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Biology Grade 11 — Chapter 5

Acellular Life

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Independent practice MCQs from the supplied Class 11 Biology notes pack. Total: 50 questions.

A. Important / Main Topics

1. What is a complete viral particle called?

(A) Virion
(B) Capsid
(C) Prion
(D) Viroid

Correct Answer: A

Explanation: A complete viral particle is called a virion, which consists of a core and a coat.

2. Which scientist first crystallized the tobacco mosaic virus (TMV)?

(A) Iwanowsky
(B) W. M. Stanley
(C) Charles Chamberlain
(D) Louis Pasteur

Correct Answer: B

Explanation: W. M. Stanley (1935) crystallized the infectious particle, now known as tobacco mosaic virus (TMV).

3. Which part of a virus contains its genetic material?

(A) Capsid
(B) Envelope
(C) Core
(D) Glycoprotein spikes

Correct Answer: C

Explanation: The core is the inner part of the virion which consists of the viral genome and various proteins (enzymes).

4. What are the protein subunits that make up the capsid called?

(A) Peptidoglycans
(B) Glycoproteins
(C) Nucleoproteins
(D) Capsomeres

Correct Answer: D

Explanation: The capsid is composed of identical repeating subunits called capsomeres.

5. Which of the following viruses has a complex capsid with a head and a tail?

(A) Bacteriophage
(B) Tobacco mosaic virus
(C) Adenovirus
(D) Influenza virus

Correct Answer: A

Explanation: Bacteriophage — this correctly answers the question.

6. What is the name of the enzyme present in retroviruses that converts RNA into DNA?

(A) DNA polymerase
(B) Reverse transcriptase
(C) RNA polymerase
(D) Protease

Correct Answer: B

Explanation: Reverse transcriptase — this correctly answers the question.

7. Which of the following is a non-living characteristic of viruses?

(A) They can reproduce inside a host.
(B) They have genetic material.
(C) They can be crystallized and stored in bottles.
(D) They can undergo mutation.

Correct Answer: C

Explanation: They can be crystallized and stored in bottles. — this correctly answers the question.

8. What is the primary host of a bacteriophage?

(A) Plants
(B) Animals
(C) Fungi
(D) Bacteria

Correct Answer: D

Explanation: The bacteriophage is a virus that specifically attacks and infects bacteria.

9. Which structure is responsible for the attachment of a bacteriophage to a bacterial cell?

(A) Tail fibres and tail pins
(B) Head
(C) Capsid
(D) Envelope

Correct Answer: A

Explanation: The tail fibres and tail pins/spikes are involved in the binding of the phage to specific receptors on the bacterial cell.

10. What is the process by which a bacteriophage DNA integrates into the host bacterial chromosome?

(A) Lytic cycle
(B) Lysogeny
(C) Binary fission
(D) Transduction

Correct Answer: B

Explanation: In the lysogenic cycle, the phage DNA integrates into the host chromosome, a process known as lysogeny.

11. Which cells does HIV primarily target?

(A) Red blood cells
(B) Liver cells
(C) Helper T cells (CD4 cells)
(D) Muscle cells

Correct Answer: C

Explanation: HIV attacks cells with CD4 receptors, primarily helper T cells, macrophages, and certain brain cells.

12. What does the acronym AIDS stand for?

(A) Auto Immune Disease Syndrome
(B) Acute Infection Disease Syndrome
(C) Antibody Immune Deficiency Syndrome
(D) Acquired Immune Deficiency Syndrome

Correct Answer: D

Explanation: AIDS stands for Acquired Immune Deficiency Syndrome, which is caused by HIV.

13. Which protein on the HIV envelope is needed to attach to the host cell?

(A) gp 120
(B) gp 41

(C) p24
(D) Reverse transcriptase

Correct Answer: A

Explanation: gp 120 is the outer glycoprotein needed to attach to the CD4 receptor on the host cell.

14. Which of the following diseases is caused by a prion?

(A) Hepatitis D
(B) Mad cow disease
(C) Polio
(D) Herpes

Correct Answer: B

Explanation: Prions cause fatal neurodegenerative diseases such as Kuru in humans and mad cow disease in cattle.

15. Which of the following is the only human disease known to be caused by a viroid?

(A) Hepatitis A
(B) Hepatitis B
(C) Hepatitis D
(D) Hepatitis E

Correct Answer: C

Explanation: The only human disease known to be caused by a viroid is hepatitis D.

16. Why are viruses considered obligate intracellular parasites?

(A) They can reproduce independently.
(B) They can synthesize their own proteins.
(C) They do not require any host cell.
(D) They lack their own metabolic enzymes and ribosomes, requiring a host cell to reproduce.

Correct Answer: D

Explanation: Viruses are obligate intracellular parasites because they cannot multiply outside a living cell. They lack metabolic enzymes and ribosomes to make proteins.

17. What is the significance of the Hershey-Chase experiment using T2 bacteriophage?

(A) It proved that DNA is the hereditary material.
(B) It proved that bacteria can divide by binary fission.
(C) It discovered the structure of the ribosome.
(D) It discovered reverse transcriptase.

Correct Answer: A

Explanation: In 1952, Alfred D. Hershey and Martha Chase used T2 bacteriophage and bacteria to prove that DNA is the hereditary material.

18. In the lytic cycle, what happens immediately after the viral DNA is injected into the host bacterium?

(A) The host cell divides.
(B) The host DNA is degraded.
(C) The host DNA is integrated into the viral DNA.
(D) The virus enters the lysogenic cycle.

Correct Answer: B

Explanation: In the lytic cycle, the host genomic DNA is immediately disintegrated by the virally encoded DNA digesting enzyme (DNAase).

19. Which of the following enables a virus to evade the host immune system?

(A) It has a thick peptidoglycan cell wall.
(B) It produces antibodies.
(C) It hides inside the host cell and rapidly changes its genetic constitution.
(D) It uses the host's immune system to attack itself.

Correct Answer: C

Explanation: Once inside a host cell, the virus hides from the immune system. It also rapidly changes its genetic constitution so that host antibodies and vaccines become ineffective.

20. In the HIV life cycle, what is the role of the enzyme integrase?

(A) It converts viral RNA to DNA.
(B) It breaks down viral proteins.
(C) It assists in viral assembly.
(D) It integrates viral DNA into the host cell DNA.

Correct Answer: D

Explanation: Integrase is a virus-encoded enzyme that mediates the integration of the double-stranded cDNA into the host cell DNA.

21. Why are non-enveloped viruses generally able to survive longer outside the host than enveloped viruses?

(A) They have a tough protein capsid.
(B) They have a lipid envelope that protects them.
(C) They can form spores.
(D) They are larger in size.

Correct Answer: A

Explanation: Non-enveloped viruses have a tough protein capsid, making them resistant to drying and heat. Enveloped viruses have a lipid envelope that is sensitive to degradation.

22. Which of the following is an example of a disease caused by a virus that affects the liver?

(A) Poliomyelitis
(B) Hepatitis B
(C) Herpes
(D) Cotton leaf curl disease

Correct Answer: B

Explanation: Hepatitis B is caused by HBV, which infects the liver.

23. Which vector is responsible for transmitting Cotton Leaf Curl Disease (CLCuD)?

(A) Mosquito
(B) Housefly
(C) Whitefly
(D) Aphid

Correct Answer: C

Explanation: Cotton leaf curl disease (CLCuD) is transmitted by the whitefly.

24. What is the primary reason why a flu vaccine must be updated every year?

(A) The vaccine loses its potency over time.
(B) The virus can no longer be cultured.
(C) New vaccines are cheaper to produce.
(D) The flu virus constantly evolves new strains, and the immune response changes over time.

Correct Answer: D

Explanation: The flu virus constantly evolves new strains, and the immune response changes over time. — this correctly answers the question.

25. What is the primary difference between a viroid and a prion?

(A) A viroid consists of a short, circular RNA without a protein coat, while a prion is an infectious protein particle without nucleic acids.
(B) A viroid is made of protein, while a prion is made of RNA.
(C) Viroids infect only animals, while prions infect only plants.
(D) Viroids are larger than prions.

Correct Answer: A

Explanation: Viroids are composed of short, circular, single-stranded RNA and lack a protein coat. Prions are infectious protein particles with no nucleic acids.

B. Less Important / Secondary Topics

26. Which type of hepatitis is transmitted primarily by the faecal-oral route?

(A) Hepatitis A
(B) Hepatitis B
(C) Hepatitis C
(D) Hepatitis D

Correct Answer: A

Explanation: Hepatitis A is transmitted by the faecal-oral route. Hepatitis B and C are transmitted via blood.

27. What is the function of the enzyme lysozyme in the bacteriophage infection process?

(A) It synthesizes viral proteins.
(B) It digests the host cell wall to allow core tube penetration.
(C) It degrades the viral DNA.
(D) It helps in the assembly of new phages.

Correct Answer: B

Explanation: It digests the host cell wall to allow core tube penetration. — this correctly answers the question.

28. Which of the following is true regarding the capsid symmetry of a tobacco mosaic virus (TMV)?

(A) Icosahedral
(B) Complex
(C) Helical
(D) Enveloped

Correct Answer: C

Explanation: Helical — this correctly answers the question.

29. Which of the following is a characteristic feature of a lysogenic phage?

(A) It immediately lyses the host cell.
(B) It develops a Master-Slave relationship with the host.
(C) It lacks a capsid.
(D) It can integrate its DNA into the host chromosome as a prophage.

Correct Answer: D

Explanation: Lysogenic (temperate) phages can enter a dormant state by integrating their DNA into the host chromosome, forming a prophage.

30. What is the clinical name for the disease caused by a prion in humans?

(A) Kuru
(B) HIV
(C) Hepatitis D
(D) Polio

Correct Answer: A

Explanation: Kuru is a fatal neurodegenerative disease in humans caused by prions.

31. Which of the following is a method of transmission for HIV?

(A) Shaking hands
(B) Blood transfusion with unscreened blood
(C) Hugging
(D) Mosquito bites

Correct Answer: B

Explanation: HIV is transmitted through blood, semen, and other body fluids. Shaking hands, hugging, and mosquito bites do not transmit HIV.

32. What is the purpose of using reverse transcriptase in the life cycle of HIV?

(A) To synthesize viral proteins.
(B) To degrade host DNA.
(C) To convert viral RNA into cDNA, which can then integrate into the host genome.

(D) To help in the assembly of virions.

Correct Answer: C

Explanation: Reverse transcriptase synthesizes a single-stranded DNA complementary to virus RNA. This cDNA is then replicated into double-stranded cDNA and integrated into the host genome.

33. What is the significance of the structural feature of the HIV capsid?

(A) It is helical and helps in attachment.
(B) It is surrounded by a cell wall.
(C) It is composed of cellulose.
(D) It is conical shaped and composed of capsomeres.

Correct Answer: D

Explanation: The HIV capsid is somewhat conical shaped and is composed of capsomeres.

34. Which of the following is a reason for the global economic losses due to COVID-19?

(A) Widespread lockdowns slowed economic activity and caused job losses.
(B) The virus directly attacked all food crops.
(C) The virus increased the cost of oil.
(D) The virus caused a sudden increase in agricultural productivity.

Correct Answer: A

Explanation: The notes state that lockdowns slowed global economic.

35. What is the primary reason why developing a vaccine for the common cold is not practical?

(A) The cold virus is too large.
(B) There are more than 200 viruses that cause cold.
(C) Cold is caused by bacteria.
(D) The cold virus cannot be cultured.

Correct Answer: B

Explanation: The notes state that there are more than 200 viruses that cause cold, making developing a single vaccine against the infection impractical.

36. A virus is discovered that has a single-stranded RNA genome. It is classified under the Baltimore classification system. Which group is it likely to belong to based on its genome and mode of replication?

(A) Group I (dsDNA)
(B) Group III (dsRNA)
(C) Group IV (positive-sense ssRNA)
(D) Group V (negative-sense ssRNA)

Correct Answer: C

Explanation: The Baltimore classification groups viruses based on genome type and mode of replication. A single-stranded RNA genome that serves directly as mRNA would belong to Group IV (positive-sense ssRNA).

37. If a bacterium is infected by a lysogenic phage, what is the most likely immediate consequence?

(A) The bacterium will immediately lyse.
(B) The bacterium will become more pathogenic by expressing viral genes.
(C) The bacterium will produce new phages continuously.
(D) The phage DNA will integrate into the bacterial chromosome as a prophage, and the cell will survive and replicate.

Correct Answer: D

Explanation: In the lysogenic cycle, phage DNA integrates into the host chromosome as a prophage, and the host cell survives and replicates.

38. Why is HIV considered a retrovirus?

(A) It has an RNA genome and uses reverse transcriptase to synthesize DNA.
(B) It has a DNA genome and uses reverse transcriptase to synthesize RNA.
(C) It can replicate both as DNA and RNA.
(D) It causes a disease that cannot be cured.

Correct Answer: A

Explanation: It has an RNA genome and uses reverse transcriptase to synthesize DNA. — this correctly answers the question.

39. In a severe case of HIV infection, a patient experiences a drastic decrease in CD4 T cells. What is the most likely consequence?

(A) Enhanced immune response to infections.
(B) Increased risk of opportunistic infections.
(C) Increased production of red blood cells.
(D) Faster wound healing.

Correct Answer: B

Explanation: CD4 T cells are critical for activating other immune cells. Their destruction leads to severe immunodeficiency, making the patient vulnerable to opportunistic infections.

40. What is the primary mechanism by which prions cause disease?

(A) They destroy the host's DNA.
(B) They produce toxins that kill cells.
(C) They induce normal proteins to misfold and clump, causing neurodegeneration.
(D) They consume all the nutrients in the brain.

Correct Answer: C

Explanation: They induce normal proteins to misfold and clump, causing neurodegeneration. — this correctly answers the question.

41. Which of the following is a key difference between the lytic and lysogenic cycles?

(A) In the lytic cycle, the host cell survives; in the lysogenic cycle, it dies.
(B) Lytic cycles involve RNA viruses; lysogenic cycles involve DNA viruses.
(C) Only the lytic cycle produces new virions.
(D) In the lysogenic cycle, viral DNA integrates into the host genome; in the lytic cycle, it does not.

Correct Answer: D

Explanation: In the lysogenic cycle, viral DNA integrates into the host genome; in the lytic cycle, it does not. — this correctly answers the question.

42. If a viroid is treated with a protease (an enzyme that breaks down proteins), what would be the expected result?

(A) The viroid would remain unaffected because it lacks a protein coat.
(B) The viroid would be destroyed.
(C) The viroid would become more infectious.
(D) The viroid would replicate faster.

Correct Answer: A

Explanation: Viroids are composed of RNA only and lack a protein coat. Therefore, protease treatment would not affect them.

43. A new vaccine is developed against a specific strain of influenza. Why might it be ineffective the following year?

(A) The vaccine loses its potency over time.
(B) The virus undergoes mutation and reassortment, creating new strains not covered by the previous year's vaccine.
(C) The immune system forgets the vaccine.
(D) The vaccine is only effective for a single day.

Correct Answer: B

Explanation: The virus undergoes mutation and reassortment, creating new strains not covered by the previous year's vaccine. — this correctly answers the question.

44. What would be the most likely consequence of a drug that blocks the activity of reverse transcriptase in a cell infected with HIV?

(A) The virus would immediately integrate into the host DNA.

(B) The virus would enter the lytic cycle.
(C) The viral RNA could not be converted into cDNA, preventing integration and replication.
(D) The host immune system would be completely restored.

Correct Answer: C

Explanation: Reverse transcriptase is essential for converting viral RNA into cDNA. Blocking its.

45. Which of the following accurately describes the role of the capsid in a virus?

(A) It synthesizes viral proteins.
(B) It contains the viral genome.
(C) It produces energy for the virus.
(D) It protects the viral genome from nucleases and helps in host cell attachment.

Correct Answer: D

Explanation: The capsid protects the viral genome from nucleases of the host cell and helps in attachment to host cell receptors.

46. A researcher discovers a new infectious agent that consists only of RNA and lacks a protein coat. It infects plant cells. What is this agent most likely to be?

(A) A viroid
(B) A prion
(C) A bacteriophage
(D) A retrovirus

Correct Answer: A

Explanation: Viroids are pathogens that consist of a short, circular, single-stranded RNA without a protein coat or envelope. They cause several plant diseases.

47. If a virus's envelope is destroyed, what is the most likely consequence?

(A) The virus would become more infectious.
(B) The virus's capsid would be exposed, and it may lose its ability to infect host cells.
(C) The virus would be able to infect a wider range of hosts.
(D) The virus would turn into a viroid.

Correct Answer: B

Explanation: The virus's capsid would be exposed, and it may lose its ability to infect host cells. — this correctly answers the question.

48. Which of the following statements about the transmission of Hepatitis C is accurate?

(A) It is transmitted by the faecal-oral route.
(B) It is transmitted by sexual contact.
(C) It is only transmitted via blood.
(D) It is transmitted by mosquito bites.

Correct Answer: C

Explanation: Hepatitis C is caused by HCV and is only transmitted via blood.

49. What is the significance of the observation that lysosomes digest excess mitochondria in a cell?

(A) It proves that lysosomes are the main site of ATP production.
(B) It proves that mitochondria can reproduce outside the cell.
(C) It shows that lysosomes can synthesize proteins.
(D) It shows how cellular organelles are regulated and recycled through autophagy.

Correct Answer: D

Explanation: It shows how cellular organelles are regulated and recycled through autophagy. — this correctly answers the question.

50. A bacterium is infected with a phage, but the phage enters the lysogenic cycle. Later, the bacterium is exposed to UV radiation. What is the most likely consequence?

(A) The prophage will be induced to enter the lytic cycle, causing cell lysis and release of new phages.
(B) The bacterium will be permanently immune to the phage.
(C) The bacterium will divide normally with the prophage.

(D) The phage DNA will be permanently destroyed.

Correct Answer: A

Explanation: Exposure to UV radiation is a condition that induces the termination of the lysogenic state. The prophage is excised, initiating the lytic cycle, leading to cell lysis and release of phages.