Q. No. BTE 610/ 37

B.TECH/EVEN
REG/(22-23)

Even Semester Mid-term Examination, 2022-23

ANIMAL BIOTECHNOLOGY

BTE 610

Full Marks : 25

The figures in the margin indicate full marks.

Marks $1 \times 25 = 25$

1. Animal cells grow in laboratory at
   (a) 37C 5% CO2
   (b) 27 C 5% CO2
   (c) 37C 10% CO2
2. Animal cells grow in
   (a) DMEM
   (b) DMEM+ 10% serum
   (c) MEM
3. Antibiotics are added in cell culture media
   (a) Better growth of cells
   (b) Extra nutrient for cells
   (c) Prevention of infection
4. Trypsinization is important for cell culture
   (a) Prevention of infection

(b) nutrient for cells

(c) Helps in removing the cells from culture plate

5. Media contains a pH indicator (phenol red) looks

(a) pink/red at pH 7.2

(b) acidic - purple

(c) Basic - yellow or orange

6. Stem cells have

(a) Self-renewal property

(b) Remain unspecialized

(c) Potency to become specialize

(d) All true

7. Stem cells are isolated from

(a) Embryo

(b) Fetus

(c) Adult tissue

(d) All above

8. Adult stem cells are

(a) Pluripotent

(b) Multipotent

(c) Unipotent

(d) All are true

(*Continued*)

9. Yamanaka reported that pluripotent stem cells can be established by transcription factors

   (a) Oct4and Sox2

   (b) Klf4 and Myc2

   (c) Oct4, Sox2 and Myc2

   (d) All four Oct4,Sox2, Klf4 and Myc2

10. EDTA added with Trypsin in cell culture because

   (a) Increase the trypsin activity

   (b) Inactivate the Trypsin activity

   (c) Moderate activity of Trypsin

   (d) None is true

11. HeLa cells grow in

   (a) DMEM

   (b) MEM

   (c) RPMI

   (c) All

12. Basic components of culture media are

   (a) Amino acids & glucose

   (b) Amino acids, glucose and salts

   (c) Amino acids, glucose, salts and vitamins

   (d) All true

13. Hayflick's phenomenon suggests

(a) Cells will continue to grow for a limited number of passage

(b) Cells will continue to grow for an unlimited number of passage

(c) Cells will continue to grow for an unlimited number of passage if appropriate nutrients are given

(d) None is true

14. Contact inhibition is specifically observed in

(a) Cancer cells

(b) Normal adherent cells

(c) Lymphoblasts cells

(d) None

15. Stem cells isolated from blastocyst

(a) Can form all tissues including placenta

(b) Can form all tissues excluding placenta

(c) Can form only ectoderm and mesoderm

(d) Can form only ectoderm and endoderm

16. Oct3/4 and Sox2 maintain the pleuripotency only in

(a) Early embryo

(b) Both in early embryo and ES cells

(c) Only in ES cells

(d) None

17. C-Myc and Klf4 are

(a) Transcription factors

(b) Modify the chromatin structure

(c) Facilitate the Oct3/4 and Sox2 binding

(d) All are true

18. iPS cells and ES cells are

(a) similar

(b) identical

(c) somewhat similar but not identical

(d) None

19. Immune rejection possibility does not occur in

(a) Embryonic stem cells

(b) Adult cells

(c) iPS cells

(d) None

20. Fbx 15 expresses in

(a) Undifferentiated ES cells

(b) Differentiated cells

(c) Both

(d) None

21. Adeherant cells grow in

(a) DMEM

(b) RPMI

(c) Both

(d) None

22. Counting cell numbers by

(a) Haemocytometer

(b) Spectrophotometer

(c) Thermometer

(d) None

23. Subculture or reseeding cell during

(a) Log phase

(b) Lag Phase

(c) Plateau phase

(d) All

24. Contact inhibition of the cells in cell culture occurs during

(a) Log phase

(b) Lag Phase

(c) Plateau phase

(d) All

25. Adult stem cells have

(a) Possibility of immune rejection

(b) No rejection or minimum rejection

(c) None

(d) All above

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Q. No. BTE 613/ 38

B.TECH/EVEN
REG/(22-23)

Even Semester Mid-term Examination, 2022-23

HUMAN GENOMICS

BTE 613

Full Marks : 25 *Time* : 90 Minutes

The figures in the margin indicate full marks.

Answer *all* the questions.

Question No.	Body of the Question	Marks	Mapped CO

1. How does mono-cistronic gene layouts in higher eukaryotes add up to the diversity and complexity of the organisms? Are they anyway related to the total energy expenditure of the organism? Comment! 2+2=4 CO1

2. In the context of co-location for redox regulation what are co-localized and what is redox regulation? 1.5+1.5=3 CO1

3. Are the intron-less mitochondrial genome problematic? 2 CO1

4. Comment on monocsitronic and overlapping mitochondrial gene lay out! 1.5+1.5=3 CO1

5. Repeat element in nuclear genome are the canvas of evolution. Comment! 3 |CO1

6. How does overlapping transcription factor binding site help in finer spatio-temporal gene regulation? 2 CO1

7. What is mitochondrial heteroplasmy? Why a muscle disorder due to mitochondrial heteroplasmy may not be detected in mitochondria isolated from blood samples? 2+2=4 CO 2

8 What are inversions and interstitial deletion in the context of chromosomal aberration? 2+2=4 CO1, CO2

COURSE OUTCOMES

CO1: To understand the general organization of human nuclear and mitochondrial genome and know about the salient features and characteristics

CO2: To acquire knowledge the human genome project and its implication on clinical biology in the post Genomic era.

CO3: To familiarize with different scientific techniques used for studying different features of genome.

CO4: To get an overview about different applications of the genomic based knowledge.

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Q. No. BTE 614/ 34

B.TECH/EVEN
REG/(22-23)

Even Semester Mid-term Examination, 2022-23

MOLECULAR VIROLOGY

BTE 614

Full Marks : 25 *Time* : 90 Minutes

The figures in the margin indicate full marks.

Answer *all* the questions.

Question No.	Body of the Question	Marks	Mapped CO

1. In 1892, Dimitri Iwanowski, a Russian botanist, showed that, mosaic disease of tobacco leaves (mottled browning of tobacco leaves) not caused due to bacteria, but some other germ. How he reached to such conclusion? 2 CO1

2. Name three different methods by which structure of a virus particle can be analysed? 3 CO2

3. How do you distinguish between productive and non-productive viral infections. Give one example each. 2+1 CO1

4. Why COVID caused damaged to multiple organs whereas Rabies mostly affects nervous system? 3 CO1

5. If a virus infection leads to immunity to reinfection, how will it behave in a small, isolated population and why? 3 CO1

6. Why do we say virus particles are metastable and how is it achieved? 3 CO1

7 Fill in the blanks with appropriate word/s. 1×8=8

(a) Two basic symmetries in which viral particle can assemble are _____ and _____. CO1

(b) Upon replication polio viruses will come out of the cell by _____ the cell. These types of viruses are called _____ virus. This feature helps us to determine virus titer by _____. CO2

(c) For JEV virus bats act as _____ and mosquitos act as _____. CO1

(d) A Rabies virus infected animal will be able to spread the virus only when virus reaches _____ tissue. CO1

COURSE OUTCOMES

- CO1: Acquire an understanding of virus life cycle and host-virus interactions.
- CO2: Acquire an idea about detection, prevention and treatment of virus infections.
- CO3: To learn about use of virus in biotechnology.

NATIONAL INSTITUTE OF TECHNOLOGY DURGAPUR

Even Semester Mid-term Examination, 2022-23

Course Code: BTE 616 Full Marks: 25

Course Name: Nanobiotechnology Time: 90 Mins

Question Paper No.: NITDGP/BTE616/1 Date of Exam: 24/02/2023

Instructions: Answer all the questions.

Materials to be supplied: Graph paper shall be supplied, if required.

Question No.	Body of the Question	Marks	Mapped CO
1	(a) Who pioneered the concept of nanotechnology? (b) Discuss the advantages of nanotechnology over conventional methods. (c) Which nanoparticles are responsible for the interesting properties of the Lycurgus Cup?	1+3+1	CO1
2	(a) Discuss various important characteristics of the atom. (c) Why nanotechnology but not femtotechnology? (c) What is IBM's Quantum Corral?	3+1+1	CO1
3	(a) What are the major cell types present in stomach epithelia and what are their functions? (b) Discuss the stability of protein-based drugs like insulin in the gastrointestinal tract considering the pH and enzyme variations.	3+2	CO4
4	(a) Discuss the structural features of a single layer and a multilayer epithelium with schematics. (b) What are the functional roles of these two types of epithelia? (c) Which types of epithelia are more suitable for drug delivery?	2+2+1	CO4
5	(a) What is liposome? Name two lipid molecules suitable for liposome formulation. (b) Where do you load hydrophobic and hydrophilic drugs in liposomes? Explain with schematic. (c) Discuss the advantages and disadvantages of liposomes as a drug delivery vehicle.	1+2+2	CO3+CO4

Course Outcomes

CO1: Acquire an idea about nanoscale phenomenon.

CO2: To learn about the basic investigation tools for the nanobiotechnology.

CO3: To learn about bottom up and top-down synthesis of nanosystems

CO4: to get comprehensive understanding of applications of nanotechnology in biology