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SARDAR PATEL UNIVERSITY
M Sc IV Semester Examination

Date: 25-04-2015 Day: Saturday

Time: 10.30 AM To 1.30 PM

Subject: BIOTECHNOLOGY

Paper: PS04EBIT01 – Animal Biotechnology

Marks: 70

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

- (i) Which of the following is an endothelial mitogen?
(a) bFGF (b) Erythropoietin (c) Angiogenin (d) KGF

- (ii) At pH 4, phenol red indicator turns
(a) Yellow (b) Purple (c) Pink (d) White

- (iii) The appropriate marker for the characterization of enterocytes is
(a) Tyrosinase (b) Proline hydroxylase (c) Creatine kinase (d) ALP

- (iv) A cell with very slow turnover is
(a) Blood vessel endothelia (b) Keratinocytes (c) Enterocytes (d) Blood cells

- (v) The cell line that can be disaggregated very easily is
(a) Epidermal (b) Endothelia (c) Mesenchymal (d) Hepatocyte

- (vi) Which of the following are the metabolic products of glucose and glutamine?
(a) CO₂ and NH₃ (b) CO₂ and lactate (c) Lactate and ammonium (d) Lactate only

- (vii) The chromosome proteins are partially digested by crude trypsin, producing a banded appearance on subsequent staining in
(a) G banding (b) C banding (c) Q banding (d) R banding

- (viii) Growth medium used for culture of rat hepatocytes is
(a) L-15 Leibovitz (b) DMEM (c) Ham's F-12 medium (d) RPMI-1640

Q2. Answer any Seven from the following.

(14 M)

- (i) Explain the terms: Split ratio and Terminal differentiation.
- (ii) How immortalization of a cell line can be developed using viral genes?
- (iii) Briefly explain antibody based cell separation techniques.
- (iv) What is a conditioned medium? Write its significance in cell culture.
- (v) Why is microtitration assay considered suitable for toxicological studies?
- (vi) State various parameters that control differentiation.
- (vii) What is malignancy? Explain.
- (viii) What is focal adhesion? Explain.
- (ix) What are the basic differences between embryonic stem cells and adult stem cells?

Q3. (a) Write a brief note on the basic requirements for a cell culture laboratory. (6M)
(b) What is primary culture? Describe in brief enzymatic disaggregation in primary culture. (6M)

OR

(b) Give an account of different molecules involved in cell-cell adhesion and cell-matrix adhesion in animal tissues ; and write their significance during cell culture. (6M)

Q4. (a) Give an overview on various signal transduction pathways that help to maintain stem cells and prevent their differentiation. Also add a note on any three therapeutic applications of stem cells. (6M)

(b) Why cell lines are considered a good model for the toxicological studies? Discuss different applications of cytotoxicity assays using cell lines. (6M)

OR

(b) Discuss how cells can be characterized based on DNA content and chromosomal analysis. (6M)

Q5. (a) Describe the culture of any one epithelial cell. Write its characterization during culture and discuss its applications. (6M)

(b) State different types of serum used in complete media. Give the details of major contents of serum and discuss importance of serum for animal cell culture. (6M)

OR

(b) Write a note on transgenic animals and discuss their applications. (6M)

Q6. (a) Answer the following in the context of monolayer culture. (6M)

(i) Under which conditions subculture of a primary culture is required?

(ii) Discuss the protocol for subculture of a primary culture.

(b) Write a note on conditions that improve the clonal growth. (6M)

OR

(b) Enumerate various assays to study cell viability and cell apoptosis; and explain in detail the experimental techniques to study apoptosis. (6M)
