transformation

   d) Micropropagation

   e) Diploid Vs. Haploid plants

   f) Secondary metabolite

   g) Biotransformation

   h) Growth regulators

   i) Cell Totipotency

   j) Transgenic plants

SECTION-B

2. Explain briefly elements of plant tissue culture.
3. Describe briefly protoplast isolation, culture and fusion.
4. Discuss chromosome elimination in wild crosses with suitable examples.
5. Describe briefly anther and microspore cultures.
6. Describe briefly biosynthesis and storage of any one plant growth regulator.
7. Discuss cryopreservation of germplasm with merits and demerits.
8. Describe the production of secondary metabolites by plant tissue culture.

SECTION-C

9. Write an essay on tissue culture techniques used for plant improvement.
10. Describe the physiological effects and mechanism of action of gibberellins.
11. What are somaclonal variations and how they occur? Explain briefly. Also highlight applications of somaclonal variations.

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M.Sc. (BT) (2018 Batch) (Sem.-2)

ENZYME TECHNOLOGY

Subject Code : MBT-203

M.Code : 76247

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

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2. SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. **Describe briefly :**

   (a) Enzyme assay

   (b) Enzyme active site

   (c) Lineweaver-Burk plot

   (d) Allosteric inhibition

   (e) Substrate inhibition

   (f) Allosteric enzymes

   (g) Monomeric enzymes

   (h) Enzyme immobilization

   (i) Therapeutic enzymes

   (j) Food enzymes

DEC-2019

SECTION-B

2. Describe briefly classification of enzymes.
3. Describe briefly trapping of enzyme substrate complex with suitable examples.
4. Describe the Michaelis-Menton equation for the determination of Km and Vmax.
5. Discuss the factors affecting the rate of enzymatic reactions.
6. Describe the role of metals and co-enzymes in enzyme catalysis.
7. Describe briefly serin proteases and oligomeric enzymes with suitable examples.
8. Describe techniques of enzyme immobilization with merits and demerits in each case.

SECTION-C

9. Describe industrial applications of enzymes with suitable examples.
10. Describe steady and non-steady state methods for investigation of enzyme reaction mechanism with merits and demerits in each case.
11. What is enzyme inhibition? Describe competitive, uncompetitive and non-competitive inhibition with suitable examples.

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Total No. of Pages : 02

Total No. of Questions : 11

M.Sc.(BT) (2018 Batch) (Sem.-2)

IMMUNOLOGY AND IMMUNOTECHNOLOGY

Subject Code : MBT-202

M.Code : 76246

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

a) Define immunoprecipitation.

b) What are proto oncogenes?

c) Why is apoptosis important? What triggers apoptosis?

d) What are proinflammatory cytokines?

e) Name common autoimmune disorders.

f) What is human leukocyte antigen? Describe its significance.

g) What are monoclonal and polyclonal antibodies?

h) What is opsonization?

i) What do you mean by compromised immune system? How does it differ from immunosuppression?

j) Describe the significance of CD4 cells.

(S38)-884

SECTION-B

2. What are the components of cell-mediated immunity? Explain.

3. Describe the structure and function of immunoglobulins. Define isotypes, allotypes and idiotypes.

4. What are cytokines? How are they useful in immunology?

5. How are monoclonal antibodies produced? Describe the advantages and limitations of monoclonal antibodies.

6. Describe the molecular mechanism of cancer induction.

7. Write a note on antigen presenting cells.

8. What is a graft? What is an autograft, allograft and isograft? Explain with suitable examples. What is the most successful type of transplant?

SECTION-C

9. What is immunohistochemistry? What are IHC markers? Describe the fundamental principle and applications of IHC.

10. Give the mechanism and pathology of autoimmune disorders.

11. Write a note on production and maturation of B-cells.

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(S38) 884

Roll No. [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

Total No. of Pages : 02

Total No. of Questions : 11

M.Sc. (Biotechnology) (2018 Batch) (Sem.-2)

CELL AND DEVELOPMENTAL BIOLOGY

Subject Code : MBT-201

M.Code : 76245

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. **Attempt all parts :**

   a. Explain functions of PM.

   b. Draw well labeled diagram of Golgi apparatus.

   c. What do you mean by cell aggregation?

   d. Define cell differentiation.

   e. Explain in brief Senescence.

   f. What are the differences between cell fate and cell lineage?

   g. Define Gametogenesis.

   h. Explain the term organogenesis.

   i. What is meant by Endocytosis?

   j. Write functions of Lysosome.

SECTION-B

2. Give a brief account on structure of ER.

3. Write a detailed note on Glyoxisomes.

4. Discuss in detailed the programmed cell death.

5. Give detailed account on double fertilization.

6. Write a detailed note on limb development and regeneration in vertebrates.

7. Write a note on Germinal layers.

8. Discuss in detail Phyllotaxy

SECTION-C

9. Describe structure and functions of chromosomes.

10. Write a note on Embryogenesis.

11. Discuss in detail Shoot meristem.

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