2. Immune System

Part-A

1. Question

Pick out a case of healthy state of an individual.

A. Mr. X is recovering from an infectious disease.

B. Mr. Y takes insulin injection everyday.

C. Mrs. Z is very depressed.

D. Mr. K does his duty and spends time joyfully.

Answer

Healthy state is a condition of a person in which the person is physically, mentally and socially well-being. His body is able to adjust itself and strike a balance with the physical, mental and social environments.

2. Question

Which one of the following is not socially balanced?

A. He enjoys a birthday party.

B. He behaves rudely over trivial matters.

C. He adjusts well to the surrounding situation.

D. He attends to his ailing mother at the hospital.

Answer

An individual who is able to adjust in society by maintaining good interpersonal relationship with family members and colleagues at work spot. He is free from interpersonal conflicts and will never quarrel with others. He is said to be socially balanced. Behaving rudely over unimportant is not socially balanced behaviour.

3. Question

_____ is a bacterial disease.

A. Meningitis

B. Rabies

C. Tetanus

D. Small pox

Answer

Tetanus caused by a bacterium *Clostridium tetani*. This bacteria can enter the body through the mouth, nostrils (nose), cuts and bruises (wound) on the skin. It reproduce in the body and produce poisonous substance (toxins) which affect health.

4. Question

One of the following is transmitted through air. Find it out.

A. Tuberculosis

B. Meningitis

C. Typhoid

D. Cholera

Answer

Tuberculosis is a bacterial disease caused *Mycobacterium.* It is spread through air. It affects lungs and other

parts of our body such as bones, joints, lymph glands, alimentary tract, liver, kidney, etc.

5. Question

The most serious form of malaria is caused by Plasmodium _____.

A. ovale

B. malariae

C. falciparum

D. vivax

Answer

Four different species of *Plasmodium* such as *Plasmodium vivax, Plasmodium malariae, Plasmodium falciparum* and *Plasmodium ovale* are *present* in India and cause malaria. But malaria caused by *Plasmodium falciparum* is dangerous and can cause death.

6. Question

An example of protozoan infecting our intestine is _____.

A. Plasmodium vivax

B. Entamoeba histolytica

C. Trypanosoma gambiense

D. Taenia solium

Answer

Entamoeba histolytica is a protozoan parasite that infects our large intestine causes fever, constipation, abdominal pain and cramps. Stools with excess mucous and blood clot. These are the signs of amoebiasis.

7. Question

One of the means of indirect transmission of a disease is _____.

A. sneezing

B. coughing

C. through placenta

D. using utensils of patients

Answer

Common cold is a viral disease which is spread through contaminated objects such as handkerchief, bedding, clothes, utensils, toilet articles, etc.

8. Question

When antibodies, extracted from other animals are injected into your body, what kind of immunity do you gain?

A. Artificially active acquired immunity

B. Artificially passive acquired immunity

C. Naturally active acquired immunity

D. Naturally passive acquired immunity

Answer

In Artificially passive acquired immunity, a ready-made antibody (a proteinaceous substance produced in our body against infection) is introduced from outside, instead of stimulating the body to produce antibody with antigenic stimulus. For example polio vaccine.

9. Question

The first vaccine injected into a just born baby is _____.

A. Oral polio

B. DPT

C. DPT and Oral polio

D. BCG

Answer

BCG stands for Bacillus Calmette–Guérin. This is the first vaccine given to new-born. BCG protects from the disease tuberculosis (TB).

10. Question

In order to lead a healthy life, a person should enjoy physical, mental and social well-being. If a person lacks any one of them, then that person is suffering from _____.

Answer

disease

The word ‘disease’ means “without ease or not at ease”. It is opposite to the state of physical and mental and social well-being. When our body organs not functioning properly due any reason is called disease. There are numerous diseases that affect our health.

11. Question

A child eats food rich in carbohydrates and avoids protein in its diet. Which type of nutritional deficiency will affect that child?

A. Kwashiorkar

B. Nyctalopia

C. Diabetes

D. Down syndrome

Answer

To maintain good health one should eat a diet which contains all essential nutrients in correct proportion. Deficiency of protein in food causes Kwashiorkar. In this disease the child develops an enlarged belly with face and feet swelling.

Kwashiorkor

12. Question

Assertion (A) Expulsion of excess unused glucose in the blood through urine is observed in a diabetic mellitus person.

Reason (R): insulin is not produced in sufficient quantity by pancreas.

A. Both ‘A’ and ‘R’ are true and ‘R’ explains ‘A’.

B. Both ‘A’ and ‘R’ are true but ‘R’ doesn’t explain ‘A’.

C. Only ‘A’ is true but ‘R’ is false.

D. A is false but ‘R’ is true.

Answer

Diabetes mellitus is a disease in which excess of unused glucose from the blood is excreted in the urine. Less secretion of insulin does not converts glucose into glycogen. High glucose in blood cause diabetes.

Part-B

1. Question

Marasmus and Kwashiorkar are both protein deficiency defects. Marasmus differs from Kwashiorkar in enlarged belly and swelling in the face. Are these symptoms for the above diseases correct? If not, correct it.

Answer

No, these symptoms are not correct. In Marasmus, the child loses weight and suffers severe diarrhoea and it will appear as though bones are covered by skin. In Kwashiorkar, the child develops an enlarged belly with face and feet swelling.

Kwashiorkor

Marasmus

2. Question

A list of disorders are given below. Pick out the odd one out and give reasons.

(Thalassemia, haemophilia, night blindness, albinism, sickle cell anaemia)

Answer

Night blindness

Night blindness is a symptom of a disease called Nyctalopia. This disease occurs due to the deficiency of vitamin A. A person who is suffering from this disease is unable to see things in the night. Thalassemia, haemophilia, albinism, and sickle cell anaemia are genetic disorders.

3. Question

What are the symptoms of common cold?

i) _____

ii) _____

Answer

Common cold is a viral disease. Symptoms of common cold are:

1. Inflammation of upper respiratory (nasal passage) and nasal epithelium.

2. Flow of mucus from the nose.

3. Headache and mild fever are other symptoms.

4. Question

Differentiate between the diseases-night blindness and colour blindness.

Answer

Night blindness	Colour blindness.
It is a nutritional deficiency disease	This is genetic disorder due to defective gene.
Person unable to see in the night	Person unable to make differentiate colours.

5. Question

After observing dark patches with itching sensation on the skin of a student in a school hostel, the warden advises his roommates not to share towels, clothes and combs among themselves. Name the disease the student is suffering from and name the causative organisms.

Answer

The disease from which the student suffering from is ringworm. Ringworm is caused by three different fungus. These are *Epidermophyton, Microsporum* and *Trichophyton*.

6. Question

Name the vector host of the malarial parasite. Mention the species of malarial parasite which causes malignant and fatal malaria.

Answer

• The vector (organism that carries germs) of malaria is the female *Anopheles* mosquito.

• Malaria is caused by a parasite, *Plasmodium.* Its three *species cause* malaria.

• Out of three species *Plasmodium falciparum* causes malignant and fatal (dangerous and death causing) malaria.

7. Question

Name the tests done for the diagnosis and confirmation of AIDS.

Answer

Acquired Immuno Deficiency Syndrome or AIDS is caused by Human Immuno

Deficiency Virus (HIV). It is a dreadful disease. The test for AIDS are:

i. Enzyme Linked Immuno Sorbent Assay (ELISA)

ii. Western Blot – a confirmatory test.

8. Question

What is triple antigen? Name the three diseases which, can be prevented by using it.

Answer

Diphtheria, Pertussis, Tetanus

Vaccine (Triple antigen) *Triple Antigen* Injection or vaccine is given to children and infants for the active immunisation against diphtheria, tetanus and pertussis (DPT).

9. Question

Mention the type of immunity acquired by a baby through breast-feeding.

Answer

Mother’s milk contains antibodies which enters the child. Hence, mother’s milk provides Naturally Passive Acquired Immunity.

10. Question

Study the following statements and state whether they are true or false.

i) Colour blindness is a genetic disorder, whereas night blindness is a nutritional disorder.

ii) Pernicious anaemia is a nutritional deficiency disease, whereas sickle cell anaemia is a genetic disease / disorder.

iii) Administering TT injection to an injured child is related to passive artificial immunity, whereas giving BCG vaccine is active artificial immunity.

iv) Malaria is a bacterial disease, whereas ring worm is a viral disease.

Answer

i) True

Colour blindness is a genetic disorder, whereas night blindness is a nutritional disorder. Night blindness is caused due to deficiency of vitamin A. Colour blindness is a genetic disorder caused due to defective gene.

ii) True.

Pernicious anaemia is caused due to deficiency of iron, whereas sickle cell anaemia is occur due to defective red blood cells.

iii) False.

Administering TT injection to an injured child to protect from tetanus toxoid and BCG vaccine is given to protect from tuberculosis. Both of these vaccination provide artificial active acquired immunity.

iv)False.

Malaria is a disease caused by a protozoa, named *Plasmodium* whereas ring worm is caused by a fungus.

11. Question

Ramya is suffering from bleeding gums and loosening teeth. On diagnosis, it was found to have been caused by vitamin deficiency.

Tell Ramya the vitamin that is lacking in her food ____caused by _____, the name of deficiency disease she is suffering from _____.

Answer

Vitamin C is lacking in her food. She is suffering from the disease Scurvy, which is characterised by bleeding gums and loosening of teeth.

12. Question

Match B and C with A:

A	B	C
Vitamins	Deficiency diseases	Symptoms
Vitamin A	Nyctalopia	Night Blindness
Vitamin B_1	Scurvy	Nervous disorder
Vitamin C	Rickets	Bleeding gums
Vitamin D	Haemorrhage	Defective calcification of bones
Vitamin K	Beri-beri	Profuse loss of blood

Answer

A	B	C
Vitamins	Deficiency diseases	Symptoms
Vitamin A	Nyctalopia	Night Blindness
Vitamin B_1	Beri-beri	Nervous disorder
Vitamin C	Scurvy	Bleeding gums
Vitamin D	Rickets	Defective calcification of bones
Vitamin K	Haemorrhage	Profuse loss of blood

13. Question

A health worker advises the people in a locality not to have tattooing done using common needles and to insist the barber to change the shaving razors/ blades in the salon. Name the dreadful disease, the spreading of which, can be prevented by following these measures. Also mention other preventive measures that can be taken with regard to this disease.

Answer

Using common needle may infected with HIV can transmitted (pass) it to the healthy person causing Acquired Immuno Deficiency Syndrome (AIDS). Hence, avoid tattooing using a common needle.

The other preventives measures can be taken to prevent transmission of HIV:

a. Safe sex practices

b. Screening of blood for HIV before giving blood to the patient.

c. Usage of disposable syringes in the hospitals.

d. Avoid sharing the razors and blades in the salon

14. Question

Match the following:

List I (Disease)	List II (Symptoms)
A. Amoebiasis	I) Chills and high fever recurring for 3 to 4 days
B. Tuberculosis	II) Patches on skin and nails with itching sensation
C. Ringworm	III) Abdominal pain with blood and mucus in stools
D. Malaria	IV) Persistent cough and loss of body weight

Answer

	List I (Disease)	**List II (Symptoms)**	**Causal organisms**
A.	Amoebiasis	Abdominal pain with blood and mucus in stools	*Entamoeba*
B.	Tuberculosis	Persistent cough and loss of body weight	*Mycobacterium*
C.	Ringworm	Patches on skin and nails with itching sensation	*Epidermophyton*
D.	Malaria	Chills and high fever recurring for 3 to 4 days	*Plasmodium*

15. Question

List out the diseases based on their mode of transmission (water borne, air borne, and sexual contact)

i) cholera ii) typhoid

iii) tuberculosis iv) leprosy v) syphilis

vi) gonorrhoea vii) pneumonia

viii) common cold ix) amoebic dysentery x) AIDS

Answer

i) Cholera. It is an airborne disease spread through droplet discharged from the infected person during talking, laughing and sneezing

ii) Typhoid is a waterborne disease and it spread through food and water contaminated with the germ.

iii) Tuberculosis it is airborne, a large number of bacteria are expelled through the sputum of the patients while eating, sneezing, talking, laughing and so on.

iv) Leprosy spreads person to person by nasal secretions or droplets.

v) Syphilis spreads through sexual contact from infected person.

vi) Gonorrhoea spreads through sexual contact from infected person.

vii) Pneumonia is an airborne disease spread through droplet discharged from the infected person during talking, laughing and sneezing

viii) Common cold is an airborne and spread through droplet discharged from the infected person during talking, laughing and sneezing.

ix) Amoebic dysentery is a water-borne and food-borne disease. Houseflies act as mechanical carriers.

x) AIDS spreads through sexual contact from infected person.

16. Question

i) Give any three examples for the most infectious diseases in man and their causative agents.

ii) To discover medicine for viral infected diseases like AIDS is more difficult than other diseases. Is the statement true or false? Discuss.

Answer

i) Examples for the most infectious diseases:

Influenza is caused by A (H1N1) Virus, is highly contagious (infectious),

Tuberculosis is caused by *Mycobacterium*, a rod-shaped bacterium.

Typhoid is caused by a short rod-shaped bacterium with numerous flagella *Salmonella typhi*.

ii) Antibiotics are useless against viral infections. This is because viruses are so simple that they use the energy of the host cells to perform their activities. Hence, antibiotics do not work for them.

17. Question

A student had an attack of measles and recovered from the infection. His science teacher said that he will not get that disease again in his life time. Is it true? Why?

Answer

Yes, it because he developed immunity during the first infection of measles virus. The antibodies produced in the blood remain for a long period and kill the similar pathogens, whenever they enter the body. If the antibody production is stimulated naturally after recovering from a disease, it is called Naturally Active Acquired Immunity

18. Question

Name the causative organisms responsible for ring worm in humans? Mention the symptoms of the infection.

Answer

Ringworm is caused by three different genera of fungi namely, Epidermophyton, Microsporum and Trichophyton.

Symptoms of ringworms:

Fungi can live on the dead cells of epidermis. They cause superficial infections in skin, hair, nail, etc. form patches and cause itching.

19. Question

Pick out the odd ones:

i) AIDS: Retro virus, lymphocytes, BCG, ELISA

ii) Bacterial disease: Rabies, cholera, common cold, influenza

iii) DPT vaccine: Diphtheria, tuberculosis, pertusis, tetanus

iv) Infective stage of Plasmodium in humans: Sporozoites, merozoites, trophozoites, gametocytes.

v) Mental dimension: brightness of skin, normal metabolism, no black rings around eyes, knows his capacity.

Answer

i) BCG

BCG is a vaccine which protects against tuberculosis.

ii) Cholera

Common cold, influenza and rabies are viral disease.

iii) Tuberculosis

DPT vaccine protects against Diphtheria, pertusis and tetanus, not against tuberculosis.

iv) Sporozoites.

Infective stage of *Plasmodium* in humans are sporozoites and in in female anopheles are gametocytes.

v) Knows his capacity.

Mental dimension is one of the dimensions of personal health in which a person knows his capacity it means he or she do not overestimate or underestimate.

20. Question

In the manufacturing of anti-venom injection against snake bite, antibodies produced in the horse are being used. Mention the type of immunity involved.

Answer

Giving readymade antibody (produced in some other animal and extracted) to an individual artificially to achieve immunity. This type of immunity is called Artificial Passive Acquired Immunity. This immunity is not permanent.

21. Question

Say whether each of the following diseases is a metabolic disorder, a genetic disorder or a nutritional deficiency disease.

i) thalassemia

ii) beriberi

iii) diabetes mellitus

iv) bubble boy syndrome

v) scurvy

vi) marasmus

vii) obesity

viii) Alzheimer’s disease

ix) nyctalopia

x) haemophilia

Answer

i) Thalassemia is a genetic disorder caused due to defective gene.

ii) Beri-beri is vitamin deficiency disease caused due to deficiency of vitamin B_1.

iii) Diabetes mellitus is a metabolic disorder caused due to high glucose in blood due to insulin imbalance.

iv) Bubble boy syndrome is a genetic disorder caused due to defective gene.

v) Scurvy is a vitamin deficiency disease caused due to deficiency of vitamin C.

vi) Marasmus is a nutritional deficiency disease caused due to deficiency of protein in the food.

vii) Obesity is a metabolic disorder caused due to intake high glucose contains food.

viii) Alzheimer's disease is a metabolic disorder caused due to death of brain cells.

ix) Nyctalopia is a vitamin deficiency disease caused due to deficiency of vitamin A.

x) Haemophilia is a genetic disorder caused due to defective gene.

22. Question

Find the correct statement (True / False):

i) Tuberculosis is caused by Mycobacterium tuberculosis bacteria.

ii) Typhoid is caused by Trichophyton fungi.

iii) Malaria is caused by Plasmodium vivax.

iv) Influenza is caused by Entamoeba histolytica protozoan.

Answer

i) Tuberculosis is caused by *Mycobacterium* tuberculosis bacteria. True.

ii) Typhoid is caused by Trichophyton fungi. False. Typhoid is caused by bacterium *Salmonella typhi.*

iii) Malaria is caused by Plasmodium vivax. True.

iv) Influenza is caused by *Entamoeba histolytica* protozoan. False. Influenza is caused by A(H1N1) Virus.

23. Question

Malarial fever is not caused in a person immediately after introducing the sporozoites by an infected anopheles mosquito. Why?

Answer

When female anopheles mosquitoes bite a healthy person, the sporozoites (the infectious stage) are introduced into his body. Sporozoites multiply within the liver cells first and enter the Red Blood Cells (RBC) of man, resulting in the rupture of RBC. This results in the release of toxic substance called haemozoin which is responsible for the chill and high fever, recurring every three to four days.

24. Question

Name the stages of Plasmodium.

i) introduced by an infected Anopheles mosquito.

ii) picked up by Anopheles mosquito from an infected human being.

Answer

i) Sporozoite stage: When female anopheles mosquitoes bite a healthy person, the sporozoites (the infectious stage) are introduced into the human body.

Gametocytic stage: when female anopheles bites infected person and sucks blood along with gametocytes.

25. Question

Name two diseases that are transmitted by houseflies. Mention their causative pathogens.

Answer

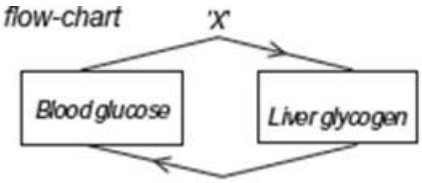
The diseases that are transmitted by houseflies are

• Typhoid which is caused by a short rod-shaped bacterium called *Salmonella typhi*.

• Amoebiasis caused by *Entamoeba histolytica, a* protozoan parasite.

26. Question

Observe the following flow-chart



Mention the metabolic disorder 'X' and the causative factor from the options given below:

Disorder	Factors
a)Diabetes insipidus	Deficiency of ADH hormone
b)Diabetes mellitus	Deficiency of insulin hormone
c) Coronary heart disease	Blockage of arteries supplying blood to heart muscles
d) Renal failure	Failure of nephrons to filter the blood

Answer

b) Diabetes mellitus – deficiency of insulin hormone

When high quantities of glucose enter the blood stream, the excess glucose is converted into insoluble glycogen and is stored in liver and muscles for future use. All these processes are controlled by the hormones, insulin and glucagon. If insulin is not produced in sufficient quantity, excess of sugar cannot be stored in the liver and cannot be utilized. As a result, sugar gets accumulated in the blood and is subsequently expelled through the urine. This results in diabetes mellitus.

Part-C

1. Question

Kala has delivered a baby,

i) Suggest the immunization schedule for the baby, in the first six months.

ii) What are the diseases that can be cured as per the schedule?

Answer

Immunization schedule for the baby in first 6 months.

Age	**Vaccine**	**Dose**
New born	BCG	1^{st} dose
15 days	Polio drops	1^{st} dose
6^{th} week	DPT and polio	1^{st} dose
10^{th} week	DPT and polio	2^{nd} dose
14^{th} week	DPT and polio	3^{rd} dose

ii) BCG vaccine protects from tuberculosis. DPT vaccine protects from Diphtheria, Pertussis and Tetanus. Polio vaccine protects from polio.

2. Question

There is a widespread outbreak of malaria in your area.

i) Suggest some controlling measures to the local authorities concerned.

ii) Pick out the right symptom for malaria.

(chills, shivering and a rise in temperature, diarrhoea)

Answer

i) Some controlling measures on outbreak of malaria are

a. Sanitary measures include ground fogging with disinfectants.

b. Prevent water stagnation and cover ditches and drains.

c. Use mosquito nets and mosquito repellents.

ii) Chills, shivering and mild fever are the symptoms of malaria.

3. Question

15th October is observed as ‘World Hand washing Day’.

i) Tell your friend the effects of hand washing.

ii) How frequently do you wash your hands everyday and when?

Answer

i) Our hands are contaminated with disease-causing bacteria and viruses, these pathogens can enter the body or pass from one person to another to cause disease. Hand washing with soap prevents many common and dangerous infections such as diarrhea and pneumonia.

ii) Many illnesses start when hands become contaminated with disease-causing bacteria and viruses. This can happen after using the toilet, contact with a child's excreta, coughing, sneezing, touching other people's hands, and touching other contaminated surfaces. Whenever your hand is contaminated with touching contaminated surface, hands should be washed properly.

4. Question

What is immunity? Write a note on the various types of immunity.

Answer

• Immunity is the ability of the body to fight against diseases.

• Infectious organisms that enters the body and produces toxins.

• These toxins are called **antigens**.

• The immune system of our body includes blood plasma, lymph and lymphocytes.

• These cells analyse the antigens and produce suitable protein substances called **antibodies** to kill the antigen in order to develop immunity.

Types of Immunity:

i) Natural or Innate Immunity: immunity present in the body since birth.

ii) Acquired or Specific Immunity: The immunity developed after birth against some

• Active acquired immunity: This kind of immunity is developed by our body, during the first infection of any pathogen. The antibodies produced in the blood remain for a long period and kill the similar pathogens.

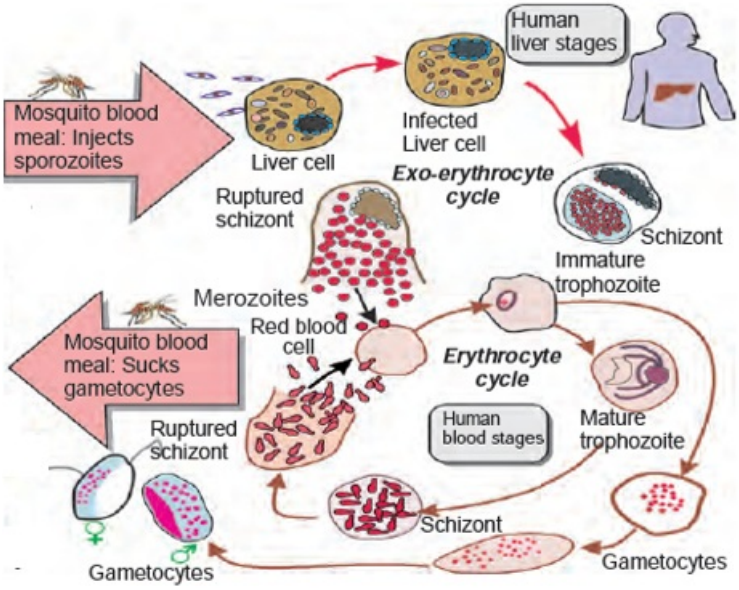
• Passive Acquired Immunity**:** In this type of immunity, a ready-made antibody is given to develop immunity is introduced from outside, instead of stimulating the body to produce antibody with antigenic stimulus.

5. Question

Describe the life-cycle of plasmodium in man.

Answer

The asexual life cycle of *Plasmodium* occurs in humans. It begins with a bite of an infected female Anopheles mosquito. When these mosquitoes bite a healthy person, the sporozoites of plasmodium present in the salivary glands of female anopheles are introduced into his body. They multiply within the liver cells first and enter the Red Blood Cells (RBC) of man, resulting in the rupture of RBC. This results in the release of toxic substance called haemozoin which is responsible for the chill and high fever, recurring every three to four days.



Life cycle of plasmodium in human

6. Question

List out the various diseases caused due to nutritional deficiency. Add a note on their symptoms.

Answer

• Deficiency in certain food constituents such as protein causes nutritional deficiency diseases.

• Protein deficiency diseases are Marasmus and Kwashiorkar.

• In Marasmus the child loses weight and suffers severe diarrhoea and it will appear very weak and looks their bones are covered by skin.

• In Kwashiorkar the child develops an enlarged belly with face and feet swelling.