

CC5 Model Questions

Unit 1: Nature and Properties of Viruses

1. Why the Koch postulates are not properly applicable for viruses?
2. What is *contagium vivum fluidum*?
3. Define the terms, 'susceptible' & 'permissive' in the context of viral infection.
4. Comment on the utility of host RNA polIII in viral infection.
5. State two methods for viral cultivation.
6. What is the basis of two-hit kinetics in viral infection?
7. Define eclipse period in viral infection.
8. Give one example each of (+)ssRNA & ssDNA virus.
9. State two important functional features of viral capsid.
10. What are the various types of capsids available for viruses?
11. Define the terms: Facet, Triangulation number.
12. Cite two properties of viral molecular pattern for interacting to host receptor.
13. Describe briefly the role of coreceptor in viral interaction to host cell with one example.
14. Give one example each of attachment & entry receptor.
15. What is the importance of neuraminidase in viral entry?
16. Define the terms: Virosome; Replication licensing.
17. Cite the role of LT in SV40 replication very briefly.
18. Give one example of 'protein priming' in viral replication.
19. Describe the function of EBNA-1 of EBV.
20. What is the advantage of envelope in entry of virus?
21. Mention the principles adopted by ICTV in framing the classification method of viruses.
22. Cite the classifying properties of Group 2, 4,5 of Baltimore method of viral classification.
23. What is the contribution of Felix d'Herelle in the field of virology?

24. How can you assay oncogenic viruses?
25. Mention three cytopathic effects induced by viral infection.
26. Give one example of the use of viral RTase other than retroviruses.
27. What is the basic difference between helical & icosahedral capsid structure?
28. Comment on the natural utility of icosahedral capsids.
29. Briefly discuss the capsid surface properties in interacting with host cell receptors during viral entry.
30. Describe the role of perfect & imperfect palindrome in SV 40 viral replication initiation.

Unit 2: Bacteriophages

Very short answer type/one word questions (1 mark each)

SL. No.

1. Which capsid symmetry is exhibited by most of the phages?
2. Name a phage having contractile sheath of the tail.
3. Who discovered bacteriophage?
4. Give an example of a single stranded RNA phage.
5. What is a virion?
6. What is meant by pleomorphic bacteriophages?
7. Give an example of a temperate phage.
8. Define burst size.
9. What are plaques?
10. What is Nut ?
11. What is MOI?

Short answer type questions (2 marks each)

SL. No.

1. Define capsid and capsomere.
2. Write about the characteristics of M13 bacteriophage?

3. Distinguish between T4 and λ phages.
4. Define zygotic induction.
5. Define one step growth curve of phage replication.
6. Distinguish between temperate and virulent phages.
7. What is the T series of bacteriophages?
8. What is the application of phage typing?

Broad answer type questions (greater than 2 marks)

SL. No.

1. What is the phenotype of a λ mutant containing a defective cI gene?
2. Which regulatory proteins and promoters are crucial in the λ lytic pathway?
3. Contrast and compare rolling circle replication and theta mode replication.
4. How do restriction/modification systems function?
5. Which regulatory proteins and promoters are crucial in the λ lysogenic pathway?
6. A new phage from local sewage was recently isolated that infects laboratory strains of E. coli. How would you determine if this new phage is a temperate or lytic phage using simple genetic tests?
7. Mention the function of the following proteins
cI,
cII,
cIII
8. Name the immediate early genes and delayed early genes.
9. Give the name of five commonly studied phages and the nature of their nucleic acids.
10. Describe the technique by which phages are isolated.
11. Explain the following terms with reference to viral multiplication cycle
Rise period
Eclipse period
Burst size
Latent period

Unit 3: Viral Transmission, Salient features of viral nucleic acids and Replication

1. What are the cellular components converge at replication initiation site during replication initiation of SV 40?
2. What are the functions of Ori P & Ori Lyt in case of EBV?

3. How can you prove the evidence of synthesis of DNA from RNA during reverse transcription?
4. What type of RNA primer is being used in reverse transcription process?
5. Define the terms: Strong stop DNA; Terminal redundancy; Concatemer; Polyprotein; Cap snatching;
6. How does the copy DNA from retroviral RNA become longer in size compared to the template RNA?
7. Give examples of some modified bases found in T4 viral DNA.
8. What is 'overlapping gene'? How was it found out that, ϕ X174 DNA has overlapping genes?
9. Describe the components of preprimosome complex in ϕ X174 DNA replication.
10. What are RF1 & RF2 in case of ϕ X174 DNA replication?
11. Cite the contrasting properties of genomes of influenza & polio viruses.
12. Describe the interaction of receptor and ligand in influenza virus infection.
13. How do HIV1 & SV 40 enter the target host cells?
14. What is the gap filling strategy in hepadna viral replication? How does this process help in replicating the hepadna viral DNA?
15. How are the retroviral proteins arranged from corresponding polyprotein?
16. Cite the important features of retroviral RTase.
17. How does the priming process occur in polioviral replication?
18. Discuss the basic properties of polioviral RNA replication briefly.
19. Enlist the proteins involved in vaccinia viral replication mentioning their functions.
20. Describe the differences between Cap '2' & Cap '0' structure in viral mRNA cap with chemical structure.
21. How do cellular enzymes carry out tailing of viral mRNAs?
22. Briefly discuss the tailing mechanism employed by viral tailing enzymes.

Unit 4: Viruses and Cancer

1. What are the different classes of oncogenic viruses?
2. Give some examples of DNA & RNA oncogenic viruses.
3. Mention the possible consequences of integration of oncogenic viral DNA into host genome.
4. What is the first viral oncogene to be identified? State & explain the properties of this oncogene.
5. Comment on the origin of c-src & v-src oncogene.
6. Give two examples of proto oncogenes involved in viral oncogenesis.

Unit 5: Prevention & control of viral diseases

Very short answer type/one word questions (1 mark each)

SL. No.

1. What is an antiviral compound?
2. Name a drug which is deoxycytidine analogue.
3. Name a broad spectrum antiviral drug.
4. Name a drug that acts as a neuraminidase inhibitor.
5. Define HAART.
6. What are Interferons?
7. What is a viral vaccine?

Short answer type (2 marks each)

SL. No.

1. Name the viruses controlled by current antiviral therapy.
2. Write the different types of antiviral drugs.
3. Write the differences between amantadine and rimantadine drugs.
4. What are the different targets of anti-HIV drugs?
5. Write the different genes for Interferons.
6. What ideal properties should a vaccine have?
7. What are the different types of viral vaccines?

Broad questions (3 marks each)

SL. No.

1. Write the different modes of action of antiviral drugs?
2. Write the key characteristics of an ideal antiviral drug.
3. Write the mode of action of acyclovir and congeners
4. How do interferons work as antiviral resistance?
5. Write a short note on DNA vaccines.

Unit 6: Applications of Virology

Very short answer type/one word questions (1 mark each)

SL. No.

1. What is a viral vector?
2. What are the different types of retro viral vectors?
3. Are lentiviral vectors retroviral vectors?
4. Which viral vectors can transfer large-scale quantities of exogenous DNA.

Short answer type (2 marks each)

SL. No.

1. Write the key properties of viral vectors.
2. What are the main types of viral vectors?
3. Compare between the viral mediated and bacterial mediated gene transfer.
4. What is gene therapy?
5. What is a phage display?

Broad answer type (Above 2 marks)

SL. No.

1. How can you convert a viral vector from a virus? 3
2. Write a short note on adeno viral vectors. 4

3. Write the different applications of viral vectors. 3
4. How retro viral vectors used in gene therapy explain with a simple diagram. 4
5. How are adeno viral vectors used for viral vaccines? 4
6. How does phage display works? 3