

Animal Biotechnology BTE610

Even Semester (Regular)

2022

Answer all the questions

Time 90 minutes

Total 30 marks

1. You are asked to clone human insulin gene. Briefly describe the each step. Choose any vector of your choice and explain screening procedure. Confirmation of the gene is required. Marks10: CO1
2. Write the steps of IVF technology. What is 47th Chromosome? Marks5:CO2&3
3. Make 500ml of culture growth media for HeLa cell: Name the artificial media and explain the composition of the total growth media. Marks 5: CO2&3
4. What is stem cell? What are the sources of the stem cells? Can you make differentiated cell into stem cells? If yes. How (explain with proper drawing)? Marks10: CO4

(CO: course outcome)

NATIONAL INSTITUTE OF TECHNOLOGY DURGAPUR

Even Semester End-term Examination, 2021-22

Course Code: BTE613

Full Marks: 30

Course Name: Human Genomics

Time: 90 Minutes

Question Paper No.: NITDGP/BTE613/12

Date of Exam: 22/04/2022

Instructions: Answer all the questions.

Question No.	Body of the Question	Marks	Mapped CO
1	What are pseudogenes?	2	CO1
2	What is the difference between processed and unprocessed pseudogenes?	3	CO1
3	How pseudogenes drive evolution?	3	CO4
4	Briefly state the mechanism by which pseudogenes can form proteins with novel function?	3	CO1
5	What are the differences in consequences of DNA methylation and Histone Methylation?	3	CO2
6	What is X inactivation and how does it implement dosage compensation?	4	CO1
7	Females are genetic mosaics with respect to the parental origin of inactivated X chromosome! What might be the biological consequence of this with respect to an X-Linked disease?	3	CO2
8	What will happen if an X-inactivation center is translocated to chromosome 1 due to an aberration?	3	CO4
9	Temperature-dependent sex determination (TSD) is a type of environmental sex determination in which the temperatures experienced during embryonic/larval development determine the sex of the offspring. What do you think could be the mechanism of such extraordinary feat?	3	CO4
10	What is ChIP? How is it applied to study Epigenetics	3	CO3

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.

NATIONAL INSTITUTE OF TECHNOLOGY DURGAPUR**Even Semester End-term Examination, 2021-22****Course Code:** BTE614

Full Marks: 30

Course Name: Molecular Virology

Time: 90 Minutes

Question Paper No.: NITDGP/BTE614/

Date of Exam: 21/04/2022

Instructions: Answer any **10** questions.

Materials to be supplied: NA

Question No.	Body of the Question	Marks	Mapped CO
1	Discuss three strategies virus can use to evade/prevent antiviral immune response.	3	CO1
2	What is p53? How viruses affect p53? Why is it important for the viruses?	3	CO1
3	What is the function of herpes simplex virus (HSV) LAT gene and how does it achieve that?	3	CO1
4	How latent and persistent pathogenic infections differ? Give one example each.	3	CO1
5	How live attenuated virus vaccine and inactivated virus vaccine differ? In your opinion which one is advantageous?	3	CO2
6	Why genetic vaccines are one of the front runners in the development of vaccine against COVID-19?	3	CO2
7	How neutralizing antibodies help to control viral infections?	3	CO2
8	How can you target viruses using CRISPR-CAS system? Discuss any one strategy.	3	CO2
9	Why acyclovir is such a potent drug?	3	CO2
10	What are biomimetics? Give one example of it in antiviral therapy.	3	CO2
11	Why lentiviral vector system uses three plasmids?	3	CO3
12	Discuss the application of viral vectors in the cancer therapy.	3	CO3

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 End-term Examination, 2021-22****Course Code:** BTE616

Full Marks: 30

Course Name: Nanobiotechnology

Time: 90 Min

Question Paper No.: NITDGP/BTE616/1

Date of Exam: 22/04/2022

Instructions: Answer all questions.

Question No.	Body of the Question	Marks
1	a. Define Resolution. b. What voltage need to be applied in a TEM instrument to generate an electron with wavelength of 1 nm. Given: Mass of electron = 9.1×10^{-31} kg. Electric charge = 1.6×10^{-19} C. Planks constant 6.2×10^{-34} Joule.second (J.s). c. What are major differences between SEM and TEM imaging techniques? d. Which instrument (SEM/TEM) you will prefer to image the following: virus, red blood cell, Cell membrane, protein.	2+4+2+2
2	a. Describe bottom-up and top-down techniques in your own word with examples. b. What are the common protein secondary structures. c. Describe the characteristic of one of the secondary structures.	2+1+2
3	a. Identify the palindromes: i. <i>Sator arepo tenet opera rotas</i> ii. MOONMOON iii. Ala-Phe-Val-Ser-Val-Phe-Ala iv. 5'GAAATC 3'CTTTAG b. What is persistence length? What are the persistence lengths of double and single stranded DNA?	2+3
4	a. What do you understand by the term 'tissue engineering'? b. What are different types of tissues found in animal? Mention the function of one of the tissues. c. What is extracellular matrix and what is its biological functions. d. What do you understand by autologous, allogenic and xenogenic cell types.	2+2+3+3