P. P. SAVANI UNIVERSITY

Fifth Semester of B.Sc. Examination
December-2021
SSBT3070–Animal Biotechnology I

09.12.2021, Thursday **Time: 12:30 p.m. to 3:00 p.m.** **Maximum Marks: 60**

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

Section-I (Total Marks - 30)

Q.1 Short Questions **[10]**

1.1 Objectives **[05]**

1.1a With the increase in atmospheric CO_2, the culture media will display

- **A** increase in H_2CO_3
- **B** decrease in H_2CO_3
- **C** increase in pH
- **D** Both A and C

1.1b Following is an example of anchorage-independent cells

- **A** Keratinocytes
- **B** Fibroblast
- **C** Lymphocythes
- **D** Hepatocyte

1.1c The inclusion of pyruvate in the medium enables cells to

- **A** decrease their endogenous production of CO_2
- **B** decrease their endogenous production of O_2
- **C** increase their endogenous production of O_2
- **D** increase their endogenous production of CO_2

1.1d Glutamine is a ..... in animal cell culture medium

- **A** a source of alternative energy
- **B** a source of alternative nitrogen
- **C** a source of amino acid
- **D** All of the above

1.1e ..... acts as a carrier protein in animal cell culture medium

- **A** Fibronectin
- **B** α2-macroglobulin
- **C** Albumin
- **D** All of the above

1.1f Phenol red is used as ..... in animal cell culture media

- **A** pH indicator
- **B** viscosity indicator
- **C** foaming indicator
- **D** temperature indicator

1.1g Epithelial–mesenchymal transition (EMT): is a process by which

A Epithelial cells lose their cell-cell adhesion
B Mesenchymal cells lose their cell-cell adhesion
C Both Epithelial and Mesenchymal cells lose their cell-cell adhesion
D None of the above

1.1h Role(s) of Hydrocortisone in animal cell culture include
A Promote Cell attachment
B Promote Cell proliferation
C Induce cell differentiation at high cell density
D All of the above

1.1i Availability of serum fluctuates based on several factors such as
A Spread of disease among cattle
B Economic or political reasons
C The environmental factors (e.g. drought, flood etc.)
D All of the above

1.1j Stem cell regeneration is an example of
A Symmetric cell division
B Asymmetric cell division
C Unidirectional cell division
D Both Symmetric and Asymmetric Cell Division

1.2 Answer the Following: (MCQ/Short Question/Fill in the Blanks) **[05]**

1.2a HeLa is a continuous cell line (True/False)
1.2b With every passage the heterogeneity of cells decreases (True/ False)
1.2c Cell proliferation increases with the high cell density (True/False)
1.2d Cells in a culture may be transformed spontaneously (True / False)
1.2e Phenol red is a buffer in animal cell culture medium (True/False)

Q.2 Short Notes (Attempt any two) **[06]**

A Explain why fog cell culture was quite popular once.
B Stem Cell Plasticity
C Substrate adhesion

Q.3 Explain in detail (Attempt any two) **[14]**

A Types of animal cell culture
B Physiochemical parameters for animal cell culture
C Explain why proliferation and differentiation is antagonist to each other?
Explain (a) progenitor cells, (b) differentiation, (c) dedifferentiation

Section-II (Total Marks - 30)

Q.1 Short Questions **[10]**
1.1 Objectives **[05]**

1.1a Primary culture has following characteristic features
A unlimited life span
B homogenous culture
C abnormal physiology

D none of the above

1.1b Which of the following is true for continuous cell lines

A do not represent in vivo state
B they are genetically modified
C they have altered physiological properties
D all of the above

1.1c In contrast to the cells from serum containing media, the cells from serum-free media

A are more fragile
B are more prone to physical damage
C require media components in ultra pure state
D all of the above

1.1d Continuous cells lines generally

A proliferate indefinitely (immortalized)
B are more robust
C both A and B
D none of the above

1.1e Serum-free media provides

A ability to make a medium more selective for a particular cell
B regulation of proliferation
C regulation of differentiation
D all of the above

1.1f Transformation may occur

A by chemical induction
B by viral induction
C spontaneously
D all of the above

1.1g Aprotinin is used as

A a protease inhibitor
B antifoaming agent
C a carrier for nutrition
D None of the above

1.1h Which of the following is NOT true for continuous cell lines?

A They are highly unstable
B They do not exhibit genetic alteration
C they exhibit genetic variation at almost every passage
D They are indefinite cell lines

1.1i Which of the following method has least risk of cell damage

A warm trypsinization
B cold trypsinization
C mechanical disaggregation
D both B and C

1.1j Laminin in media is used as a

A a carrier of iron
B a carrier of lipids

C an adhesion factor
D a protease inhibitor

1.2 Answer the Following: (MCQ/Short Question/Fill in the Blanks) **[05]**

1.2a Serum consists of TGF- β which is a negative growth regulator (True/False)
1.2b Serum consists of TGF- β which is a negative growth regulator (True/False)
1.2c FBS is the most commonly used serum for media (True/False
1.2d Lymphocytes are anchorage dependent (True/False)
1.2e Collagenase is used for disaggregation of cells from tissue (True/False)

Q.2 Short Notes (Attempt any two) **[06]**

A Serum-free media
B Continuous cell lines
C Anchorage dependent vs. anchorage independent cell

Q.3 Explain in detail (Attempt any two) **[14]**

A Methods for establishing primary cell culture.
B Primary cell culture and its application
C Role of serum in animal cell culture