

**M.Sc. BIOTECHNOLOGY**  
**FOURTH SEMESTER**  
**VIROLOGY**  
**MBT-403**

(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:**

*1×20=20*

1. Transcription of the  $\lambda$  genome is catalyzed by the hosts cell:  
a. RNA dependent DNA polymerase      b. DNA dependent DNA polymerase  
c. RNA dependent RNA polymerase      d. DNA dependent RNA polymerase
2. Bacteriophage is a type of:  
a. DNA      b. Fungi  
c. Virus      d. Gram (-) ve bacteria
3. The Class-IV in the virus classification proposed by David Baltimore includes:  
a. ssDNA viruses      b. (+) sense ssRNA viruses  
c. (-) sense ssRNA viruses      d. RNA reverse transcribing viruses
4. Normal cellular prion protein (Pr<sup>PC</sup>), found on the surface of neurons, is coded for by a gene on:  
a. chromosome 20      b. chromosome 15  
c. chromosome 21      d. chromosome 11
5. Which of the following represents a difference between viruses and viroids?  
a. Viruses infect many types of cells, whereas viroids infect only prokaryotic cells.  
b. Viruses have capsids composed of protein, whereas viroids have no capsids.  
c. Viruses contain introns; viroids have only exons.  
d. Viruses always have DNA genomes, whereas viroids always have genomes composed of RNA.
6. Viscerotropic viruses usually affect:  
a. skin cell      b. respiratory system  
c. nerve cell      d. organ of digestive tract
7. Rous sarcoma virus that possesses both DNA and RNA as genetic material is a:  
a. reovirus      b. coronavirus  
c. picornavirus      d. retrovirus
8. Viroids of Pospiviroidae family replicate in the:  
a. cytoplasm      b. mitochondria  
c. nucleus      d. chloroplasts
9. The viruses that are single-stranded RNA that acts as a template for DNA synthesis, are known as:  
a. retroviruses      b. proviruses  
c. viroids      d. lytic phages

10. Reverse transcriptase is a useful enzyme to have when:  
 a. an RNA virus converts its RNA to DNA    b. there are no host cells present  
 c. nutrients are scarce    d. spikes are forming in the new virus
11. Viroids have:  
 a. DS-DNA enclosed by protein coat    b. SS-DNA not enclosed by protein coat  
 c. SS-RNA not enclosed by protein coat    d. DS-RNA enclosed by protein coat
12. The release of IFN- $\alpha$  is inhibited by the cytokine:  
 a. IL-10    b. IL-12  
 c. IL-10R<sub>2</sub>    d. eIF-2
13. Virulen phages are capable of:  
 a. Lytic    b. Lysogenic  
 c. Both a & b    d. None of the above
14. Bacteriophage T4 is an example of:  
 a. ss-RNA    b. ds-RNA  
 c. ss-DNA    d. ds-DNA
15. Which among the following is a temperate bacteriophage?  
 a.  $\lambda$     b. T4  
 c. fd    d.  $\Phi$ x174
16. Parvovirus are virus of:  
 a. Fungi    b. Eukaryotic cells  
 c. Moulds    d. Bacteria
17. Which among the following virus causes diarrhea in children?  
 a. Parvovirus    b. Rotavirus  
 c. Polio virus    d. Herpesvirus
18. Which among the following virus is responsible for causing paralysis in children?  
 a. Mosaic virus of tobacco    b. Rotavirus  
 c. Polio virus    d. Herpesvirus
19. Retrovirus have:  
 a. Negative strand RNA genome    b. Positive strand RNA genome  
 c. Negative strand DNA genome    d. Positive strand DNA genome
20. M13 is a:  
 a. Filamentous phage    b. Spiral phage  
 c. Spherical phage    d. Rectangular phage

( PART-B : Descriptive )

Time : 2 hrs. 40 min.

Marks : 50

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

1. What is viral replication? Briefly elaborate the different steps of viral multiplication. 2+8=10
2. What is a vector? Why is a vector used for cloning? Explain the bacteriophage vector  $\lambda$ . 2+2+6=10
3. What do you understand by phage display? What are the characteristics of phage display? Mention the characteristics of viral nucleic acid. 2+3+5=10
4. What are the different genome types found in a virus? Explain the genome of rotavirus and herpesvirus. 2+8=10
5. Describe the process of laboratory cultivation of animal viruses using chick-embryo technique. Discuss the differences in Persistent and non-persistent mode of virus transmission. 6+4=10
6. Discuss briefly the expression of early and late gene proteins among the viruses of Class-I of Baltimore's classification. Add a note on the general characteristic features of prions. 6+4=10
7. What is a vaccine? Discuss how a vaccine can help in developing resistance against an infectious pathogen. Add a note on the immunological significance of interferons. 2+4+4=10
8. What do you understand by lysogenic conversion? Give a diagrammatic description of multiplication cycle in lytic phage. Draw the one step multiplication curve in lytic phage. 2+5+3=10

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