MODEL ANSWERS

M.Sc. III Semester Biotechnology Examination, 2014

LBTM-304: Animal Biotechnology

Answer Key for Section- A (Objective Type Questions)

Question 1:

(i) (D) all of the above

(ii) (c) Both

(iii) (c) Reduction in the pH of culture hence loss of cell Viability.

(iv) (d) ECL do not show much evidence of spatial orientation.

(v) (d)All

(vi) (c) The anatomical relationship and functions are not maintained.

(vii) (b) Cell divides asymmetrically to produce one determined or fully differentiated cell.

(viii) (a) Unused embryos from fertility clinic.

(ix) (a) Liposomes

(x) (b) Gametes only.

Model Answers for section-B (Long Answer Type Questions)

Answer 2: A blood substitute / artificial blood or blood surrogates is a substance used to mimic and fulfill some functions of biological blood. It aims to provide an alternative to blood transfusion, which is transferring blood or blood-based products from one person into another.

- **Oxygen-carrying substitutes**: An oxygen-carrying blood substitute, sometimes called artificial haemoglobin, is an artificially made red blood cell substitute whose main function is to carry oxygen, as does natural haemoglobin. There are two basic approaches to constructing oxygen therapeutic: (i) Per fluorocarbons (PFC) based (ii) Haemoglobin based.
- **Advantages over human blood**
- **Risks**
- **Current Therapeutics: Perfluorocarbon based, Haemoglobin based.**
- **Other functions than carrying blood**

Answer 3: Somatic cell nuclear transfer (SCNT): it is a laboratory technique for creating a viable embryo from a body cell and an egg cell. The technique consists of taking an enucleated oocyte (egg cell) and implanting a donor nucleus from a somatic (body) cell. It is used in both therapeutic and reproductive cloning. Dolly the Sheep, famous for being the first successfully cloned mammal was created using this process.

- Process of SCNT
- Application
- Limitations

Answer 4: A tissue culture laboratory should be designed with the following considerations:

(i) Layout of aseptic room: (Explain under the following heads):
   (a) Sterile handling area (b)Laminar Flow (c)Quarantine and Containment(d)Service bench.

(ii) Incubation

(iii) Preparation area: (describe under the following heads)
   (a) Media preparation (b) Washup (c) Storage

(iv) Usefull additions.

Answer 5: Types of Stem cells:

(i) Embryonic stem cell

(ii) Adult stem cell: Blood and skin stem cells, Cord blood stem cells, Mesenchymal stem cells,

(iii) Induced Pluripotent stem cells

Give application of each type.

Based on potency it is of following types: (Totipotent, Pluripotent, Multipotent, oligopotent, unipotent)- Explain each.

Answer 6: Procedure of cryopreservation of animal cells: Discuss the procedure/steps involved in cryopreservation of animal cells in liquid Nitrogen (-196°c).

Application : Disscus application of cryopreserving animal cells.

Answer 7: In vitro regulation of blood cell production: Discuss in vitro regulation of blood cell production by erythropoietin.

Answer 8: **Cell cloning:** The process of producing a group of cells that are genetically identical (clones) to a single ancestral cell. (Discuss the following):

Cloning of Monolayer cells: Dilution Cloning

Conditions that improve clonal growth

Suspension Cloning.

Pharming: Molecular pharming is the production of pharmaceutically important and commercially valuable proteins. It harnesses heterologous protein expression systems, such as plants and other traditional expression systems like bacteria, mammalian cell culture and transgenic animals for the large- scale production of recombinant proteins that are therapeutically valuable.

Animal Pharming: Transformation of animals for pharming beings with the preparation of a gene construct in which a specific milk protein promoter is ligated to the gene coding for the protein of interest. Gene transfer is then affected by microinjecting copies of the cloned gene into the proembryo of a recently fertilised egg with the aid of special optics and a micromanipulator system.

Applications of Animal Pharming: Discuss its application.

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