

**BIO · BIOLOGY**

08. Immunity

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

🎯 39 Solved Questions

📅 2014 to 2024 Archive

📋 Boards: KMU, MDCAT, NUMS, PMDC, SZABMU, UHS

📊 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.**

KMU 2024

What directly triggers the activation of natural killer cells?

- (A) Free radicals
- (B) Hydrogen peroxide
- (C) Oxygen
- (D) Interferons

Q2.

KMU 2024

In an inflammatory response, bradykinin causes:

- (A) Activation of natural killer cells
- (B) Blockage in blood vessels
- (C) Constriction of blood vessels
- (D) Leakage of fluid from blood vessels

Q3.

KMU 2024

Which of the following is an example of passive immunity:

- (A) Antibodies from mother's milk
- (B) Previous chickenpox infection
- (C) Inactivated polio vaccine
- (D) Live polio vaccine

Q4.

SZABMU 2024

If a person becomes ill with HIV and survives, then the type of immunity developed is:

- (A) Artificial passive immunity
- (B) Natural passive immunity
- (C) Artificial active immunity
- (D) Natural active immunity

Q5.

SZABMU 2024

Which of the following chemicals is responsible for causing inflammation in upper respiratory tract?

- (A) Acetyl amine
- (B) Ampicillin
- (C) Histamine
- (D) Nicotine

Q6.

NUMS 2024

During COVID-19 epidemic the plasma of recovered patients was injected in COVID patients. This proved quite effective, which component of plasma do you think was responsible for this?

- (A) Plasminogen
- (B) Interferon
- (C) Antibodies
- (D) Interleukin-I

Q7.

NUMS 2024

Choose the one which is an example of artificial active immunity:

- (A) Foetus receiving antibodies of mother through placenta
- (B) Mother receiving antibodies
- (C) Babies receiving MMR shots
- (D) Prevention of disease due to previous infection

Q8.

NUMS 2024

Which of the following type of T-cells are required for the activation of B-cells?

- (A) Helper T-cells
- (B) Cytotoxic T-cells
- (C) Suppressor T-cells
- (D) Memory T-cells

Q9.

SZABMU 2024

Immunity provided to baby through colostrum is an example of:

- (A) Natural active immunity
- (B) Artificial active immunity
- (C) Natural passive immunity
- (D) Artificial passive immunity

Q10.

SZABMU 2023

Which may NOT be a possible action of interferons?

- (A) Belongs to cytokines
- (B) Activate natural killer cells
- (C) Activate immune cells
- (D) Secrete interleukin

Q11.

KMU 2023

The immune cells that clean up pus as a part of the healing process is:

- (A) Natural killer cell
- (B) Macrophages
- (C) Antibodies
- (D) Neutrophils

Q12.

NUMS 2023

Which may not be a mode of action of an antibody:

- (A) Neutralizing an antigen
- (B) Precipitating an antigen
- (C) Secretion of cytokines
- (D) Enhancing phagocytosis

Q13.

NUMS 2023

Vaccination is an example of:

- (A) Natural passive immunity
- (B) Natural active immunity
- (C) Acquired/artificial active immunity
- (D) Acquired/artificial passive immunity

Q14.

KMU 2023

Thymus gland is involved in maturation of which of the following?

- (A) Platelets
- (B) Eosinophils
- (C) B- lymphocytes
- (D) T-lymphocytes

Q15.

KMU 2023

Cytotoxic T-cells

- (A) Directly kill invaders
- (B) Aid B-cells in their job
- (C) Both A and B
- (D) Suppress T-cells activity

Q16.

KMU 2023

All of these following are true about neutrophils except:

- (A) Most abundant form of WBCs
- (B) Have a short life span
- (C) Made by the thymus gland
- (D) Released by the bone marrow

Q17.

KMU 2023

Which of the following can be effective in preventing viral infection in humans?

- (A) Taking antihistamines
- (B) Getting vaccinated
- (C) Applying antiseptics
- (D) Taking antibiotics

Q18.

KMU 2023

Which of the following is true about bradykinin?

- (A) It is produced at the site of tissue injury
- (B) It has no role in the leakage of fluids into the tissues in inflammation
- (C) It destroys phagocytes
- (D) It produces interferon gamma

Q19.

UHS 2022

_____ proteins are produced by WBCs in response to _____ and provide immunity.

- (A) Antibiotics, antigen
- (B) Antibodies, RBC
- (C) Globulin, histamine
- (D) Antibodies, antigen

Q20.

SZABMU 2022

Which of the following helps in developing immunity against germs?

- (A) Radiotherapy
- (B) Chemotherapy
- (C) Vaccination
- (D) Antibiotics

Q21.

NUMS 2020

The cells which play very important role in developing immunity are:

- (A) Monocytes
- (B) Lymphocytes
- (C) Neutrophils
- (D) Thrombocytes

Q22.

SZABMU 2020

Antibodies are manufactured in:

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

Q23.

PMDC 2020

Autoimmune diseases act at the principle of:

- (A) Self against antigens
- (B) Self against self
- (C) Antigen against self
- (D) Antigen self-destroyed

Q24.

MDCAT 2019

Now a day, every new born gets regular shots of vaccine for polio. It contains ____ for polio to make a child immune against this disease.

- (A) Antisera
- (B) Antibiotics
- (C) Antibodies
- (D) Antigens

Q25.

MDCAT 2019

A person got an infection, he became ill but then he survived. What do you think which type of immunity he would have developed?

- (A) Naturally induced active immunity
- (B) Active immunity
- (C) Artificially induced active immunity
- (D) Passive immunity

Q26.

SZABMU 2019

The prevention of disease by artificial activation of immune response is possible by:

- (A) Gene therapy
- (B) Drugs
- (C) Vaccines
- (D) Antibodies

Q27.

SZABMU 2019

Is a foreign substance, which stimulates the formation of antibodies?

- (A) Antibiotic
- (B) Antigen
- (C) Archaea
- (D) Transposon

Q28.

MDCAT 2018

Cell mediated immune response is given by:

- (A) Neutrophils
- (B) Macrophages
- (C) T lymphocytes
- (D) B lymphocytes

Q29.

MDCAT 2018

Anti-venom given after a snake bite venom is an example of:

- (A) Artificial active immunity
- (B) Artificial passive immunity
- (C) Natural active immunity
- (D) Natural passive immunity

Q30.

MDCAT 2017

____ cells survive for a few days and secrete a huge number of antibodies in blood, tissue fluids or lymph.

- (A) Memory
- (B) T-lymphocytes
- (C) B-lymphocytes
- (D) Plasma clone

Q31.

MDCAT 2017

Vaccination is:

- (A) Natural active immunity
- (B) Artificial active immunity
- (C) Natural passive immunity
- (D) Artificial passive immunity

Q32.

MDCAT 2016

The type of immunity in which antibodies are passed from one individual to another is called:

- (A) Passive Immunity
- (B) Natural Active Immunity
- (C) Artificial Active Immunity
- (D) Humoral Immunity

Q33.

MDCAT 2015

In _____ response, B-cells produce plasma cells that synthesize antibodies and release in blood plasma and tissue fluid.

- (A) Cell-Mediated
- (B) Humoral
- (C) Hormonal
- (D) Phototactic

Q34.

MDCAT 2015

Response of body against the transplanted organ is:

- (A) Homeostatic Response
- (B) Primary Response
- (C) Behavioral Response
- (D) Cell-mediated Response

Q35.

MDCAT 2014

Which part of antibody recognizes the antigen during immune response?

- (A) Heavy part
- (B) Constant part
- (C) Light part
- (D) Variable part

Q36.

MDCAT 2014

Which one of the following glands is involved in the production of lymphocytes?

- (A) Pineal
- (B) Thymus
- (C) Pituitary
- (D) Adrenal

Q37.

MDCAT 2014

Antibodies are proteins and made up of how many polypeptide chains?

- (A) One
- (B) Three
- (C) Two
- (D) Four

Q38.

MDCAT 2014

T-lymphocytes recognize antigen and attack microorganisms or transplanted organ and tissues. This effect is called:

- (A) Cell-mediated response
- (B) Active immunity
- (C) Humoral immune response
- (D) Passive immunity

Q39.

MDCAT 2014

What type of immunity is achieved by injecting antibodies, antiserum, anti-venom serum?

- (A) Active immunity
- (B) Artificially induced immunity
- (C) Passive immunity
- (D) Naturally induced immunity

RAPID 5-COLUMN ANSWER KEY

Official PMDC verified answer keys for 08. Immunity.

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Q#	KEY	BOARD	Q#	KEY	BOARD	Q#	KEY	BOARD	Q#	KEY	BOARD	Q#	KEY	BOARD
1	D	KMU 2024	9	C	SZABMU 2024	17	B	KMU 2023	25	A	MDCAT 2019	33	B	MDCAT 2015
2	D	KMU 2024	10	D	SZABMU 2023	18	A	KMU 2023	26	C	SZABMU 2019	34	D	MDCAT 2015
3	A	KMU 2024	11	B	KMU 2023	19	D	UHS 2022	27	B	SZABMU 2019	35	D	MDCAT 2014
4	D	SZABMU 2024	12	C	NUMS 2023	20	C	SZABMU 2022	28	C	MDCAT 2018	36	B	MDCAT 2014
5	C	SZABMU 2024	13	C	NUMS 2023	21	B	NUMS 2020	29	B	MDCAT 2018	37	D	MDCAT 2014
6	C	NUMS 2024	14	D	KMU 2023	22	D	SZABMU 2020	30	D	MDCAT 2017	38	A	MDCAT 2014
7	C	NUMS 2024	15	A	KMU 2023	23	B	PMDC 2020	31	B	MDCAT 2017	39	C	MDCAT 2014
8	A	NUMS 2024	16	C	KMU 2023	24	D	MDCAT 2019	32	A	MDCAT 2016			

TOTAL
MCQS
39

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: (D)

KMU 2024

What directly triggers the activation of natural killer cells?

CORE CONCEPT AND DERIVATION

The innate immune system utilizes cytokine signaling to mobilize cellular defenses rapidly.

Formula:

None

Solution:

- When a host cell is infected by a virus, it synthesizes and secretes warning proteins known as **Interferons**.
- These interferons bind to receptors on nearby uninfected cells to boost their defenses.
- Crucially, interferons act as a chemical distress beacon that directly stimulates and activates nearby Natural Killer (NK) cells to find and destroy the infected host cells.

Why other options are incorrect:

- Free radicals, hydrogen peroxide, and oxygen are chemicals used during the "respiratory burst" by macrophages and neutrophils to digest phagocytosed bacteria, but they are not the signaling molecules that activate NK cells.

Question #2 Key: (D)

KMU 2024

In an inflammatory response, bradykinin causes:

CORE CONCEPT AND DERIVATION

Inflammation requires the movement of plasma and immune cells from the bloodstream into the damaged tissue.

Formula:

None

Solution:

- Bradykinin is a potent inflammatory mediator peptide.
- Its primary vascular role is to cause the endothelial cells of the capillaries to pull apart slightly.
- This drastically increases capillary permeability, resulting in the rapid **leakage of fluid from blood vessels** into the surrounding tissue space, clinically presenting as swelling (edema).

Why other options are incorrect:

- **Constriction / Blockage:** Bradykinin causes intense vasodilation (widening), not constriction or clotting.

Question #3 **Key: (A)**

KMU 2024

Which of the following is an example of passive immunity:

CORE CONCEPT AND DERIVATION

Passive immunity involves the reception of pre-formed antibodies without any metabolic effort from the recipient's own immune system.

Formula:

None

Solution:

- A nursing mother secretes high concentrations of IgA antibodies into her colostrum and breast milk.
- When the infant consumes this milk, they gain immediate immunological protection against pathogens in the environment.
- Because the infant did not produce these antibodies themselves, this is classic, naturally acquired **passive immunity**.

Why other options are incorrect:

- **Infection / Vaccines:** All of these force the recipient's immune system to actively generate its own antibodies and memory cells, which defines active immunity.

Question #4 **Key: (D)**

SZABMU 2024

If a person becomes ill with HIV and survives, then the type of immunity developed is:

CORE CONCEPT AND DERIVATION

Immunity categorized by how the antigen is encountered (natural vs syringe) and who does the immune work (host vs donor).

Formula:

None

Solution:

- The person caught the HIV virus through biological, real-world transmission. This makes the exposure **natural**.
- The person became ill, meaning their own immune system fought the virus and (theoretically in this prompt) survived by creating their own antibodies and cytotoxic T-cells. This makes it an **active** metabolic process.
- Therefore, the resulting memory represents **natural active immunity**.

Why other options are incorrect:

- Artificial immunity implies medical intervention (vaccine or antivenom). Passive implies receiving someone else's antibodies.

Question #5 **Key: (C)**

SZABMU 2024

Which of the following chemicals is responsible for causing inflammation in upper respiratory tract?

CORE CONCEPT AND DERIVATION

Allergic and inflammatory responses in mucosal tissues are driven by mast cell degranulation.

Formula:

None

Solution:

- When allergens (like pollen) enter the upper respiratory tract, they bind to IgE antibodies on local mast cells.
- This triggers the massive release of **histamine**.
- Histamine binds to local H1 receptors, causing aggressive vasodilation and mucus hypersecretion, resulting in the classic inflammatory symptoms of a runny nose and congestion.

Why other options are incorrect:

- **Ampicillin:** An antibiotic.
- **Nicotine:** A stimulant found in tobacco.
- **Acetyl amine:** Not a primary physiological inflammatory mediator.

Question #6 **Key: (C)**

NUMS 2024

During COVID-19 epidemic the plasma of recovered patients was injected in COVID patients. This proved quite ef...

CORE CONCEPT AND DERIVATION

Convalescent plasma therapy relies on the principle of artificially acquired passive immunity.

Formula:

None

Solution:

- When a patient successfully recovers from a virus like COVID-19, their blood plasma is flooded with highly specific neutralizing **antibodies** (IgG) against the SARS-CoV-2 spike protein.
- By extracting this plasma and transfusing it into a currently sick patient, the sick patient receives immediate, pre-made immune weapons.
- These antibodies rapidly bind to and neutralize the virus in the new host, aiding their recovery.

Why other options are incorrect:

- While plasma contains traces of interferons and interleukins, these degrade quickly. The stable, highly specific, and massively abundant therapeutic agents are the antibodies.

Question #7 **Key: (C)**

NUMS 2024

Choose the one which is an example of artificial active immunity:

CORE CONCEPT AND DERIVATION

Artificial active immunity involves the medical administration of an antigen to stimulate a permanent immune response.

Formula:

None

Solution:

- **Artificial:** The immune system is stimulated via a clinical injection (a shot/vaccine), rather than a natural environmental encounter.
- **Active:** The MMR (Measles, Mumps, Rubella) vaccine contains attenuated viruses. The baby's immune system must actively process these and generate its own memory cells.
- Therefore, babies receiving MMR shots is the perfect example of artificial active immunity.

Why other options are incorrect:

- **Foetus receiving antibodies:** Natural passive immunity.
- **Previous infection:** Natural active immunity.

Question #8 **Key: (A)**

NUMS 2024

Which of the following type of T-cells are required for the activation of B-cells?

CORE CONCEPT AND DERIVATION

The adaptive immune system requires a "two-key" system to prevent accidental autoimmune activation; B-cells usually cannot mount a full response alone.

Formula:

None

Solution:

- When a naive B-cell encounters its specific antigen, it engulfs it and displays pieces of it on its surface via MHC-II molecules.
- However, to undergo rapid clonal expansion and become plasma cells, the B-cell requires chemical permission (interleukins).
- This permission is granted by **Helper T-cells** (CD4+ cells) that recognize the displayed antigen and bind to the B-cell, officially activating it.

Why other options are incorrect:

- **Cytotoxic T-cells:** Kill infected cells directly.
- **Suppressor T-cells:** Turn off the immune response to prevent tissue damage.

Question #9 **Key: (C)**

SZABMU 2024

Immunity provided to baby through colostrum is an example of:

CORE CONCEPT AND DERIVATION

Maternal antibody transfer is an evolutionary mechanism to protect neonates before their own immune system fully boots up.

Formula:

None

Solution:

- Colostrum, the first breast milk produced, is incredibly rich in secretory IgA antibodies.
- Because breastfeeding is a standard biological process, the transfer is **natural**.
- Because the baby is merely absorbing these pre-made antibodies without utilizing its own immune machinery to create them, the immunity is **passive**.

Why other options are incorrect:

- Active immunity would require the baby to be infected with a disease or injected with a vaccine.

Question #10 **Key: (D)**

SZABMU 2023

Which may NOT be a possible action of interferons?

CORE CONCEPT AND DERIVATION

Interferons are signaling proteins (cytokines) released by host cells in response to the presence of pathogens, particularly viruses.

Formula:

None

Solution:

- Interferons act as distress signals. They belong to the cytokine family (A is true).
- They actively "interfere" with viral replication and activate other immune cells (C is true), including Natural Killer (NK) cells and macrophages (B is true).
- However, interferons themselves are just protein molecules; they are not living cells, and therefore they do not have the cellular machinery to **secrete** interleukins. Cells secrete cytokines, not the other way around.

Why other options are incorrect:

- Options A, B, and C describe valid properties or downstream effects of interferons.

Question #11 Key: (B)

KMU 2023

The immune cells that clean up pus as a part of the healing process is:

CORE CONCEPT AND DERIVATION

Pus consists of dead pathogens, tissue debris, and millions of dead neutrophils that fought the initial infection.

Formula:

None

Solution:

- While neutrophils are the first responders and form the bulk of pus when they die, they do not clean it up.
- **Macrophages** are large, long-lived phagocytes that arrive later at the infection site.
- They act as the "garbage collectors" of the immune system, engulfing and digesting the dead neutrophils, debris, and remaining bacteria to facilitate tissue healing.

Why other options are incorrect:

- **Neutrophils:** Their death creates the pus.
- **Antibodies:** Molecules, not cells; they cannot phagocytose debris.

Question #12 Key: (C)

NUMS 2023

Which may not be a mode of action of an antibody:

CORE CONCEPT AND DERIVATION

Antibodies are highly specialized Y-shaped proteins, not living cells, meaning they operate strictly through chemical binding mechanics.

Formula:

None

Solution:

- Antibodies bind to antigens to neutralize them (blocking viral entry), precipitate them (clumping soluble antigens), and opsonize them (enhancing phagocytosis by macrophages).
- However, **secretion of cytokines** requires a living cell with a nucleus, ribosomes, and a Golgi apparatus (like a T-cell or Macrophage).
- An antibody is merely a secreted protein molecule and has no biological machinery to secrete anything itself.

Why other options are incorrect:

- Neutralization, precipitation, and opsonization are the three classic textbook mechanisms of antibody action.

Question #13 **Key: (C)**

NUMS 2023

Vaccination is an example of:

CORE CONCEPT AND DERIVATION

Medical interventions that train the immune system utilize artificial means to generate an active biological response.

Formula:

None

Solution:

- A vaccine consists of medical (artificial) injection of an antigen.
- This forces the patient's own immune system to expend energy to synthesize antibodies and form memory cells (an active process).
- Therefore, vaccination is classified as **artificial active immunity**.

Why other options are incorrect:

- **Natural active:** Surviving a naturally caught disease.
- **Artificial passive:** Being injected with someone else's pre-made antibodies (antivenom).

Question #14 **Key: (D)**

KMU 2023

Thymus gland is involved in maturation of which of the following?

CORE CONCEPT AND DERIVATION

Lymphocytes are named based on the primary lymphoid organ where they undergo their final maturation and selection.

Formula:

None

Solution:

- All blood cells originate from hematopoietic stem cells in the bone marrow.
- A specific lineage of immature lymphocytes leaves the marrow and migrates to the thymus gland situated in the upper chest.
- Within the thymus, under the influence of thymosin hormones, these cells mature into immunocompetent **T-lymphocytes** (the 'T' literally stands for Thymus).

Why other options are incorrect:

- **B-lymphocytes:** Mature entirely within the Bone marrow.

Question #15 **Key: (A)**

KMU 2023

*Cytotoxic T-cells***CORE CONCEPT AND DERIVATION**

T-cells are divided into subsets with vastly different effector functions: Helpers, Cytotoxics, and Suppressors/Regulators.

Formula:

None

Solution:

- **Cytotoxic T-cells** (CD8+ cells) are the foot soldiers of the cell-mediated response.
- They seek out host cells infected with viruses or cancer cells. Upon recognizing the specific antigen, they release lethal proteins (perforin and granzymes) to **directly kill the invader/infected cell**.

Why other options are incorrect:

- **Aid B-cells:** This is the specific job of Helper T-cells (CD4+).
- **Suppress activity:** This is the job of Regulatory/Suppressor T-cells to prevent autoimmune reactions.

Question #16 **Key: (C)**

KMU 2023

*All of these following are true about neutrophils except:***CORE CONCEPT AND DERIVATION**

Neutrophils are the highly abundant, rapid-response phagocytes of the innate immune system.

Formula:

None

Solution:

- Neutrophils make up 60-70% of all circulating white blood cells (most abundant).
- They are produced and released by the red bone marrow.
- They have a very short lifespan, surviving only a few days before dying to form pus.
- They are **NOT made by the thymus gland**. The thymus is strictly dedicated to the maturation of T-lymphocytes.

Why other options are incorrect:

- Options A, B, and D are factually correct statements regarding neutrophil physiology.

Question #17 **Key: (B)**

KMU 2023

Which of the following can be effective in preventing viral infection in humans?

CORE CONCEPT AND DERIVATION

Viruses hijack host cell machinery, making them incredibly difficult to treat after infection begins. Prophylactic (preventative) immune training is the best defense.

Formula:

None

Solution:

- Because viruses live inside host cells, the most effective prevention is to train the adaptive immune system to recognize and destroy the virus the moment it enters the body.
- **Getting vaccinated** induces the production of memory B and T cells specific to that virus, neutralizing it before an infection can take hold.

Why other options are incorrect:

- **Taking antibiotics:** Antibiotics only kill bacteria; they are 100% ineffective against viruses.
- **Antihistamines:** Only reduce allergy symptoms.

Question #18 **Key: (A)**

KMU 2023

Which of the following is true about bradykinin?

CORE CONCEPT AND DERIVATION

Bradykinin is a potent peptide hormone involved in the inflammatory cascade and pain sensation.

Formula:

None

Solution:

- When tissue is damaged, an enzymatic cascade in the blood is triggered, cleaving kininogens to produce bradykinin right at the **site of tissue injury**.
- Bradykinin is a powerful vasodilator, increases vascular permeability (causing swelling/edema), and powerfully stimulates local pain receptors.

Why other options are incorrect:

- **No role in leakage:** False, it is one of the primary causes of capillary leakage during inflammation.
- **Destroys phagocytes / produces interferon:** Bradykinin is a vasoactive peptide, not a cytotoxic molecule or a cell that produces cytokines.

Question #19 Key: (D)

UHS 2022

_____ proteins are produced by WBCs in response to _____ and provide immunity.

CORE CONCEPT AND DERIVATION

The humoral immune response is a direct reaction to foreign molecular markers.

Formula:

None

Solution:

- When White Blood Cells (specifically B-lymphocytes) detect a foreign shape (an **antigen**), they differentiate into plasma cells.
- These plasma cells synthesize and release highly specific **antibodies** (immunoglobulins).
- These antibodies bind to the antigens to neutralize them, thus providing immunity.

Why other options are incorrect:

- WBCs do not produce antibiotics (fungi and bacteria produce antibiotics).
- Antibodies are not produced in response to healthy RBCs (unless it is a mismatched blood transfusion).

Question #20 Key: (C)

SZABMU 2022

Which of the following helps in developing immunity against germs?

CORE CONCEPT AND DERIVATION

Long-term immunity requires the generation of memory lymphocytes.

Formula:

None

Solution:

- **Vaccination** deliberately exposes the immune system to weakened antigens.
- This safely triggers the primary immune response, resulting in the creation of memory B and memory T cells.
- If the real germ ever enters the body, these memory cells mount an overwhelmingly fast secondary response, preventing illness.

Why other options are incorrect:

- **Antibiotics**: Kill existing bacteria but do not train the immune system to remember them.
- **Radio/Chemotherapy**: Cytotoxic treatments that actually destroy rapidly dividing cells, severely weakening the immune system.

Question #21 Key: (B)

NUMS 2020

The cells which play very important role in developing immunity are:

1.

CORE CONCEPT AND DERIVATION

The immune system relies on specialized white blood cells to mediate innate and adaptive defenses. Long-term specific immunity (humoral and cell-mediated immunity) is orchestrated by lymphocytes (B-cells and T-cells).

2. High-Yield PYQ Note:

This question is a high-yield medical entrance staple that appeared in both **PMC-2020** and **NUMS-2023**.

3. Solution:

- **Lymphocytes:** Key effectors of adaptive immunity. B-lymphocytes synthesize antibodies (humoral defense), while T-lymphocytes govern cell-mediated cytotoxicity and immune coordination.

4. Why other options are incorrect:

- **Monocytes:** Phagocytic agranulocytes that mature into tissue macrophages; part of the innate first/second line of defense.
- **Neutrophils:** Short-lived granulocytic phagocytes active in acute bacterial infection.
- **Thrombocytes:** Platelets involved in hemostasis and blood clotting, not developing specific immunity.

Question #22 Key: (D)

SZABMU 2020

Antibodies are manufactured in:

1.

CORE CONCEPT AND DERIVATION

Humoral immunity involves the synthesis and secretion of specific immunoglobulins (antibodies) to neutralize pathogens and toxins in body fluids.

2. High-Yield PYQ Note:

This core concept was tested in both **PMC-2020** and **SZABMU-2024 (Reconduct)**.

3. Solution:

- **B lymphocytes:** Upon antigen presentation and activation (facilitated by Helper T-cells), B-lymphocytes differentiate into plasma cells that produce and secrete large volumes of antigen-specific antibodies.

4. Why other options are incorrect:

- **T lymphocytes:** Mediate cell-mediated immunity and provide cytokines; they do not synthesize or secrete soluble antibodies.
- **Red blood cells (Erythrocytes):** Specialized for oxygen and carbon dioxide transport via hemoglobin.
- **Platelets (Thrombocytes):** Non-nucleated fragments specialized in blood coagulation.

Question #23 **Key: (B)**

PMDC 2020

Autoimmune diseases act at the principle of:

CORE CONCEPT AND DERIVATION

A healthy immune system exhibits "self-tolerance," meaning it ignores the body's own tissues while attacking foreign antigens.

Formula:

None

Solution:

- In an autoimmune disease, there is a breakdown in immunological tolerance.
- The body's T-cells and auto-antibodies mistakenly identify the host's own healthy cells as foreign invaders.
- This results in the immune system actively destroying its own tissues, fundamentally operating on the principle of **self against self**.

Why other options are incorrect:

- "Self against antigens" is the normal, healthy immune response.

Question #24 **Key: (D)**

MDCAT 2019

Now a day, every new born gets regular shots of vaccine for polio. It contains ____ for polio to make a child ...

CORE CONCEPT AND DERIVATION

The fundamental mechanism of a vaccine is to expose the immune system to a safe version of a pathogen.

Formula:

None

Solution:

- A vaccine contains attenuated (weakened) or dead pathogens, or pieces of the pathogen's surface proteins.
- These immune-provoking components are known as **antigens**.
- When injected, the body recognizes these antigens as foreign and mounts an active immune response to create memory cells.

Why other options are incorrect:

- **Antibodies/Antisera:** Used for immediate, temporary passive immunity (like antivenom), not long-term vaccination.
- **Antibiotics:** Chemicals that kill bacteria, completely useless against a virus like polio.

Question #25 **Key: (A)**

MDCAT 2019

A person got an infection, he became ill but then he survived. What do you think which type of immunity he would have?

CORE CONCEPT AND DERIVATION

Immunity acquired through real-world exposure to a pathogen stimulates the body's natural defense mechanisms.

Formula:

None

Solution:

- Because the person caught the disease through natural environmental exposure (not a syringe), the trigger is **naturally induced**.
- Because the person's own immune system successfully fought off the infection and generated memory B and T cells, the immunity is **active**.
- This results in highly effective, naturally induced active immunity.

Why other options are incorrect:

- **Artificially induced:** This would imply they received a vaccine.
- **Passive immunity:** Implies they were given a cure of pre-made antibodies.

Question #26 **Key: (C)**

SZABMU 2019

The prevention of disease by artificial activation of immune response is possible by:

CORE CONCEPT AND DERIVATION

Artificial, active immunization relies on medical science to prepare the immune system prior to an actual infection.

Formula:

None

Solution:

- The process of artificially forcing the body to actively mount an immune response and generate memory cells is achieved using **vaccines**.
- Vaccines contain weakened antigens that train the immune system without causing the actual disease.

Why other options are incorrect:

- **Antibodies:** Provide artificial *passive* immunity, not an active response.
- **Drugs:** Manage symptoms or kill pathogens directly but do not activate immunological memory.

Question #27 Key: (B)

SZABMU 2019

Is a foreign substance, which stimulates the formation of antibodies?

CORE CONCEPT AND DERIVATION

The immune system utilizes molecular markers to distinguish "self" from "non-self".

Formula:

None

Solution:

- Any substance (usually a protein or polysaccharide) that the immune system recognizes as foreign is called an **antigen**.
- The presence of an antigen binds to specific receptors on B-cells and T-cells, stimulating an immune cascade that results in the formation of targeted antibodies.

Why other options are incorrect:

- Antibiotic:** A drug used to kill bacteria.
- Transposon:** A jumping gene sequence in DNA.

Question #28 Key: (C)

MDCAT 2018

Cell mediated immune response is given by:

CORE CONCEPT AND DERIVATION

The adaptive immune system delegates responsibilities between two main classes of lymphocytes.

Formula:

None

Solution:

- While B lymphocytes handle the humoral (antibody) response, **T lymphocytes** handle the cell-mediated response.
- Cytotoxic T cells physically dock with infected host cells and release perforin and granzymes to induce apoptosis.

Why other options are incorrect:

- Neutrophils/Macrophages:** Part of the innate, non-specific immune system (phagocytosis).
- B lymphocytes:** Responsible for humoral immunity.

Question #29 Key: (B)

MDCAT 2018

Anti-venom given after a snake bite venom is an example of:

CORE CONCEPT AND DERIVATION

Snake bites require immediate neutralization of the toxin, which is too fast for the victim's immune system to mount an active response.

Formula:

None

Solution:

- Anti-venom consists of concentrated antibodies harvested from an animal (like a horse) that has been hyperimmunized against the venom.
- Since the antibodies are injected via syringe, it is an **artificial** transfer.
- Because the victim's body is receiving pre-formed defenses rather than making its own, it is **passive** immunity.

Why other options are incorrect:

- Active immunity would mean waiting weeks for the victim to produce their own antibodies, by which point the venom would have been fatal.

Question #30 Key: (D)

MDCAT 2017

_____ cells survive for a few days and secrete a huge number of antibodies in blood, tissue fluids or lymph.

CORE CONCEPT AND DERIVATION

Following activation by an antigen, naive B-cells undergo rapid clonal expansion and differentiation.

Formula:

None

Solution:

- An activated B-cell differentiates into an effector cell called a **plasma cell** (or plasma clone).
- These plasma cells become highly metabolic factories, surviving only for a few days to weeks, but secreting up to 2,000 antibody molecules per second into the circulation.

Why other options are incorrect:

- **Memory cells:** Survive for decades to provide long-term immunity but do not secrete large volumes of antibodies themselves until reactivated.

Question #31 Key: (B)

MDCAT 2017

Vaccination is:

CORE CONCEPT AND DERIVATION

Vaccines simulate an infection to trick the immune system into developing immunological memory.

Formula:

None

Solution:

- Because a vaccine is deliberately and medically introduced into the body, it is an **artificial** process.
- Because the vaccine contains antigens that force the host's own immune system to actively generate antibodies and memory cells, it provides **active** immunity.
- Therefore, vaccination equals **artificial active immunity**.

Why other options are incorrect:

- **Natural active:** Getting sick from the wild pathogen.
- **Artificial passive:** Receiving an injection of pre-made antivenom.

Question #32 Key: (A)

MDCAT 2016

The type of immunity in which antibodies are passed from one individual to another is called:

CORE CONCEPT AND DERIVATION

The direct transfer of immune components bypasses the need for the recipient to undergo a primary immune response.

Formula:

None

Solution:

- If a person receives pre-made antibodies (either artificially via injection or naturally via breast milk/placenta), their immune system did not "actively" create them.
- Because the recipient is entirely passive in the acquisition of these defenses, it is termed **Passive Immunity**.

Why other options are incorrect:

- **Active Immunity:** Always requires the host to be exposed to the antigen and expend energy manufacturing their own antibodies and memory cells.

Question #34 Key: (D)

MDCAT 2015

Response of body against the transplanted organ is:

CORE CONCEPT AND DERIVATION

Tissue rejection is primarily a function of the cellular branch of the adaptive immune system recognizing foreign MHC markers.

Formula:

None

Solution:

- A transplanted organ contains cells with non-self Major Histocompatibility Complex (MHC) or HLA antigens.
- Cytotoxic T-cells identify these foreign cells and directly induce apoptosis (cell death) in the transplanted tissue.
- This direct cellular attack classifies graft rejection strictly as a **cell-mediated response**.

Why other options are incorrect:

- Antibodies (humoral response) play a minor or hyperacute role, but the primary chronic rejection is T-cell mediated.

Question #33 Key: (B)

MDCAT 2015

In _____ response, B-cells produce plasma cells that synthesize antibodies and release in blood plasma and tiss...

CORE CONCEPT AND DERIVATION

The branch of adaptive immunity governed by B-lymphocytes operates via fluid-borne macromolecules.

Formula:

None

Solution:

- Historically, bodily fluids were called "humors".
- Because antibodies are secreted into the blood plasma and lymph (extracellular fluids) to combat circulating pathogens, the B-cell driven immune pathway is called the **Humoral response**.

Why other options are incorrect:

- **Cell-Mediated:** Controlled by T-cells targeting intracellular pathogens.
- **Hormonal:** Relates to the endocrine system, not immunity.

Question #35 **Key: (D)**

MDCAT 2014

Which part of antibody recognizes the antigen during immune response?

CORE CONCEPT AND DERIVATION

Antibodies (immunoglobulins) have a highly specific lock-and-key mechanism to bind to countless diverse antigens.

Formula:

None

Solution:

- An antibody is a Y-shaped molecule. The tips of the "Y" form the antigen-binding site.
- This specific region is composed of the **variable parts** (variable regions) of both the heavy and light chains.
- Its unique amino acid sequence allows it to recognize and bind tightly to one specific antigen epitope.

Why other options are incorrect:

- **Constant part:** Determines the mechanism of action/class of the antibody (e.g., IgG, IgE), but plays no role in specific antigen recognition.

Question #36 **Key: (B)**

MDCAT 2014

Which one of the following glands is involved in the production of lymphocytes?

CORE CONCEPT AND DERIVATION

Primary lymphoid organs provide the necessary microenvironment for the maturation and selection of lymphocytes.

Formula:

None

Solution:

- While all lymphocytes originate in the bone marrow, T-lymphocytes migrate to the **thymus gland** to mature.
- The thymus provides hormones (thymosins) and a selective environment where T-cells become immunocompetent and learn self-tolerance.

Why other options are incorrect:

- Pineal, Pituitary, and Adrenal glands are purely endocrine organs that secrete hormones regulating sleep, metabolism, and stress, completely unrelated to lymphocyte production.

Question #37 **Key: (D)**

MDCAT 2014

Antibodies are proteins and made up of how many polypeptide chains?

CORE CONCEPT AND DERIVATION

Immunoglobulins are large, complex glycoproteins characterized by a standardized, multi-chain quaternary structure.

Formula:

None

Solution:

- A standard monomeric antibody (like IgG) is composed of exactly **four** polypeptide chains.
- These include two identical longer chains (Heavy chains) and two identical shorter chains (Light chains).
- They are held together in a Y-shape by disulfide bridges.

Why other options are incorrect:

- Antibodies are not simple single or dimeric chains; the fundamental unit universally requires four polypeptides to form the binding sites correctly.

Question #38 **Key: (A)**

MDCAT 2014

T-lymphocytes recognize antigen and attack microorganisms or transplanted organ and tissues. This effect is ca...

CORE CONCEPT AND DERIVATION

The adaptive immune system is divided into two broad branches based on the effector mechanism: humoral (antibodies) and cell-mediated (cells).

Formula:

None

Solution:

- T-lymphocytes (specifically Cytotoxic T-cells) directly engage and destroy infected host cells, cancer cells, or foreign transplant cells.
- Because this destruction is carried out directly by physical cell-to-cell contact rather than by secreted molecules, it is termed a **cell-mediated response**.

Why other options are incorrect:

- **Humoral response:** Driven by B-cells and the antibodies they secrete into the body's humors (fluids).

Question #39 **Key: (C)**

MDCAT 2014

What type of immunity is achieved by injecting antibodies, antiserum, anti-venom serum?

CORE CONCEPT AND DERIVATION

Immunity can be categorized by how it is acquired (natural vs. artificial) and whether the host makes their own response (active vs. passive).

Formula:

None

Solution:

- When pre-formed antibodies (like antivenom or antiserum) are injected into a patient, the patient's immune system does not do the work of creating them.
- Because the body is passively receiving external defense molecules, this is defined as **passive immunity** (specifically, artificial passive immunity).
- This provides immediate, but short-lived, protection.

Why other options are incorrect:

- **Active immunity:** Occurs when the host's own B and T cells generate a response (e.g., getting a vaccine or catching a disease).