M.Sc. BIOTECHNOLOGY
FIRST SEMESTER
CELL & DEVELOPMENTAL BIOLOGY
MBT-101

(Use separate answer scripts for Objective & Descriptive)

Duration: 3 hrs. **Full Marks: 70**

[PART-A: Objective]

Time: 20 min. **Marks: 20**

Choose the correct answer from the following: ***1x20=20***

1. The single cell which further develops into an embryo is known as:
   a. Egg b. Zygote
   c. Blastomeres d. Morula

2. The ability of a cell to differentiate into a closely related family of a cell is known as:
   a. Totipotent b. Multipotent
   c. Unipotent d. Pluripotent

3. The cell which can give rise to placenta, zygote and embryo is known as:
   a. Totipotent b. Unipotent
   c. Pluripotent d. Multipotent

4. Which of this is not the non-preventable cause of infertility?
   a. Anatomical b. Genetical
   c. Hormonal d. Infection

5. The differential cell product of lens cell type is known as:
   a. Haemoglobin b. Crystallins
   c. Cytokines d. Keratin

6. The morphogenetic determinant involved in cellular differentiation are:
   a. Lipid or RNA b. DNA or Carbohydrate
   c. Protein or RNA d. Protein or Lipid

7. Spatial differences in shape, structure, and function within a cell is.....
   a. Morphogenesis b. Differentiation
   c. Cellular development d. Cellular polarity

8. In syntycium.....divides.
   a. Cell b. Nucleus
   c. Drosophila egg d. Plasma membrane

9. In hypotonic solution the cell usually.....
   a. Swells b. Shrinks
   c. Remain same d. None of the above

10. Plasma membrane is responsible for.....
    a. Cell-Cell contact b. Cell communication
    c. Cellular transport d. All are correct

11. The enzyme kinase has the ability to.....
    a. Add Phosphate
    b. Remove Phosphate
    c. Decrease Phosphate
    d. Degrade energy

12. Steroid hormone has target in the.....
    a. Cytoplasm
    b. Ribosome
    c. Nucleus
    d. Mitochondria

13. DNA is present in.....
    a. Nucleus
    b. Mitochondria
    c. Chloroplast
    d. All are correct

14. The major amino acids of histones are:
    a. Arginine
    b. Histidine
    c. Lysine
    d. All of the above

15. The most important function of nuclear membrane is:
    a. Regulate nucleo cytoplasmic traffic
    b. Synthesis rDNA
    c. Protect genetic material
    d. Prevent the entry of active ribosomes

16. The smooth ER is especially abundant in cells that synthesize extensive amounts of:
    a. Toxins
    b. Enzymes
    c. Proteins
    d. Lipids

17. What is the main difference between prokaryotes and eukaryotes?
    a. Prokaryotes cannot undergo cell division.
    b. Prokaryotes have no DNA.
    c. Prokaryotes have no internal membranes.
    d. Prokaryotes have no cytosol.

18. Regressive metamorphosis in amphibians include:
    a. Organs present at the larval stage but removed at adult stage.
    b. Organs present at adult stage but not present at the larval stage.
    c. Organs present both at the larval stage and the adult stage.
    d. None of the above.

19. The hormone that triggers the prothoracic gland in insects:
    a. Juvenile hormone
    b. Ecdysteroids
    c. Eclosion hormone
    d. PTTH

20. Cytoskeletons are chemically:
    a. Nucleoprotein filaments
    b. Nucleoprotein filaments and lipids
    c. Ribonucleoprotein filaments
    d. Protein filaments

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[PART-B: Descriptive]

Time: 2 hrs. 40 min. **Marks: 50**

[Answer question no.1 & any four (4) from the rest]

1. What is the significance of maternal gene? Explain the significance of cellular polarity in drosophila development. 5+5=10

2. Write short notes on: 5+5=10
   a. Morphogenetic gradient.
   b. Mechanism of cellular differentiation.

3. a. Define stem cells and classify them based on their potency. 4+6=10
   b. What do you mean by infertility? Describe briefly the process of invitro fertilization and embryo transfer.

4. Write short notes on the following: 5+5=10
   a. Types of regeneration.
   b. Hormonal control of metamorphosis in amphibians.

5. a. Explain fluid mosaic model of plasma membrane. 5+5=10
   b. Explain the function of plasma membrane.

6. a. Explain the mechanism of steroid hormone signal transduction. 6+4=10
   b. Describe autocrine and paracrine signaling mechanism.

7. Define metamorphosis and regeneration. Explain the mechanism of metamorphosis in insects. 5+5=10

8. Write short notes on: 5+5=10
   a. Plasmids, types and their role in bacteria.
   b. Histones, types and their function.

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