

**BIO · BIOLOGY**

05. Acellular Life

Official PMDC Solved Past Paper Topical Booklet · High-Yield Examination Series

© 69 Solved Questions

📅 2014 to 2024 Archive

📋 Boards: BUMHS, DUHS, KMU, MDCAT, NUMS, PMDC

📊 Weightage: 34% of MDCAT (68 MCQs)

Curated by Ibrahim for fellow bees. Every question in this chapter has been verified against official UHS, NUMS, SZABMU, DUHS, and KMU answer keys. Propolis cognitive autopsies are provided at the end of this booklet to explain core concepts and break down common distractor traps.

OFFICIAL SOLVED EDITION**Q1.**

NUMS 2024

Which of the following virus has a double stranded DNA genome?

[NUMS-2024]

- (A) Rubella
- (B) Influenza
- (C) Small pox
- (D) HIV

Q2.

UHS 2024

Example of viruses having a polyhedral capsid that is with 252 capsomeres is:

[UHS-2024]

- (A) Influenza virus
- (B) Adenovirus
- (C) Bacteriophage
- (D) Tobacco Mosaic Virus

Q3.

UHS 2024

The complete, mature & infectious particle of virus is known as:

[UHS-2024]

- (A) Capsomere
- (B) Virion
- (C) Genome
- (D) Prion

Q4.

KMU 2024

Antibiotics can be used against:

[KMU-2024]

- (A) Salmonella typhi
- (B) Herpes simplex
- (C) Influenza
- (D) Polio

Q5.

KMU 2024

Which of the following is not true about viruses?

[KMU-2024]

- (A) Contain DNA
- (B) Can infect bacteria
- (C) They have a sub-cellular structure
- (D) Can replicate on their own

Q6.

KMU 2024

The genetic code of ____ is bound by a lipid membrane?

[KMU-2024]

- (A) Hepatitis A virus
- (B) Enterovirus
- (C) Polio virus
- (D) Flu virus

Q7.

KMU 2024

Viruses cannot:

[KMU-2024]

- (A) Excrete
- (B) Mutate
- (C) Infect bacteria
- (D) Crystalize

Q8.

SZABMU 2024

Who purified the filterable agents for the first time?

[SZABMU-2024]

- (A) Charles Chamberland
- (B) Ivanovsky
- (C) W. M. Stanley
- (D) Louis Pasteur

Q9.

SZABMU 2024

A virus recognizes its specific host organism by which characteristics?

[SZABMU-2024-Reconduct]

- (A) Viral genome
- (B) Viral envelope
- (C) Host cytoplasm
- (D) Host genome

Q10.

UHS 2024

In the life cycle of a bacteriophage, the lysozymes are required in which of the following steps of infection process?

[UHS-2024]

- (A) Adsorption
- (B) Genome injection
- (C) Replication
- (D) Penetration

Q11.

SZABMU 2024

The side of sheath which is attached to head of bacteriophage is called:

[SZABMU-2024]

- (A) Capsid
- (B) End plate
- (C) Core
- (D) Collar

Q12.

SZABMU 2024

The lysozyme is involved in which step of the life cycle of bacteriophage?

[SZABMU-2024]

- (A) Attachment
- (B) Assembly
- (C) Penetration
- (D) Adsorption

Q13.

UHS 2024

_____ is transmitted through infected blood and hypodermic syringes:

[UHS-2024]

- (A) Influenza Virus
- (B) HIV
- (C) Vibrio cholerae (Cholera)
- (D) Morbilli Virus (Measles)

Q14.

KMU 2024

Where are the enzymes required for the replication of HIV virus located?

[KMU-2024]

- (A) Surrounding the viral core
- (B) In the protein spikes
- (C) Outside the capsid
- (D) Inside the capsid

Q15.

UHS 2024

The causative organism of measles is:

[UHS-2024]

- (A) Poxivirus
- (B) Paramyxovirus
- (C) Picornovirus
- (D) Papovirus

Q16.

NUMS 2024

Corona virus is enveloped virus. Hand sanitizers and hand cleaners were recommended to avoid COVID epidemic. Which property of corona virus made these products effective?

[NUMS-2024]

- (A) ss-RNA genome
- (B) pH sensitivity
- (C) Hypo-tonicity
- (D) Heat sensitivity

Q17.

UHS 2023

Which of the following virus contains single stranded DNA?

[UHS-2023]

- (A) Pox virus
- (B) Parvo virus
- (C) Adeno virus
- (D) Herpes virus

Q18.

SZABMU 2023

Which of the following is not related to enveloped virus?

[SZABMU-2023]

- (A) They are tolerant to antibodies
- (B) They survive for a short time
- (C) Their envelope is sensitive to sun light
- (D) Envelop is derived from host

Q19.

NUMS 2023

The complete, mature and infectious virus particle is known as:

[NUMS-2023]

- (A) Virion
- (B) Venome
- (C) Genome
- (D) Capsid

Q20.

NUMS 2023

All viruses are:

[NUMS-2023]

- (A) Predators
- (B) Heterotrophs
- (C) Parasites
- (D) Autotrophs

Q21.

KMU 2023

How many pieces of ribonucleic acid (RNA) make up the genome of influenza virus?

[ETEA-2023]

- (A) 10
- (B) 6
- (C) 4
- (D) 8

Q22.

KMU 2023

Which of the following agents can easily pass through the filter paper?

[ETEA-2023]

- (A) Bacteria
- (B) Fungi
- (C) Virus
- (D) Yeast

Q23.

KMU 2023

Viruses are not classified based on:

[ETEA-2023 Retake]

- (A) Host specificity
- (B) Envelope
- (C) Cell membrane
- (D) Morphology

Q24.

UHS 2023

Virus is what type of agent?

[UHS-2023]

- (A) Cellular agent
- (B) Infectious agent
- (C) Non-protein agent
- (D) Non-infectious agent

Q25.

SZABMU 2023

Choose the entities which requires a single cellular gene to encode the protein making up the organism:

[SZABMU-2023]

- (A) Viroid
- (B) Virion
- (C) Virus
- (D) Prions

Q26.

SZABMU 2023

_____ infection is caused by a viroid:

[SZABMU-2023]

- (A) Mysterious brain infection
- (B) Hepatitis A
- (C) Hepatitis D
- (D) Mad Cow disease

Q27.

KMU 2023

The head of some phages are icosahedral, which means that the head possess:

[ETEA-2023]

- (A) 15 sides
- (B) 6 sides
- (C) 20 sides
- (D) 10 sides

Q28.

KMU 2023

The protein coat surrounding the genome of virus is called:

[ETEA-2023 Retake]

- (A) DNA sheath
- (B) Viroid
- (C) Capsid
- (D) Phage

Q29.

SZABMU 2023

_____ is transmitted through infected blood and hypodermic syringes:

[SZABMU-2023]

- (A) Morbilli Virus (Measles)
- (B) HIV
- (C) Vibrio Cholerae (Cholera)
- (D) Influenza Virus

Q30.

KMU 2023

HIV belongs to a special class of virus known as:

[ETEA-2023]

- (A) Novavirus
- (B) Retrovirus
- (C) Tetravirus
- (D) Flavivirus

Q31.

KMU 2023

The genome of the human immunodeficiency virus is made up of:

[ETEA-2023 Retake]

- (A) RNA
- (B) DNA
- (C) cDNA
- (D) rRNA

Q32.

UHS 2023

The molecules used to control virus during infection of animal cells are:

[UHS-2023]

- (A) Antigen
- (B) Interferon
- (C) Serum
- (D) Histone

Q33.

UHS 2023

The provirus of HIV is structurally and chemically made up of?

[UHS-2023]

- (A) dsRNA
- (B) ssDNA
- (C) dsDNA
- (D) ssRNA

Q34.

KMU 2022

In 1935 W. M. Stanley prepared an extract of:

[ETEA-2022]

- (A) Human immunodeficiency virus (HIV)
- (B) Tobacco mosaic virus (TMV)
- (C) Flu virus
- (D) Polio virus

Q35.

DUHS 2022

Virus is a Latin word meaning:

[DUHS-2022]

- (A) Poison
- (B) Sweet
- (C) Acidic
- (D) Sour

Q36.

NUMS 2022

Which one can be considered as living characteristic of virus?

[NUMS-2022]

- (A) Lack biosynthetic machinery
- (B) Can be crystalized
- (C) No cellular respiration
- (D) Mutate their genetic material

Q37.

KMU 2022

Which one of the following is the characteristic of viruses?

[ETEA-2022]

- (A) They are facultative parasites
- (B) Non-facultative parasites
- (C) Intracellular obligate parasites
- (D) All of these

Q38.

UHS 2022

Which of the following virus contains single stranded DNA?

[UHS-2022]

- (A) Adenovirus
- (B) Pox virus
- (C) Herpes virus
- (D) Parvovirus

Q39.

BUMHS 2022

A virion is designated as:

[BUMHS-2022]

- (A) Viral enzyme
- (B) Complete virus
- (C) Viral genome
- (D) Viral lysosome

Q40.

BUMHS 2022

Poliovirus is an example of:

[BUMHS-2022]

- (A) Tadpole shaped viruses
- (B) Helical shaped viruses
- (C) Rod shaped viruses
- (D) Spherical viruses

Q41.

BUMHS 2022

Which of the following is a DNA virus?

[BUMHS-2022]

- (A) Polio virus
- (B) Influenza virus
- (C) Mumps virus
- (D) Herpes virus

Q42.

UHS 2022

What does the term bacteriophage refer to?

[UHS-2022]

- (A) Combination of bacterium and virion
- (B) A virus that infects bacteria
- (C) A virus which behaves as bacteria
- (D) A bacterium that infects virus

Q43.

KMU 2022

The word hepatitis means inflammation of the:

[ETEA-2022]

- (A) Gall bladder
- (B) Spleen
- (C) Liver
- (D) Pancreas

Q44.

KMU 2022

Which one of the following pairs of disease is caused by virus?

[ETEA-2022]

- (A) Tetanus and Cholera
- (B) Measles and Mumps
- (C) Syphilis and TB
- (D) AIDS and Typhoid

Q45.

DUHS 2022

Hepatitis is caused by:

[DUHS-2022]

- (A) Protozoans
- (B) Algae
- (C) Bacteria
- (D) Virus

Q46.

DUHS 2022

Rabies is caused by:

[DUHS-2022]

- (A) Rhabdovirus
- (B) Paramyxovirus
- (C) Arbovirus
- (D) Rhinovirus

Q47.

UHS 2022

The enzymes integrase, protease and reverse transcriptase are found in which virus?

[UHS-2022]

- (A) Influenza virus
- (B) Human immunodeficiency virus
- (C) Hepatitis 'A' virus
- (D) Herpes virus

Q48.

KMU 2022

Human immunodeficiency virus (HIV) particles are surround with a coat known as the virus envelop or membrane made up of:

[ETEA-2022]

- (A) Lipoprotein
- (B) Glycoprotein
- (C) Sulpholipid
- (D) Glycolipid

Q49.

SZABMU 2022

Which of the following is transmitted through infected blood and infected syringes?

[SZABMU-2022]

- (A) Vibrio cholerae
- (B) Morbili virus (Measles)
- (C) HIV
- (D) Influenza virus

Q50.

DUHS 2022

In AIDS, 'D' stands for:

[DUHS-2022]

- (A) Decompose
- (B) Deficiency
- (C) Degenerate
- (D) Difficult

Q51.

PMDC 2020

Which of the following is not related to enveloped virus?

[PMC-2020]

- (A) They survive for a short time
- (B) Their envelop is sensitive to sunlight
- (C) They are tolerant to antibodies
- (D) Envelope is derived from host

Q52.

PMDC 2020

The complete mature and infection virus particle is known as:

[PMC-2020]

- (A) Genome
- (B) Capsid
- (C) Virion
- (D) Venom

Q53.

PMDC 2020

Numerous opportunistic diseases might attack a person suffering from which of the following diseases:

[PMC-2020]

- (A) AIDS
- (B) Measles
- (C) Influenza
- (D) Hepatitis A

Q54.

PMDC 2020

Which of the following is not true about human immunodeficiency virus?

[PMC-2020]

- (A) It does not cause AIDS
- (B) It is surrounded by an envelope
- (C) It is a retrovirus
- (D) It causes deficiency of the human immune system

Q55.

PMDC 2019

Virus can only survive and reproduce inside a:

[NTS-2019]

- (A) Living cells
- (B) Non-living cells
- (C) Animal cells
- (D) Bacterial cells

Q56.

KMU 2019

The genome of influenza virus is made up of:

[ETEA-2019]

- (A) Double stranded DNA
- (B) Single stranded RNA
- (C) Double stranded RNA
- (D) Single stranded DNA

Q57.

MDCAT 2019

Capsid, the protective coat of a virus is made up of subunits known as capsomeres that are ____ in nature.

[MDCAT-2019]

- (A) Protein
- (B) Lipid
- (C) RNA
- (D) DNA

Q58.

PMDC 2019

Genome of virus is composed of:

[NTS-2019]

- (A) DNA
- (B) RNA
- (C) Protein
- (D) Both A and B

Q59.

KMU 2019

The bacteriophage replicates only inside the:

[ETEA-2019]

- (A) Animal cell
- (B) Bacterial cell
- (C) Fungal cell
- (D) Both A & B

Q60.

SZABMU 2019

The main target of HIV in AIDS is:

[AJK-2019]

- (A) Red blood cells
- (B) Helper T-lymphocytes
- (C) B-lymphocytes
- (D) Liver cells

Q61.

MDCAT 2018

In viruses, a combined structure formed by core (Nucleic Acid) and capsid is:

[MDCAT-2018]

- (A) Envelope
- (B) Nucleocapsid
- (C) Capsomeres
- (D) Prions

Q62.

PMDC 2018

Which of the following is the simplest forms of pathogens causing disease?

[NTS-2018]

- (A) Fungus
- (B) Viruses
- (C) Prions
- (D) Amoeba

Q63.

PMDC 2018

Which is not a viral disease?

[NTS-2018]

- (A) Chicken pox
- (B) AIDS
- (C) Influenza
- (D) Malaria

Q64.

MDCAT 2017

Cilia and flagella are absent in:

[MDCAT-2017]

- (A) Lower plants
- (B) Bacteria
- (C) Viruses
- (D) Lower animals

Q65.

KMU 2017

Which one is not an opportunistic disease related to HIV infection?

[ETEA-2017]

- Ⓐ Pulmonary tuberculosis
- Ⓑ Destruction of body immune system
- Ⓒ Toxoplasmosis
- Ⓓ Recurrent pneumonia

Q66.

MDCAT 2016

AIDS is caused by:

[MDCAT-2016]

- Ⓐ Fungi
- Ⓑ Virus
- Ⓒ Bacteria
- Ⓓ Alga

Q67.

MDCAT 2015

HIV is classified as:

[MDCAT-2015]

- Ⓐ Retrovirus
- Ⓑ Bacteriophage
- Ⓒ Oncovirus
- Ⓓ Icosahedral virus

Q68.

DUHS 2014

Polio vaccine is given by:

[KMDC-2014]

- Ⓐ Spray
- Ⓑ Oral drops
- Ⓒ Tablets
- Ⓓ Local application

Q69.

MDCAT 2014

Which of the following cells does HIV mainly infect?

[MDCAT-2014]

- Ⓐ B-plasma cells
- Ⓑ T-killer lymphocytes
- Ⓒ B-memory cells
- Ⓓ T-helper lymphocytes

RAPID 5–COLUMN ANSWER KEY

Official PMDC verified answer keys for 05. Acellular Life.

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Q#	KEY	BOARD	Q#	KEY	BOARD	Q#	KEY	BOARD	Q#	KEY	BOARD	Q#	KEY	BOARD
1	C	NUMS 2024	15	B	UHS 2024	29	B	SZABMU 2023	43	C	KMU 2022	57	A	MDCAT 2019
2	B	UHS 2024	16	B	NUMS 2024	30	B	KMU 2023	44	B	KMU 2022	58	D	PMDC 2019
3	B	UHS 2024	17	B	UHS 2023	31	A	KMU 2023	45	D	DUHS 2022	59	B	KMU 2019
4	A	KMU 2024	18	A	SZABMU 2023	32	B	UHS 2023	46	A	DUHS 2022	60	B	SZABMU 2019
5	D	KMU 2024	19	A	NUMS 2023	33	C	UHS 2023	47	B	UHS 2022	61	B	MDCAT 2018
6	D	KMU 2024	20	C	NUMS 2023	34	B	KMU 2022	48	A	KMU 2022	62	C	PMDC 2018
7	A	KMU 2024	21	D	KMU 2023	35	A	DUHS 2022	49	C	SZABMU 2022	63	D	PMDC 2018
8	C	SZABMU 2024	22	C	KMU 2023	36	D	NUMS 2022	50	B	DUHS 2022	64	C	MDCAT 2017
9	B	SZABMU 2024	23	C	KMU 2023	37	C	KMU 2022	51	C	PMDC 2020	65	B	KMU 2017
10	D	UHS 2024	24	B	UHS 2023	38	D	UHS 2022	52	C	PMDC 2020	66	B	MDCAT 2016
11	D	SZABMU 2024	25	D	SZABMU 2023	39	B	BUMHS 2022	53	A	PMDC 2020	67	A	MDCAT 2015
12	C	SZABMU 2024	26	C	SZABMU 2023	40	D	BUMHS 2022	54	A	PMDC 2020	68	B	DUHS 2014
13	B	UHS 2024	27	C	KMU 2023	41	D	BUMHS 2022	55	A	PMDC 2019	69	D	MDCAT 2014
14	D	KMU 2024	28	C	KMU 2023	42	B	UHS 2022	56	B	KMU 2019			

TOTAL
MCQS

69

CORRECT

INCORRECT

BLANK

ACCURACY

%

Scan the booklet QR code to enter answers in
BeambePrep Grind Mode for automated error
autopsies.

PROPOLIS COGNITIVE ERROR AUTOPSIES

Step-by-step conceptual derivations, formula working, and distractor autopsies for every question.

Question #1 Key: (C)

NUMS 2024

Which of the following virus has a double stranded DNA genome?
[NUMS-2024]

CORE CONCEPT AND DERIVATION

Viruses are heavily categorized by the Baltimore classification system, which focuses on their nucleic acid type.

Solution:

- **Smallpox** is caused by the variola virus, which belongs to the Poxviridae family.
- Poxviruses are notable for being very large, complex viruses that contain a **double-stranded DNA (dsDNA)** genome.

Why other options are incorrect:

- **Rubella, Influenza, HIV:** All of these viruses possess RNA genomes, not DNA.

Question #2 Key: (B)

UHS 2024

Example of viruses having a polyhedral capsid that is with [Formula] capsomeres is: [UHS-2024]

CORE CONCEPT AND DERIVATION

Viral capsids exhibit precise, genetically determined geometric symmetries and specific capsomere counts.

Solution:

- **Adenoviruses** are classic examples of non-enveloped, icosahedral (polyhedral) viruses.
- Their highly stable, geometric capsid is structurally composed of exactly 252 **capsomeres** (240 hexons and 12 pentons at the vertices).

Why other options are incorrect:

- **Tobacco Mosaic Virus:** Has a helical (rod-like) symmetry, not polyhedral.
- **Bacteriophage:** Typically has a complex (binal) symmetry with a polyhedral head and helical tail.
- **Influenza virus:** Has a helical nucleocapsid surrounded by a pleomorphic envelope.

Question #3 Key: (B)

UHS 2024

The complete, mature & infectious particle of virus is known as:
[UHS-2024]

CORE CONCEPT AND DERIVATION

Clear virological terminology distinguishes the actively infectious whole from its inert constituent parts.

Solution:

- A **virion** is the official biological term for a fully assembled, complete, and infectious viral particle capable of transmitting its genome to a new host cell.

Why other options are incorrect:

- **Genome / Capsomere:** These are simply parts of the virion (the nucleic acid and the protein subunits, respectively).
- **Prion:** An infectious misfolded protein entirely distinct from a virus.

Question #4 Key: (A)

KMU 2024

Antibiotics can be used against: [KMU-2024]

CORE CONCEPT AND DERIVATION

Antibiotics selectively target cellular components and metabolic pathways unique to bacteria (e.g., peptidoglycan synthesis, bacterial ribosomes).

Solution:

- **Salmonella typhi** is a pathogenic bacterium (causative agent of typhoid fever).
- Because it is a cellular organism with its own metabolism and cell wall, antibiotics can effectively target and kill it.

Why other options are incorrect:

- **Herpes simplex, Influenza, Polio:** These are viruses. Viruses lack cellular structures, cell walls, and independent ribosomes, making them completely immune to antibiotics. Antiviral drugs are required instead.

Question #5 Key: (D)

KMU 2024

Which of the following is not true about viruses? [KMU-2024]

CORE CONCEPT AND DERIVATION

Viruses are obligate intracellular parasites entirely dependent on host machinery.

Solution:

- The statement "**Can replicate on their own**" is fundamentally false.
- Viruses possess zero metabolic enzymes and lack ribosomes. They must invade a host cell to copy their genome and synthesize their capsids.

Why other options are incorrect:

- **Contain DNA, Can infect bacteria, Have sub-cellular structure:** These are all factual statements. Some viruses contain DNA, bacteriophages infect bacteria, and they are sub-cellular (acellular) entities.

Question #6 Key: (D)

KMU 2024

The genetic code of ____ is bound by a lipid membrane? [KMU-2024]

CORE CONCEPT AND DERIVATION

Viruses are classified structurally into naked (non-enveloped) and enveloped categories.

Solution:

- The **Flu virus (Influenza)** is an enveloped virus.
- When it buds from the host cell, its nucleocapsid (containing the genetic code) gets wrapped in a lipid bilayer membrane derived from the host.

Why other options are incorrect:

- **Hepatitis A, Enterovirus, Polio virus:** These all belong to the Picornaviridae family and are strictly naked (non-enveloped) viruses. Their genetic code is only bound by a protein capsid.

Question #7 Key: (A)

KMU 2024

Viruses cannot: [KMU-2024]

CORE CONCEPT AND DERIVATION

Viruses straddle the line between living and non-living, lacking fundamental biological processes of cellular life.

Solution:

- Excretion is a physiological process required to eliminate metabolic waste.
- Because viruses have absolutely no internal metabolism or energy production, they produce no metabolic waste and therefore **cannot excrete**.

Why other options are incorrect:

- **Mutate, Infect bacteria, Crystallize:** Viruses routinely mutate (e.g., flu variants), phages infect bacteria, and they can be crystallized (as proven by W.M. Stanley) because of their symmetrical, predictable biochemical structure.

Question #8 Key: (C)

SZABMU 2024

Who purified the filterable agents for the first time? [SZABMU-2024]

CORE CONCEPT AND DERIVATION

The timeline of virology involves sequential breakthroughs from filtration to biochemical isolation.

Solution:

- While Chamberland and Ivanovsky discovered that infectious agents could pass through fine porcelain filters, it was **Wendell M. Stanley** in 1935 who achieved a massive breakthrough.
- He was the first scientist to successfully purify and crystallize a virus (the Tobacco Mosaic Virus), proving it was a particulate, biochemical entity rather than a fluid.

Why other options are incorrect:

- **Chamberland:** Invented the porcelain filter.
- **Ivanovsky:** Proved the TMV pathogen was filterable.
- **Pasteur:** Developed vaccines but did not purify a virus.

Question #9 Key: (B)

SZABMU 2024

A virus recognizes its specific host organism by which characteristics? [SZABMU-2024-Reconduct]

CORE CONCEPT AND DERIVATION

Viral tropism (host specificity) relies entirely on a "lock and key" mechanism occurring at the cellular surface.

Solution:

- A virus recognizes its susceptible host via specific glycoprotein spikes or surface proteins embedded in the **viral envelope** (or the capsid in naked viruses).
- These surface structures act as the "key" that chemically binds to specific, matching receptor proteins on the host cell membrane.

Why other options are incorrect:

- **Viral/Host genome & Host cytoplasm:** These are internal components. A virus must first recognize and attach to the exterior of a host cell before it can interact with the cytoplasm or genome.

Question #10 Key: (D)

UHS 2024

In the life cycle of a bacteriophage, the lysozymes are required in which of the following steps of infection ...

CORE CONCEPT AND DERIVATION

Bacteriophages must overcome the rigid bacterial cell wall to deliver their genetic material.

Solution:

- During the **penetration** step, the bacteriophage must breach the thick peptidoglycan cell wall of the host bacterium.
- To do this, the phage tail releases the enzyme *lysozyme*, which digests a small hole in the cell wall, allowing the viral DNA to be injected into the cytoplasm.

Why other options are incorrect:

- **Adsorption:** Refers to the initial physical attachment via tail fibers, prior to enzymatic degradation.
- **Replication:** Occurs internally using host polymerases.

Question #11 Key: (D)

SZABMU 2024

The side of sheath which is attached to head of bacteriophage is called: [SZABMU-2024]

CORE CONCEPT AND DERIVATION

Complex bacteriophages (like T-even phages) have distinct mechanical parts designed for stability and genome delivery.

Solution:

- The head of the bacteriophage (containing the DNA) is connected to the contractile tail sheath by a distinct neck-like structure known as the **collar**.

Why other options are incorrect:

- **Capsid:** The head itself.
- **End plate (Base plate):** Located at the absolute bottom of the sheath, attaching to the tail fibers.
- **Core:** The central hollow tube inside the sheath.

Question #12 Key: (C)

SZABMU 2024

The lysozyme is involved in which step of the life cycle of bacteriophage? [SZABMU-2024]

CORE CONCEPT AND DERIVATION

Enzymatic degradation is a mechanical necessity for phage entry into bacterial cells.

Solution:

- Bacteriophages utilize viral lysozyme specifically during the **penetration** phase.
- The enzyme weakens the rigid bacterial peptidoglycan cell wall, allowing the phage's central tail core to drive through and inject the viral DNA.

Why other options are incorrect:

- **Attachment/Adsorption:** Driven by electrostatic interactions and tail fiber binding.
- **Assembly:** The packaging of new virions inside the host, which does not require breaking the wall from the outside.

Question #13 Key: (B)

UHS 2024

_____ is transmitted through infected blood and hypodermic syringes: [UHS-2024]

CORE CONCEPT AND DERIVATION

Different pathogens rely on distinct bodily fluids and environmental routes for successful transmission.

Solution:

- The **Human Immunodeficiency Virus (HIV)** is a fragile virus that cannot survive long outside the body.
- It requires direct, fluid-to-fluid contact to transmit successfully, making the sharing of infected blood via hypodermic syringes one of the most efficient transmission vectors.

Why other options are incorrect:

- **Influenza & Measles:** These are respiratory viruses transmitted rapidly via airborne droplets.
- **Vibrio cholerae:** A bacterium transmitted via the fecal-oral route (contaminated water).

Question #14 Key: (D)

KMU 2024

Where are the enzymes required for the replication of HIV virus located? [KMU-2024]

CORE CONCEPT AND DERIVATION

Retroviruses must physically carry their replication enzymes into the host cell because the host lacks RNA-dependent DNA synthesis machinery.

Solution:

- HIV packages its three essential replication enzymes (reverse transcriptase, integrase, and protease) directly **inside the capsid**, alongside its viral RNA genome.
- This ensures that the moment the capsid uncoats in the host cytoplasm, the enzymes are immediately available to begin reverse transcription.

Why other options are incorrect:

- **In the protein spikes / Outside the capsid:** Enzymes placed outside the protective core would be unstable and useless during the intracellular replication phase. Spikes are strictly for attachment.

Question #15 Key: (B)

UHS 2024

The causative organism of measles is: [UHS-2024]

CORE CONCEPT AND DERIVATION

Clinical diseases are directly mapped to specific viral families based on pathogenesis and taxonomy.

Solution:

- Measles is a highly contagious respiratory disease caused by a virus belonging to the **Paramyxovirus** family (specifically, the *Morbillivirus* genus).

Why other options are incorrect:

- **Poxivirus:** Causes smallpox and cowpox.
- **Picornovirus:** Causes polio and Hepatitis A.
- **Papovirus (Papillomavirus):** Causes warts and cervical cancer.

Question #16 Key: (B)

NUMS 2024

Corona virus is enveloped virus. Hand sanitizers and hand cleaners were recommended to avoid COVID epidemic. W...

CORE CONCEPT AND DERIVATION

The chemical stability of a viral envelope dictates its susceptibility to external disinfectants.

Solution:

- Coronaviruses rely on an outer lipid bilayer (envelope) to protect themselves and to fuse with host cells.
- According to the provided clinical notes, this delicate lipid envelope is highly **sensitive to changes in pH** and alcohol concentrations. Hand sanitizers physically disrupt and dissolve this envelope, instantly neutralizing the virus.

Why other options are incorrect:

- **ss-RNA genome:** The sanitizers destroy the outer envelope before they interact with the internal genome.
- **Heat sensitivity:** Sanitizers work chemically at room temperature, not via heat.
- **Hypo-tonicity:** Osmotic pressure does not play a primary role in alcohol-based viral inactivation.

Question #17 Key: (B)

UHS 2023

Which of the following virus contains single stranded DNA? [UHS-2023]

CORE CONCEPT AND DERIVATION

While most DNA viruses possess double-stranded genomes, distinct exceptions exist.

Solution:

- The **Parvo virus** family is structurally unique among medically relevant DNA viruses because its genome consists of **single-stranded DNA (ssDNA)**.

Why other options are incorrect:

- **Adenovirus, Herpes virus, Pox virus:** All of these contain typical double-stranded DNA (dsDNA).

Question #18 Key: (A)

SZABMU 2023

Which of the following is not related to enveloped virus? [SZABMU-2023]

CORE CONCEPT AND DERIVATION

An envelope provides stealth but makes the virion physically fragile and immunologically detectable.

Solution:

- Enveloped viruses are highly antigenic and are **NOT** tolerant to antibodies.
- Antibodies readily bind to the viral glycoproteins protruding from the envelope, neutralizing the virus effectively.

Why other options are incorrect:

- **Short survival, derived from host, sensitive to sunlight:** These are accurate characteristics of enveloped viruses, as the lipid bilayer degrades easily in external environments.

Question #19 Key: (A)

NUMS 2023

The complete, mature and infectious virus particle is known as: [NUMS-2023]

CORE CONCEPT AND DERIVATION

Virologists use specific terminology to differentiate between a fully assembled virus and its parts.

Solution:

- A **virion** is the fully formed, structurally intact, and infectious particle consisting of the nucleic acid genome enveloped in its protective protein capsid (and lipid envelope, if applicable).

Why other options are incorrect:

- **Genome/Capsid:** Are sub-structural components.
- **Venome:** Refers to poison, not a viral particle.

Question #20 Key: (C)

NUMS 2023

All viruses are: [NUMS-2023]

CORE CONCEPT AND DERIVATION

Viruses lack standard metabolic pathways and energy-harvesting machinery.

Solution:

- Because they possess no independent metabolic functions or ribosomes, all viruses are obligate intracellular **parasites**.
- They survive solely by hijacking the cellular machinery of a host.

Why other options are incorrect:

- **Autotrophs/Heterotrophs/Predators:** These refer to cellular life forms capable of independent energy acquisition and metabolism.

Question #21 Key: (D)

KMU 2023

How many pieces of ribonucleic acid (RNA) make up the genome of influenza virus? [ETEA-2023]

CORE CONCEPT AND DERIVATION

Certain RNA viruses possess segmented genomes, allowing for high rates of genetic reassortment (shift).

Solution:

- The genome of the Influenza A and B viruses is not a single continuous strand.
- It is divided into 8 **distinct pieces** (segments) of single-stranded RNA.

Why other options are incorrect:

- **4, 6, 10:** The biologically correct segment count for typical Influenza (A and B) is strictly 8.

Question #22 Key: (C)

KMU 2023

Which of the following agents can easily pass through the filter paper? [ETEA-2023]

CORE CONCEPT AND DERIVATION

Historically, pathogens were categorized by their physical size using unglazed porcelain filters.

Solution:

- **Viruses** are sub-microscopic entities (typically 20 to 300 nm).
- Due to their extremely small size, they can easily pass through fine bacterial filters that trap larger cellular organisms.

Why other options are incorrect:

- **Bacteria, Fungi, Yeast:** These are much larger cellular organisms (typically 1 μm or larger) that are blocked by standard biological filters.

Question #23 Key: (C)

KMU 2023

Viruses are not classified based on: [ETEA-2023 Retake]

CORE CONCEPT AND DERIVATION

Viral taxonomy utilizes inherent structural and biological properties of the virus.

Solution:

- Viruses are completely acellular. They entirely lack a **cell membrane**, cytoplasm, and organelles.
- Because a cell membrane is absent in all viruses, it cannot be used as a criterion for their classification.

Why other options are incorrect:

- **Morphology, Envelope presence, Host specificity:** These are the primary criteria used universally by virologists to classify viral families.

Question #24 Key: (B)

UHS 2023

Virus is what type of agent? [UHS-2023]

CORE CONCEPT AND DERIVATION

Viruses exist on the edge of life, defined primarily by their ability to transmit disease.

Solution:

- A virus is biologically classified as an obligate intracellular **infectious agent**.
- It is designed specifically to transfer its genetic material into a host to propagate, causing infection.

Why other options are incorrect:

- **Cellular agent:** Viruses are acellular.
- **Non-protein agent:** Viruses contain protein capsids.
- **Non-infectious agent:** Infectivity is their defining characteristic.

Question #25 Key: (D)

SZABMU 2023

Choose the entities which requires a single cellular gene to encode the protein making up the organism: [SZABM...]

CORE CONCEPT AND DERIVATION

Subviral agents and their genetic basis.

Solution:

- **Prions** are proteinaceous infectious particles completely devoid of nucleic acid.
- The structural protein making up a prion (PrP) is encoded by a **single cellular gene** (the *PRNP* gene) located in the host's own cellular genome.
- The normal cellular protein (PrP^C) undergoes conformational misfolding into the infectious, β -sheet rich scrapie isoform (PrP^{Sc}), which then induces further normal host protein molecules to misfold.
- Therefore, **Prions** require a single cellular host gene to encode their protein.

Why other options are incorrect:

- **A (Viroid):** Viroids consist solely of tiny, naked circular RNA molecules and possess **no protein coat** (they do not encode or contain any protein).
- **B & C (Virion / Virus):** Viruses contain their own viral genome encoding multiple distinct proteins (capsid capsomeres, enzymes, envelope proteins), not a single cellular host gene.

Question #26 Key: (C)

SZABMU 2023

_____ infection is caused by a viroid: [SZABMU-2023]

CORE CONCEPT AND DERIVATION

Certain human pathogens blur the lines between standard viruses and naked viroids.

Solution:

- **Hepatitis D** is uniquely caused by a "viroid-like" pathogen known as the Hepatitis Delta Virus (HDV).
- It possesses a tiny circular RNA genome and lacks its own envelope proteins, strictly requiring a co-infection with Hepatitis B to replicate and spread.

Why other options are incorrect:

- **Mad Cow / Mysterious brain infection:** These are caused by prions.
- **Hepatitis A:** Caused by a standard picornavirus.

Question #27 Key: (C)

KMU 2023

The head of some phages are icosahedral, which means that the head possess: [ETEA-2023]

CORE CONCEPT AND DERIVATION

Geometric morphology allows viruses to maximize internal volume while minimizing protein subunit variety.

Solution:

- The term "icosahedral" originates from Greek, where "eikosi" means twenty and "hedra" means seat or face.
- Therefore, an icosahedral viral head structurally possesses exactly 20 **triangular sides (faces)**.

Why other options are incorrect:

- **6, 10, 15 sides:** Do not correspond to the highly stable, geometric symmetry of an icosahedron.

Question #28 Key: (C)

KMU 2023

The protein coat surrounding the genome of virus is called: [ETEA-2023 Retake]

CORE CONCEPT AND DERIVATION

Viral architecture consists of a nucleic acid interior and a protective protein exterior.

Solution:

- The precise virological term for the protein coat that encloses and protects the viral genetic material is the **capsid**.

Why other options are incorrect:

- **Viroid/Phage:** These describe types of infectious agents, not structural layers.
- **DNA sheath:** Not a standard virological term; bacteriophages have a tail sheath, but it surrounds the tail tube, not the main genomic head.

Question #29 Key: (B)

SZABMU 2023

_____ is transmitted through infected blood and hypodermic syringes: [SZABMU-2023]

CORE CONCEPT AND DERIVATION

Pathogen transmission routes depend entirely on tissue tropism and environmental viability.

Solution:

- **HIV** is heavily concentrated in blood, semen, and vaginal fluids.
- Direct blood-to-blood contact via shared hypodermic needles or transfusions is a highly efficient vector for transmitting the virus.

Why other options are incorrect:

- **Measles & Influenza:** Are airborne/respiratory.
- **Cholera:** Is transmitted via contaminated food and water (fecal-oral).

Question #30 Key: (B)

KMU 2023

HIV belongs to a special class of virus known as: [ETEA-2023]

CORE CONCEPT AND DERIVATION

Viral classification relies on the nature of the genome and its replication strategy within the host cell.

Solution:

- The Human Immunodeficiency Virus (HIV) carries RNA as its genetic material.
- It is classified as a **retrovirus** because it utilizes the enzyme reverse transcriptase to reverse the standard flow of genetic information, synthesizing DNA from its RNA genome.

Why other options are incorrect:

- **Flavivirus, Novavirus, Tetra virus:** These are distinct viral families or genera with different genomic structures and replication mechanisms (e.g., Flaviviruses include Dengue and Zika, but they do not use reverse transcription to integrate into the host genome).

Question #31 Key: (A)

KMU 2023

The genome of the human immunodeficiency virus is made up of: [ETEA-2023 Retake]

CORE CONCEPT AND DERIVATION

The native genetic material packaged inside a virion dictates its initial life cycle steps.

Solution:

- Inside the infectious HIV particle (virion), the genome consists of two identical copies of single-stranded **RNA**.

Why other options are incorrect:

- **DNA/cDNA:** While HIV creates a complementary DNA (cDNA) intermediate inside the host cell using reverse transcriptase, its actual packaged genome is RNA.
- **rRNA:** Ribosomal RNA is a cellular component used in protein synthesis, not a viral genome.

Question #32 Key: (B)

UHS 2023

The molecules used to control virus during infection of animal cells are: [UHS-2023]

CORE CONCEPT AND DERIVATION

Host cells possess innate biochemical defense mechanisms to limit viral spread to neighboring cells.

Solution:

- When an animal cell is infected by a virus, it secretes antiviral proteins called **interferons**.
- These molecules bind to receptors on adjacent, uninfected cells, signaling them to produce enzymes that degrade viral RNA and inhibit viral protein synthesis, effectively "interfering" with viral replication.

Why other options are incorrect:

- **Antigen:** The foreign molecule that triggers an immune response, not the defensive molecule.
- **Histone:** A structural protein for packaging DNA in eukaryotes.
- **Serum:** Blood plasma without clotting factors; while it contains antibodies, interferons are the specific cellular molecules secreted locally for immediate viral control.

Question #33 Key: (C)

UHS 2023

The provirus of HIV is structurally and chemically made up of? [UHS-2023]

CORE CONCEPT AND DERIVATION

The term "provirus" refers to the specific state of the viral genome after it has been integrated into the host's chromosome.

Solution:

- Once HIV enters a host cell, its single-stranded RNA (ssRNA) genome is reverse-transcribed into double-stranded DNA (dsDNA).
- This **dsDNA** is then transported into the nucleus and spliced into the host's DNA by the enzyme integrase. In this integrated state, it is termed a provirus.

Why other options are incorrect:

- **ssRNA:** This is the structure of the free viral genome, not the integrated provirus.
- **ssDNA / dsRNA:** These are not intermediates in the HIV integration pathway.

Question #34 Key: (B)

KMU 2022

In [Formula] W. M. Stanley prepared an extract of: [ETEA-2022]

CORE CONCEPT AND DERIVATION

The history of virology involves key milestones in isolating and identifying viral structures.

Solution:

- In 1935, W.M. Stanley successfully prepared a crystallized extract of the Tobacco Mosaic Virus (TMV).
- This proved that viruses were particulate in nature and consisted of nucleic acids and proteins.

Why other options are incorrect:

- **HIV, Flu, and Polio:** These viruses were not the first to be crystallized; Stanley's pioneering work was specifically on TMV.

Question #35 Key: (A)

DUHS 2022

Virus is a Latin word meaning: [DUHS-2022]

CORE CONCEPT AND DERIVATION

The etymology of scientific terms often traces back to their initial discovery and perceived nature.

Solution:

- The word "virus" is derived from the Latin word *venome*, which translates to a poisonous fluid or venom.
- Historically, it was referred to as a poison associated with disease and death before its particulate nature was understood.

Why other options are incorrect:

- **Sweet, Acidic, Sour:** These are taste and chemical descriptors unrelated to the historical Latin naming of pathogens.

Question #36 Key: (D)

NUMS 2022

Which one can be considered as living characteristic of virus? [NUMS-2022]

CORE CONCEPT AND DERIVATION

Viruses exhibit a mix of both living and non-living characteristics, making them unique biological entities positioned at the borderline of life.

Solution:

- A defining characteristic of life is the presence of genetic material (DNA or RNA) that can undergo replication and mutation.
- Viruses possess genomes that can **mutate**, allowing them to evolve and adapt to host defenses.

Why other options are incorrect:

- **Can be crystalized, Lack biosynthetic machinery, No cellular respiration:** These are non-living characteristics of viruses.

Question #37 Key: (C)

KMU 2022

Which one of the following is the characteristic of viruses? [ETEA-2022]

CORE CONCEPT AND DERIVATION

The ecological and biological classification of a virus depends entirely on its relationship with a host.

Solution:

- Viruses are **intracellular obligate parasites**.
- This means they strictly require the internal environment of a host cell to replicate and survive. They cannot reproduce independently.

Why other options are incorrect:

- **Facultative parasites:** These can live independently or as parasites. Viruses cannot live independently.

Question #38 Key: (D)

UHS 2022

Which of the following virus contains single stranded DNA? [UHS-2022]

CORE CONCEPT AND DERIVATION

While most DNA viruses are double-stranded, there are specific exceptions in viral taxonomy.

Solution:

- **Parvovirus** is a unique and medically significant virus because it is the primary family of viruses containing a **single-stranded DNA (ssDNA)** genome.

Why other options are incorrect:

- **Adenovirus, Herpes virus, Pox virus:** All of these contain double-stranded DNA (dsDNA) genomes.

Question #39 Key: (B)

BUMHS 2022

A virion is designated as: [BUMHS-2022]

CORE CONCEPT AND DERIVATION

The functional state of a virus is described by specific terminology.

Solution:

- A virion is officially defined as the **complete virus** particle.
- It is fully equipped with its nucleic acid and protective coat, ready to infect a living cell.

Why other options are incorrect:

- **Viral enzyme, Viral genome:** These are sub-components of the virus, not the complete infectious particle.
- **Viral lysosome:** Viruses do not possess lysosomes.

Question #40 Key: (D)

BUMHS 2022

Poliovirus is an example of: [BUMHS-2022]

CORE CONCEPT AND DERIVATION

Viruses are classified structurally based on their capsid symmetry.

Solution:

- The **Poliovirus** possesses an icosahedral symmetry, which gives it a roughly **spherical** appearance under an electron microscope.

Why other options are incorrect:

- **Tadpole shaped:** Characteristic of bacteriophages.
- **Rod/Helical shaped:** Characteristic of viruses like the Tobacco Mosaic Virus (TMV).

Question #41 Key: (D)

BUMHS 2022

Which of the following is a DNA virus? [BUMHS-2022]

CORE CONCEPT AND DERIVATION

Identifying the nucleic acid core of major human pathogens is critical in viral classification.

Solution:

- The **Herpes virus** is a prominent example of a virus containing a double-stranded DNA (dsDNA) genome.

Why other options are incorrect:

- **Polio, Influenza, and Mumps viruses:** All of these contain RNA genomes.

Question #42 Key: (B)

UHS 2022

What does the term *bacteriophage* refer to? [UHS-2022]

CORE CONCEPT AND DERIVATION

The nomenclature of viruses often reflects their specific host organism.

Solution:

- The term "bacteriophage" is formed from "bacteria" and the Greek word "phagein" (to devour).
- It specifically refers to a **virus that infects bacteria**.

Why other options are incorrect:

- Viruses do not behave like bacteria, nor do bacteria infect viruses. It is strictly a viral parasite of a bacterial host.

Question #43 Key: (C)

KMU 2022

The word *hepatitis* means inflammation of the: [ETEA-2022]

CORE CONCEPT AND DERIVATION

Medical terminology utilizes root words to designate specific anatomical structures.

Solution:

- The prefix "*hepato-*" refers to the **liver**, and the suffix "*-itis*" indicates inflammation.
- Therefore, hepatitis is medically defined as the inflammation of the liver, typically caused by a viral infection.

Why other options are incorrect:

- Inflammation of the gall bladder is cholecystitis, spleen is splenitis, and pancreas is pancreatitis.

Question #44 Key: (B)

KMU 2022

Which one of the following pairs of disease is caused by virus? [ETEA-2022]

CORE CONCEPT AND DERIVATION

Recognizing clusters of pathogen types is vital for diagnosis and treatment.

Solution:

- **Measles and Mumps** are both highly contagious diseases caused by viruses belonging to the *Paramyxoviridae* family.

Why other options are incorrect:

- **Syphilis and TB**: Both are bacterial infections.
- **Tetanus and Cholera**: Both are bacterial infections.
- **AIDS and Typhoid**: AIDS is viral (HIV), but Typhoid is bacterial (*Salmonella*).

Question #45 Key: (D)

DUHS 2022

Hepatitis is caused by: [DUHS-2022]

CORE CONCEPT AND DERIVATION

While liver inflammation can have non-infectious causes (like alcohol), infectious hepatitis is heavily associated with a specific pathogen class.

Solution:

- Infectious hepatitis is primarily caused by hepatotropic **viruses** (such as Hepatitis A, B, C, D, and E viruses).

Why other options are incorrect:

- While rare bacterial or protozoan infections can affect the liver, the standard disease known universally as "Hepatitis" is virally induced.

Question #46 Key: (A)

DUHS 2022

*Rabies is caused by: [DUHS-2022]***CORE CONCEPT AND DERIVATION**

Viral families are classified based on the diseases they cause and their morphological features.

Solution:

- Rabies is a deadly neurological disease caused by the **Rhabdovirus** (specifically, the rabies virus), which has a distinct bullet-like shape.

Why other options are incorrect:

- **Paramyxovirus**: Causes measles and mumps.
- **Arbovirus**: Arthropod-borne viruses (e.g., Dengue).
- **Rhinovirus**: The primary cause of the common cold.

Question #47 Key: (B)

UHS 2022

*The enzymes integrase, protease and reverse transcriptase are found in which virus? [UHS-2022]***CORE CONCEPT AND DERIVATION**

Retroviruses require a highly specialized suite of pre-packaged enzymes to complete their unique life cycle.

Solution:

- The **Human Immunodeficiency Virus (HIV)** packages three essential enzymes within its capsid:
- **Reverse transcriptase**: To convert RNA into DNA.
- **Integrase**: To insert viral DNA into the host genome.
- **Protease**: To cleave viral polypeptides during maturation.

Why other options are incorrect:

- **Influenza, Hepatitis A, Herpes**: These do not integrate via reverse transcription and lack this specific trio of enzymes.

Question #48 Key: (A)

KMU 2022

*Human immunodeficiency virus (HIV) particles are surround with a coat known as the virus envelop or membrane m...***CORE CONCEPT AND DERIVATION**

Viral envelopes are structurally derived from the host cell but modified by the virus.

Solution:

- When HIV buds out of a host cell, it wraps itself in a section of the host's plasma membrane.
- This biological membrane is primarily composed of lipids with embedded viral proteins, classifying it biochemically as a **lipoprotein** envelope.

Why other options are incorrect:

- **Glycoprotein**: Refers specifically to the spikes (gp120/gp41) sticking out of the envelope, not the continuous membrane layer itself.

Question #49 Key: (C)

SZABMU 2022

*Which of the following is transmitted through infected blood and infected syringes? [SZABMU-2022]***CORE CONCEPT AND DERIVATION**

Pathogens evolve specific modes of transmission based on their environmental stability and tissue tropism.

Solution:

- **HIV** is a blood-borne pathogen.
- It requires direct exchange of bodily fluids and is heavily transmitted through the sharing of infected needles/syringes and blood transfusions.

Why other options are incorrect:

- **Influenza & Measles**: Transmitted via respiratory aerosols/droplets.
- **Vibrio cholerae**: Transmitted via the fecal-oral route (contaminated water).

Question #50 Key: (B)

DUHS 2022

In AIDS, 'D' stands for: [DUHS-2022]

CORE CONCEPT AND DERIVATION

Medical acronyms describe the clinical manifestation of the disease.

Solution:

- AIDS stands for Acquired Immuno**Deficiency** Syndrome.
- "Deficiency" highlights the core pathology: the profound depletion of the body's immune cells.

Why other options are incorrect:

- **Decompose, Degenerate, Difficult:** These are not part of the standard medical nomenclature for the disease.

Question #51 Key: (C)

PMDC 2020

Which of the following is not related to enveloped virus? [PMC-2020]

CORE CONCEPT AND DERIVATION

The lipid envelope of a virus dictates its stability in the environment and its interaction with the host immune system.

Solution:

- Enveloped viruses are generally fragile outside a host because their lipid envelope is susceptible to heat, detergents, and desiccation.
- They are **NOT** tolerant to antibodies. The host immune system easily targets surface proteins (spikes) on the envelope, neutralizing the virus.

Why other options are incorrect:

- **Short survival, sensitive to sunlight, derived from host:** These are all true characteristic facts regarding enveloped viruses.

Question #52 Key: (C)

PMDC 2020

The complete mature and infection virus particle is known as: [PMC-2020]

CORE CONCEPT AND DERIVATION

Terminology in virology strictly defines different states and structures of the virus.

Solution:

- A **virion** is the fully assembled, mature, and infectious viral particle capable of transmitting its genome to a new host cell.
- It includes the genome, the capsid, and occasionally an envelope.

Why other options are incorrect:

- **Genome/Capsid:** These are merely parts of the virion.
- **Venom:** Refers to a biological toxin, not an infectious particle.

Question #53 Key: (A)

PMDC 2020

Numerous opportunistic diseases might attack a person suffering from which of the following diseases: [PMC-2020...]

CORE CONCEPT AND DERIVATION

A severely compromised immune system creates an environment where normally harmless microbes become lethal.

Solution:

- **AIDS** destroys T-helper cells, creating severe immunodeficiency.
- This allows numerous opportunistic pathogens (fungi, bacteria, atypical viruses) to successfully attack and overwhelm the patient.

Why other options are incorrect:

- **Measles, Influenza, Hepatitis A:** While these can cause temporary immune stress, they do not systemically and permanently destroy the immune system to allow a cascade of opportunistic diseases like AIDS does.

Question #54 Key: (A)

PMDC 2020

Which of the following is not true about human immunodeficiency virus? [PMC-2020]

CORE CONCEPT AND DERIVATION

Understanding the direct causal relationship between HIV and its clinical pathology is fundamental to virology.

Solution:

- The statement "**It does not cause AIDS**" is patently false.
- HIV is the sole, direct causative agent of Acquired Immunodeficiency Syndrome (AIDS).

Why other options are incorrect:

- **Retrovirus, Enveloped, Causes deficiency:** All of these are factually true statements describing the nature and mechanism of HIV.

Question #55 Key: (A)

PMDC 2019

Virus can only survive and reproduce inside a: [NTS-2019]

CORE CONCEPT AND DERIVATION

Viruses are defined by their obligate intracellular parasitic nature.

Solution:

- Viruses lack the independent metabolic machinery required for reproduction.
- They must infect a **living cell** (host) to hijack its biosynthetic machinery (ribosomes, enzymes) to replicate.

Why other options are incorrect:

- **Animal/Bacterial cells:** These are specific types of living cells, but viruses infect a wide variety of living cells (plants, fungi, etc.), making "Living cells" the most comprehensive and correct answer.
- **Non-living cells:** Viruses cannot replicate in dead or non-living environments.

Question #56 Key: (B)

KMU 2019

The genome of influenza virus is made up of: [ETEA-2019]

CORE CONCEPT AND DERIVATION

Different families of viruses carry different forms of nucleic acids as their genome.

Solution:

- The Influenza virus belongs to the *Orthomyxoviridae* family.
- Its genetic material is composed of segmented, **single-stranded RNA (ssRNA)**.

Why other options are incorrect:

- **ssDNA, dsDNA, dsRNA:** These genomes are found in other viral families (e.g., Parvovirus has ssDNA, Adenovirus has dsDNA), not Influenza.

Question #57 Key: (A)

MDCAT 2019

Capsid, the protective coat of a virus is made up of subunits known as capsomeres that are ____ in nature. [MD...]

CORE CONCEPT AND DERIVATION

The viral capsid provides structural integrity and protection to the viral genome.

Solution:

- The capsid is a protective coat assembled from smaller, repeating structural subunits called capsomeres.
- Biochemically, capsomeres are entirely **protein** in nature.

Why other options are incorrect:

- **Lipid:** Found in the viral envelope, not the capsid.
- **DNA/RNA:** These form the viral genome, not the protective coat.

Question #58 Key: (D)

PMDC 2019

Genome of virus is composed of: [NTS-2019]

CORE CONCEPT AND DERIVATION

Nucleic acid composition across viral families.

Solution: Unlike cellular organisms which strictly use dsDNA, viruses can utilize either **DNA or RNA** as their primary genetic material.

Question #59 Key: (B)

KMU 2019

The bacteriophage replicates only inside the: [ETEA-2019]

CORE CONCEPT AND DERIVATION

Viruses exhibit high host specificity determined by viral surface proteins and host cell receptors.

Solution:

- A bacteriophage (phage) translates to "bacteria eater."
- It is highly specialized to recognize, infect, and replicate **only inside a bacterial cell**.

Why other options are incorrect:

- **Animal/Fungal cells:** Bacteriophages cannot bind to or infect eukaryotic cells because they lack the required host receptors.

Question #60 Key: (B)

SZABMU 2019

The main target of HIV in AIDS is: [AJK-2019]

CORE CONCEPT AND DERIVATION

HIV exhibits strict cellular tropism mediated by the CD4 surface receptor.

Solution:

- The main target of HIV is the **Helper T-lymphocytes** (CD4+ cells), which serve as the "command centers" of the immune system.
- The destruction of these cells leads to the catastrophic immune failure seen in AIDS.

Why other options are incorrect:

- **Red blood cells, B-lymphocytes, Liver cells:** Do not express the required CD4 receptor necessary for primary HIV attachment and entry.

Question #61 Key: (B)

MDCAT 2018

In viruses, a combined structure formed by core (Nucleic Acid) and capsid is: [MDCAT-2018]

CORE CONCEPT AND DERIVATION

The structural anatomy of a virus is composed of fundamental morphological units.

Solution:

- All viruses contain a genome (either DNA or RNA) and a protective protein coat called a capsid.
- Together, the nucleic acid core and the surrounding capsid are collectively referred to as the **nucleocapsid**.

Why other options are incorrect:

- **Envelope:** A lipid bilayer outside the nucleocapsid.
- **Capsomeres:** Individual protein subunits that make up the capsid.
- **Prions:** Infectious proteins lacking nucleic acids entirely.

Question #62 Key: (C)

PMDC 2018

Which of the following is the simplest forms of pathogens causing disease? [NTS-2018]

CORE CONCEPT AND DERIVATION

Pathogens vary dramatically in structural complexity, from multicellular organisms down to mere molecules.

Solution:

- **Prions** are the absolute simplest known infectious agents.
- They are composed **exclusively** of misfolded proteins and contain absolutely no genetic material (neither DNA nor RNA).

Why other options are incorrect:

- **Viruses:** More complex as they contain both nucleic acids and proteins.
- **Fungus/Amoeba:** Highly complex eukaryotic organisms.

Question #63 Key: (D)

PMDC 2018

*Which is not a viral disease? [NTS-2018]***CORE CONCEPT AND DERIVATION**

Distinguishing between the causative agents of major human diseases is a fundamental aspect of pathology.

Solution:

- **Malaria** is not a viral disease. It is caused by *Plasmodium*, which is a single-celled eukaryotic parasite (a protozoan).

Why other options are incorrect:

- **AIDS (HIV), Chicken pox (Varicella-zoster), Influenza:** These are all highly common viral diseases.

Question #64 Key: (C)

MDCAT 2017

*Cilia and flagella are absent in: [MDCAT-2017]***CORE CONCEPT AND DERIVATION**

Viruses are highly simplified, acellular infectious entities that lack typical cellular motility structures.

Solution:

- Viruses are infectious particles made up of a protein coat (capsid) and a genome (DNA or RNA).
- They completely lack cellular organelles, cytoplasm, and motility appendages like cilia and flagella.

Why other options are incorrect:

- **Lower plants, Bacteria, Lower animals:** Many species within these groups possess flagella or cilia for locomotion.

Question #65 Key: (B)

KMU 2017

*Which one is not an opportunistic disease related to HIV infection? [ETEA-2017]***CORE CONCEPT AND DERIVATION**

Opportunistic infections are secondary diseases that strike because the host's primary immune defenses have been compromised.

Solution:

- **Destruction of body immune system** is the direct, primary physiological effect of the HIV virus itself, not an "opportunistic disease."
- It is the cause of the susceptibility, not the secondary infection.

Why other options are incorrect:

- **Tuberculosis, Pneumonia, Toxoplasmosis:** These are classic opportunistic infections that heavily afflict AIDS patients due to their destroyed immune systems.

Question #66 Key: (B)

MDCAT 2016

*AIDS is caused by: [MDCAT-2016]***CORE CONCEPT AND DERIVATION**

Acquired Immunodeficiency Syndrome (AIDS) represents the advanced stage of a specific infection.

Solution:

- AIDS is caused by the Human Immunodeficiency **Virus** (HIV).

Why other options are incorrect:

- **Fungi, Bacteria, Alga:** While AIDS patients may die from secondary fungal or bacterial infections due to immunodeficiency, the underlying cause of the syndrome is viral.

Question #67 Key: (A)

MDCAT 2015

HIV is classified as: [MDCAT-2015]**CORE CONCEPT AND DERIVATION**

Viral classification is often based on the type of genetic material and the mode of replication.

Solution:

- **HIV** (Human Immunodeficiency Virus) is a **retrovirus**.
- Retroviruses are RNA viruses that use the enzyme reverse *transcriptase* to convert their single-stranded RNA genome into double-stranded DNA within the host cell.

Why other options are incorrect:

- **Bacteriophage:** A virus that infects bacteria.
- **Oncovirus:** A virus that primarily causes cancer.
- **Icosahedral virus:** Refers to shape, but retrovirus is the specific biological classification for HIV.

Question #68 Key: (B)

DUHS 2014

Polio vaccine is given by: [KMDC-2014]**CORE CONCEPT AND DERIVATION**

Vaccine administration routes vary based on the formulation and the targeted immune response.

Solution:

- The live attenuated Polio vaccine (Sabin vaccine) is famously administered globally via **oral drops**.
- This method simulates the natural fecal-oral route of polio infection, strongly stimulating mucosal immunity in the intestines.

Why other options are incorrect:

- **Spray, Tablets, Local application:** Not the standard administrative routes for the polio vaccine. (Note: The inactivated Salk vaccine is given by injection).

Question #69 Key: (D)

MDCAT 2014

Which of the following cells does HIV mainly infect? [MDCAT-2014]**CORE CONCEPT AND DERIVATION**

Viruses bind to specific host cell surface receptors to gain entry.

Solution:

- HIV uses its gp120 spike protein to specifically target and bind to CD4 receptors.
- These CD4 receptors are predominantly found on the surface of **T-helper lymphocytes**. By destroying these cells, HIV cripples the human immune system.

Why other options are incorrect:

- **T-killer, B-plasma, B-memory cells:** These lack the dense concentration of CD4 receptors required for primary HIV entry.