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63/2 (SEM-3) BIT 302

2021

(held in 2022)

BIOTECHNOLOGY

(Theory Paper)

Paper Code : BIT - 302

(Animal Biotechnology)

Full Marks – 80

Time – Three hours

The figures in the margin indicate full marks
for the questions

1. Answer any *eight* of the following questions :

1×8=8

(a) Name the type of culture which is prepared by inoculating directly from the tissue of an organism to culture media.

(i) Primary cell culture

(ii) Secondary cell culture

(iii) Cell lines

(iv) Transformed cell culture

[Turn over

- (b) Disaggregation of cells can be achieved by
- (i) Physical disruption
 - (ii) Enzymatic digestion
 - (iii) Treating with chelating agents
 - (iv) All of the above
- (c) The human fibroblast is a classical example of
- (i) established cell lines
 - (ii) stable primary cell lines
 - (iii) cell transformations
 - (iv) cell transfections
- (d) In monoclonal antibody technology, tumor cells that can replicate endlessly are fused with mammalian cells that produce an antibody. The result of this fusion is a
- (i) myeloma
 - (ii) natural killer cell
 - (iii) hybridoma
 - (iv) lymphoblast

- (e) In laminar air flow which type of filter is located ?
- (i) Membrane filter
 - (ii) Seitz filter
 - (iii) HEPA filter
 - (iv) Vacuum filter
- (f) DMEM stands for
- (i) Duchenn's Modified Eagle's Medium
 - (ii) Dulbecco's Modified Eagle's Medium
 - (iii) Dibasic Monophosphate EDTA Medium
 - (iv) Dibasic Monoglutamate EDTA Medium
- (g) Trypsinization is the process of
- (i) Cell lysis using trypsin
 - (ii) Cell adhesion using trypsin
 - (iii) Cell dissociation using trypsin
 - (iv) Cell transformation using trypsin

(h) Tissue transplants usually give rise to this response

(i) Immune response

(ii) Heat response

(iii) Cold response

(iv) No response

(i) Which of the following type of vaccines did the Moderna and Pfizer-BioNTech companies design for COVID-19 ?

(i) mRNA vaccine

(ii) Subunit vaccine

(iii) Toxoid vaccine

(iv) Vector-borne vaccine

(j) Electroporation is a method used in

(i) Induced gene mutation

(ii) Cellular transformation

(iii) Mechanical shearing of tissue

(iv) Cell adhesion

(k) Media which is obtained from an extract composition of which is not known is called

(i) Synthetic media

(ii) Semi-synthetic media

(iii) Serum free media

(iv) Natural media

2. (a) What is a substrate ? Mention its categories.
1+1=2

Or

(b) Write down the significance of heat inactivation of serum prior to its application in cell culture media.

3. Distinguish between the following (any five) :
2×5=10

(a) Antibodies and interferons

(b) Primary cell line and established cell line

(c) Transfection and transformation

(d) Embryonic stem cells and adult stem cells

(e) Adherent cell culture and suspension cell culture

(f) Autoclave and hot air oven

4. Write short notes on (any four) : $5 \times 4 = 20$

- (a) CO₂ incubator
- (b) Cell passaging
- (c) Balanced salt solution
- (d) Watch glass technique for organ culture
- (e) Targetted gene transfer
- (f) Disintegration of explants
- (g) Cryopreservation.

5. Answer any two of the following questions :

(a) What is gene therapy? Compare between somatic cell gene therapy and adult gene therapy. $8 \times 2 = 16$

(b) What is hybridoma technology? Write down the principle and procedure of hybridoma technology. $2 + 6 = 8$

(c) Briefly describe the steps involved in IVF technology. What are the ethical concerns of IVF technology? $2 + 6 = 8$

(d) What are the various types of contamination that occur in cell culture? Discuss briefly. $5 + 3 = 8$

6. Answer any two of the following questions : $12 \times 2 = 24$

(a) Discuss various components of an animal cell culture laboratory highlighting the utility of the instruments and equipments used in that laboratory.

(b) How does serum differ from plasma? Write down the advantages and disadvantages of using serum in animal cell culture media. $2 + 5 + 5 = 12$

(c) What are the various types of stem cells? Discuss the application of each type in stem cell therapy, with suitable examples. $3 + 9 = 12$

(d) Write a note on transgenic animals produced. List out the notable gene transfers in animals with special reference to their objectives and transfection methods. $6 + 6 = 12$