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SARDAR PATEL UNIVERSITY
M Sc IV Semester Examination
Date: 15-04-2017 Day: Saturday
Time: 02.00 PM To 05.00 PM
Subject: BIOCHEMISTRY
Paper: PS04CBIC01 – Animal Biotechnology

Marks: 70

Q1.Select appropriate answer for the following. (8M)

(i) Which of the following cell adhesive molecule does not require Ca^{2+} for adhesion?

(a) Integrins (b) Selectin (c) Cadherin (d) N adhesion molecules

(ii) Which of the following is a liver specific cell line?

(a) Caco-2 (b) S180 (c) HEP-G2 (d) HeLa

(iii) At pH 10, phenol red indicator turns

(a) Purple (b) Pink (c) Yellow (d) White

(iv) The EDTA is required in the media to enhance disaggregation of

(a) Epithelia (b) Bone marrow (c) Adipose (d) Lymphocytes

(v) The differentiation property of neuroendocrine cells is

(a) Immunoglobulin (b) Domes
(c)Tyrosine aminotransferase (d) Catecholamines

(vi) The dihydrofolate reductase gene can be amplified by treating the cells with

(a)Methotrexate (b) Mitomycin C (c) Phorbol ester (d) Cytochalasin b

(vii) Influence of allergen on epidermis along with dermis can be checked by release of

(a) FGF (b) KGF (c) Cytokines (d) cAMP

(viii) Which of the following is not true for embryonic stem cells?

(a) Exhibit clonogenic properties
(b) Generated after gastrulation
(c) Undergo symmetrical cell division
(d) Can develop teratomas

(PTO)

Q2.Answer briefly any Seven from the following. (14M)

(1) Explain various modifications to increase oxygen availability for cells requiring high oxygen during culture.
(2) Name different types of laminar-flow hoods and write their importance in animal cell culture.
(3) How cell lines can be immortalized by using viral genes and telomerase?
(4) Explain the role of carbon dioxide in animal cell culture.
(5) Name any four neuroglial cells and state their functions.
(6) Explain the principle of flow cytometry and write its importance in cell separation.
(7) Write the importance of using poly-D-lysine and matrigel as substrate coating.
(8) Explain any two methods used for the development of transgenic cell line or transgenic animals.
(9) What is amniocentesis technique? Write its therapeutic significance.

Q3. (a) Describe the complete culture protocol for any simple or stratified epithelia. Write its characterization and applications. (6M)
(b) List out various assays to study apoptosis in cultured cells and describe any three assays in detail. (6M)

OR

(b) Describe any three assays to study cytotoxicity in cell line. (6M)

Q4. (a) Describe the organization of cell-cell junctions. (6M)
(b) Describe complete protocol for enzymatic and mechanical disaggregation of tissues to develop primary culture. (6M)

OR

(b) Discuss all the steps for the establishment of a cell line from primary culture. (6M)

Q5. (a) Describe various constituents of complete media. (6M)
(b) Why is the characterization of cell lines necessary? Discuss chromosomal analysis methods for cell line characterization. (6M)

OR

(b) Describe different conditions that improve clonal growth in monolayer culture and suspension culture. (6M)

Q6. (a) Describe the cell separation techniques based on the following aspects
(i)Cell density (ii) Cell size (iii) Antibody based technique (6M)
(b) Discuss the characteristics of transformed and malignantly transformed cell lines. (6M)

OR

(b) Write a note on adult stem cells. (6M)

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[100] [ ] SARDAR PATEL UNIVERSITY

M.Sc. (IV Semester- CBCS) Examination

Subject: Biochemistry

PS04EBIC01; Plant Biotechnology

Monday, April 10, 2017

Time: 02.00 a.m. to 5.00 p.m.

Total Marks: 70

Note: Figures in brackets indicate marks
Answer all the questions in the given answer book

Q1. Choose the appropriate answer for the following multiple choice questions: (8x1=8)

i) Which culture systems assure the genetic stability of propagated plants:
(a) Shoot tip cultures (b) single node cultures
(c) In Vitro microtubers (d) All of these

ii) Which growth hormone is generally used to reduce the precocious germination of somatic embryos.
(a) Naphalene acetic acid (b) 6-furfuryl amino purine
(c) Abscisic acid (d) Gibberellic acid

iii) Which growth hormone is supplemented in the medium in lieu of suspensor during zygotic embryo cultures
(a) IAA (b) Kinetin (c) GA_3 (d) ABA

iv) The signal molecules that induce an array of defense response in plants are called:
(a) Elicitors (b) Pesticides
(c) Inducers (d) Phytoalexins

v) Which of the following enzymes can be used for production of Protoplasts from suspension cultures, callus tissues or intact tissues by enzymatic treatment with:
(a) celluytic enzymes (b) pectolytic enzymes
(c) cellulytic and pectolytic enzymes (d) proteolytic and cellulytic enzymes

vi) In the crown gall diseases caused by *Agrobacterium*, opines play __ role
(a) Source of carbon, nitrogen and energy for *Agrobacterium*
(b) Transfer of DNA to plant cells
(c) Attachment of *Agrobacterium* to the plants
(d) Induction of expression of vir genes

vii) One of the important advantages of Marker Assisted Selection is
(a) It is highly reliable than conventional breeding for selection of desirable trait
(b) It does not involve IPR
(c) Ideal method for selection of phenotypes involving many genes
(d) All of the above

viii) TRIPS allows patenting of new plant varieties. However, India follows the principle of
(a) No patents for plant varieties (b) "sui generis"
(c) Patents only for GM crops (d) none of these

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Q2. Answer any SEVEN of the following in brief: (7x2=14)

(a) Nurse culture Technique and its use
(b) Draw a flow chart for production of synthetic seed
(c) Leptohormone theory
(d) Androgenesis
(e) Write the advantages of zygotic embryo cultures
(f) Binary vectors
(g) Role of microprojectiles in Particle bombardment
(h) Write the disadvantages of patenting
(i) Structural barriers in plant defence

Q3. (a) Based on in vitro growth and development what are the various tissue culture systems identified? Write the applications of each culture system. (6)

(b) Write notes on anther cultures and their importance in agriculture (6)

OR

(b) What are the advantages of micropropagation over vegetative propagation? Discuss in detail various stages of Micropropagation. (6)

Q4 (a) Enlist methods used for direct gene transfer in plants. Explain any two methods with its merits and demerits. (6)

(b) Strategies for *In vitro* Germplasm conservation (6)

OR

(b) Outline various strategies used for in vitro secondary metabolite production and explain any one in detail. (6)

Q5 (a) Draw a schematic diagramme of Ti-Plasmid. Describe the vector based strategies used for construction of recombinant Ti-Plasmid in *Agrobacterium*. (6)

(b) What is Marker Assisted Selection? Which markers are commonly used in MAS? What are the advantages and limitations of this method? (6)

OR

(b) What are reporter genes? Explain the principle and advantages of any one reporter system in detail. (6)

Q6 (a) Explain the events that happen during Hypersensitive Response (HR). How is this different from Systemic Acquired Resistance (SAR)? (6)

(b) Explain in detail the role of Salicylic Acid as a signalling pathway in plant defense. (6)

OR

(b) What are the basic requirements for patenting? Explain the role of TRIPS in plant variety protection (6)

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SARDAR PATEL UNIVERSITY

M. Sc. Biochemistry IV Semester Examination (under CBCS)

Tuesday, 18th April 2017

Time: 2.00 p.m to 5.00 p.m.

Paper: PS 04EBIC09 (Bioinformatics)

Total Marks: 70

Q1. Choose the most appropriate answer for the following questions: (08 Marks)

1. GeneBank, a primary database of publically available nucleic acid sequence is maintained by
   (a) DNA databank of Japan
   (b) DNA databank of india
   (c) European Nucleotide Archive
   (d) National Centre for Biotechnology Information
2. All the following are protein sequence database except
   (a) PIR (b) PSD (c) SWISS PROT (d) EMBL
3. Which one of the following tool allows one to compute various physical and chemical parameters for a given protein in swiss-prot
   (a) MEGA
   (b) Mesquite
   (c) Protparam tool
   (d) Bioedit
4. Which one of the following is useful to analyze several proteins at the same time
   (a) Deep view
   (b) Translate tool
   (c) COILS
   (d) FindMod tool
5. The transcriptomics profile is useful to study..
   (a) Genes that are actively expressed in cell
   (b) mRNA degradation profile
   (c) Gene structure
   (d) All of the above
6. Applications of bioinformatics include
   (a) Data storage and management
   (b) Understand relationship between organisms
   (c) Drug designing
   (d) all of the above
7. Which of the following is a multiple sequence alignment tool?
   (a) Clustal W (b) Chime (c) Dismol (d) Rasmol
8. Sequence alignment is useful
   (a) to trace out evolutionary relationships
   (b) to infer the functions of genes
   (c) to predict new members of gene families
   (d) all of the above

Q2. Answer **any SEVEN** of the following: (7 X 2 = 14 Marks)

1. What is the application of BLAST?
2. Name tools for multiple sequence alignment.
3. Name any four organisms whose complete genome sequences have been published and available in the database.
4. Which are the three widely used approaches for gene annotation?
5. Name any four prokaryotic/eukaryotic gene prediction tools.
6. What is transcriptomics?
7. What is Translate tool? What is its application?
8. What is Rasmol?
9. Name the techniques used for proteome separation and protein identification.

Q.3 (a) Define Bioinformatics and narrate applications of Bioinformatics. (06)
(b)Name three major nucleotide sequence primary databases and explain. (06)

OR

(b) What is sequence alignment? Discuss local and global sequence alignment. (06)

Q.4 (a) What is gene prediction? Explain in brief steps involved in gene prediction. (06)
(b) What are the applications of multiple sequence alignment? (06)

OR

(b) What are genome databases? Give examples and explain. (06)

Q.5 (a) Give examples and explain what can be learnt about the evolutionary relationships of organisms by comparing their amino acid and nucleotide sequences. (06)
(b) What is ExPASy? Briefly mention the use of ProtParam and TMHMM tools. (06)

OR

(b) Explain the experimental approaches to study transcriptomics. (06)

Q.6 (a) Which tool is useful to convert RNA sequence to protein sequence and to confirm the identity of protein? Explain in brief. (06)
(b) What is Phylogenetic analysis? Explain any one tool useful for phylogenetic analysis. (06)

OR

(b) Explain the uses of Bioedit. (06)
