

2020

MICROBIOLOGY — HONOURS

Paper : CC-5

(Virology)

Full Marks : 50

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Answer **Question 1** and **any three** questions from the rest.

1. Answer **any ten** questions :

2×10

- (a) What are peplomers? Give an example of a virus having peplomers.
- (b) Describe the symmetry present in an icosahedral virus.
- (c) What is cytopathic effect?
- (d) Define Multiplicity of Infection.
- (e) What do you mean by tropism of a virus?
- (f) Why is it difficult to develop vaccines against RNA virus?
- (g) Why are animal viruses often enveloped in nature?
- (h) Name two unique features of virus that distinguish it from other members of microbial world.
- (i) How is host specificity of a virus determined?
- (j) What are the two unique features of T4 phage genome?
- (k) State two advantages of live attenuated viral vaccine.
- (l) What is the reason behind selection of Herpes virus based vector in gene therapy?
- (m) How many types of Influenza virus are found in nature?
- (n) What are concatamers?
- (o) What would happen if a virus particle entered intact within a host cell instead of releasing its genome?

2. (a) Classify virus based on their capsid symmetry with suitable example of each class.
- (b) What do you mean by PrP^C and PrP^{Sc}? How PrP^{Sc} is formed? Why formation PrP^{Sc} is harmful for a host organism?
- (c) Explain the reason behind occurrence of cholesterol in viral envelope. 3+(1+2+2)+2

Please Turn Over

3. (a) Briefly explain persistent mode of transmission of plant virus, with suitable example.
(b) What is λ -phage repressor protein? Which mode of λ -phage life cycle does it promote and how?
(c) Why a (-) sense RNA virus needs to carry its genome replicating polymerase in its virion while (+) sense RNA virus does not require to do so? 3+(1+3)+3
4. (a) Name one anti-hepatitis and one anti-herpes antiviral drug and state their mode of action.
(b) Why oral polio vaccine requires multiple boosting?
(c) The bacteriophage T4 degrades the host DNA after infection but the DNA of the phage is not degraded at all. Explain the reason behind the above strategy taken by the phage for its own growth. (2½×2)+2+3
5. (a) Define latent, eclipse and rise period.
(b) Explain the general mechanism of host immune response against viruses.
(c) Some people often develop recurrent viral infections following organ transplantation. Explain the reason behind this.
(d) Give an example of a segmented viral genome. State one advantage of a segmented genome over a non-segmented genome. 3+3+2+(1+1)
6. (a) How can you isolate bacteriophage from the environment?
(b) What are the advantages and disadvantages of the viral replication by the host polymerase compared to using a polymerase encoded by its own genome?
(c) Compare and contrast replication strategies of DNA and RNA viruses.
(d) How will you quantify a virus by 'Haemagglutination method'? 3+2+3+2
7. Write short notes on (*any four*): 2½×4
- (a) Viral oncogenes
(b) Viral vectors
(c) Phage display
(d) Viral vaccine
(e) Spike protein
(f) H.A.A.R.T.
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