

**A COMMON QUARTERLY EXAMINATION - 2023**

Standard - XII

Reg.No. 

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|  |  |  |  |  |
|--|--|--|--|--|

**ZOOLOGY**

Marks: 70

Time: 3.00 hrs.

**PART - I**

**Note :** i) Answer all the questions. ii) Choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer. **15×1=15**

1. Paedogentic Parthenogenesis occurs in  
a) Aphid                      b) Honeybees              c) Solenobia              d) Gallfly.
2. Areolar glands are found in  
a) Testes                      b) Mammaryglands c) Ovary                      d) vagina
3. Mammalian egg is  
a) Mesolecithal and noncleidoic              b) Microlecithal and noncleidoic  
c) Alecithal and non cleidoic              d) Alecithal and cleidoic
4. Which of the following are called as International diseases  
a) Syphilis and chlamydiasis              b) Syphilis and hepatitis - B  
c) Syphilis and Gonorrhoea              d) Chlamydiasis and Gonorrhoea
5. Which of the following is true about Rh factor in the offspring of a parental combination Dd × Dd.  
a) All will be Rh positive                      b) Half will be Rh positive  
c) About 3/4 will be Rh negative              d) About 1/4 will be Rh negative.
6. Assertion (A) : Both DNA and RNA can act as genetic material .DNA stores the genetic information.  
Reason (R) : DNA is more stable than RNA  
a) A and R are correct, R is the correct explanation of A.  
b) A and R are correct, R is not the correct explanation of A.  
c) A is true, R is false                      d) A and R - both are false.
7. The first codon to be deciphered was \_\_\_\_\_ which codes for \_\_\_\_\_.  
a) AAA, proline                      b) GGG, alanine  
c) UUU - Phenylalanine                      d) TTT, arginine
8. The golden age of reptiles was  
a) Mesozoic era    b) Cenozoic era    c) Paleozoic era    d) Proterozoic era
9. The phenomenon of "Industrial Melanism demonstrates  
a) Natural selection                      b) Induced mutation  
c) Reproductive isolation                      d) geographical isolation
10. Exo - erythrocytic schizogony of plasmodium takes place in \_\_\_\_\_.  
a) RBC                      b) Leucocytes              c) Stomach              d) Liver
11. Choose the incorrect pair:

**PART - I**

- |                              |   |  |
|------------------------------|---|--|
| a) African sleeping sickness | - |  |
| b) Amoebiasis                | - |  |
| c) Kala - azar               | - |  |
| d) Malaria                   | - |  |

**PART - II**

- |                |  |  |
|----------------|--|--|
| Tsetse fly     |  |  |
| House fly      |  |  |
| Sand fly       |  |  |
| Aedes mosquito |  |  |

12. Allergy involves

- |        |        |        |        |
|--------|--------|--------|--------|
| a) IgE | b) IgG | c) IgA | d) IgM |
|--------|--------|--------|--------|

13. AIDS virus has

- |                        |                        |
|------------------------|------------------------|
| a) Single stranded RNA | b) Double stranded RNA |
| c) Single stranded DNA | d) Double stranded DNA |

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## XII - ZOOLOGY

14. Which of the following pair is correctly matched for the product produced by them.
- |                             |   |             |
|-----------------------------|---|-------------|
| a) Acetobacter aceti        | - | Antibiotics |
| b) Methanobacterium         | - | Lactic Acid |
| c) Penicillium Notatum      | - | Acetic Acid |
| d) Saccharomyces Cerevisiae | - | Ethanol     |
15. Which is referred as queen of drugs?
- |                 |               |             |                 |
|-----------------|---------------|-------------|-----------------|
| a) Tetracycline | b) Penicillin | c) neomycin | d) Erythromycin |
|-----------------|---------------|-------------|-----------------|

## PART - II

**Note :** Answer any six of the following questions.

**Question Number 24 is compulsory.**

6×2=12

16. What is budding? What are its types?
17. Name the embryonic membranes.
18. Write the preventive measures of STDs.
19. What is extra chromosomal inheritance?
20. Differentiate nucleoside and nucleotide.
21. How does neanderthal man differ from the modern man in appearance.
22. Why do you think it is not possible to produce Vaccine against common cold.
23. Write notes on Brewer's yeast.
24. A person is infected by HIV. How will you diagnose for AIDS?

## PART - III

**Note :** Answer any six of the following question.

**Question number 33 is compulsory.**

6×3=18

25. Draw a neat labelled diagram of the structure of human ovum.
26. What is cryopreservation ? What is its significance?
27. What causes klinefelter's syndrome? mention its symptoms.
28. Explain any three applications of DNA finger printing.
29. Write any three goals of the human genome project.
30. What are the salient features of Mutation theory.
31. Compare and contrast bacillary dysentery and amoebic dysentery.
32. Write any three differences between Active immunity and Passive immunity.
33. What is Bioremediation? What are its types.

## PART - IV

**Note :** Answer all the questions.

5×5=25

34. a) Explain the various menstrual disorders. (OR)
- b) Write notes on the various Intrauterine Devices (IUDs)
35. a) What is Eugenics ? Explain the methods of Eugemics. (OR)
- b) List out any five salient features of genetic code.
36. a) Explain in detail the various types of fossilization. (OR)
- b) Write notes about any five human viral diseases.
37. a) Explain the structure of Immunoglobulin with a neat labelled diagram. (OR)
- b) Explain the production of biogas or Gobar gas.
38. a) Write notes on Any Two Protozoan diseases which commonly occur in human beings. (OR)
- b) Tabulate the different types of Innate Immunity and their mechanisms.

**COMMON QUARTERLY EXAMINATION – SEPTEMBER 2023**  
**XII - ZOOLOGY – ANSWERS**

**PART – I**

**CHOOSE THE BEST ANSWER:**

**(15 × 1 = 15)**

1. d) Gallfly
2. b) Mammary glands
3. c) Alecithal and non cleidoic
4. c) Syphilis and Gonorrhoea
5. d) About  $\frac{1}{4}$  will be Rh negative
6. a) A and R are correct, R is the correct explanation of A.
7. c) UUU – Phenylalanine
8. a) Mesozoic Era
9. a) Natural Selection
10. d) Liver
11. d) Malaria – *Aedes* mosquito
12. a) IgE
13. a) Single stranded RNA
14. d) *Saccharomyces cerevisiae*
15. b) Penicilin

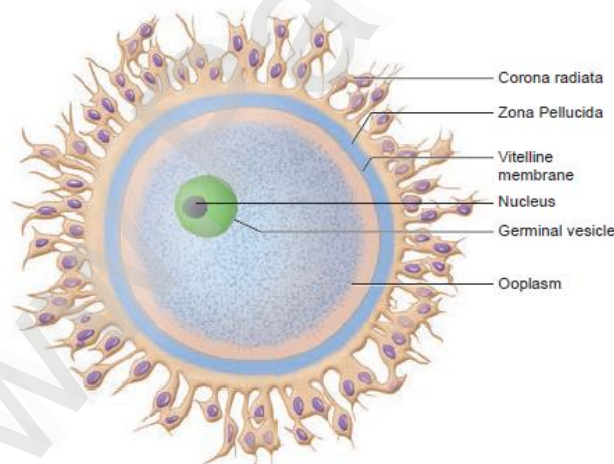
**PART – II**

16. **Budding** - The parent body produces one or more buds and each bud grows into a young one. The buds separate from the parent to lead a normal life. It is of two types Exogenous budding and Endogenous budding
17. The extra embryonic membranes namely the **amnion, yolk sac, allantois** and **chorion** protect the embryo from dessication, mechanical shock and help in the absorption of nutrients and exchange of gases.
18. Prevention of STD's
  - a. Avoid sex with unknown partner/ multiple partners.
  - b. Use condoms.
  - c. In case of doubt, consult a doctor for diagnosis and get complete treatment.
19. The cytoplasmic extra nuclear genes have a characteristic pattern of inheritance which do not resemble the genes of nuclear chromosomes and is known as extra chromosomal or extra nuclear or cytoplasmic inheritance and exhibit maternal influence.

20. The nitrogenous base is chemically linked to one molecule of sugar (at the 1-carbon of the sugar) forming a **nucleoside**.  
When a phosphate group is attached to the 5' carbon of the same sugar, the nucleoside becomes a **nucleotide**.
21. Neanderthal man differ from the modern human in having semi erect posture, flat cranium, sloping forehead, thin large orbits, heavy brow ridges, protruding jaws and no chin. They used animal hides to protect their bodies, knew the use of fire and buried their dead. They did not practice agriculture and animal domestication.
22. Common cold is caused by more than 150 different strains of Rhino viruses. More over their RNA genome keeps changing due to mutation. Hence it is very difficult to prepare a common vaccine for the disease.
23. *Saccharomyces cerevisiae* commonly called brewer's yeast is used for fermenting malted cereals and fruit juices to produce various alcoholic beverages. Wine and beer are produced without distillation, whereas whisky, brandy and rum are obtained by fermentation and distillation.
24. A simple blood test is available that can determine whether the person has been infected with HIV.  
The **ELISA** test (Enzyme Linked ImmunoSorbent Assay) detects the presence of HIV antibodies. It is a preliminary test.  
**Western blot** test is more reliable and a confirmatory test. It detects the viral core proteins.  
If both tests detect the presence of the antibodies, the person is considered to be HIV positive.

### PART - III

#### 25. Structure of Human Ovum



26. **Cryopreservation** (or freezing) of embryos is often used when there are more embryos than needed for a single IVF transfer. Embryo cryopreservation can provide an additional opportunity for pregnancy, through a **Frozen Embryo Transfer** (FET), without undergoing another ovarian stimulation and retrieval.

### 27. Klinefelter's Syndrome (XXY Males)

This genetic disorder is due to the presence of an additional copy of the X chromosome resulting in a karyotype of 47, XXY. Persons with this syndrome have 47 chromosomes (44AA+XXY). They are usually sterile males, tall, obese, with long limbs, high pitched voice, under developed genitalia and have feeble breast (gynaecomastia) development.

### 28. Application of DNA finger printing

**Forensic analysis** - It can be used in the identification of a person involved in criminal activities, for settling paternity or maternity disputes, and in determining relationships for immigration purposes.

**Pedigree analysis** – inheritance pattern of genes through generations and for detecting inherited diseases.

**Conservation of wild life** – protection of endangered species. By maintaining DNA records for identification of tissues of the dead endangered organisms.

**Anthropological studies**–It is useful in determining the origin and migration of human populations and genetic diversities.

### 29. The main goals of Human Genome Project are as follows

- Identify all the genes (approximately 30000) in human DNA.
- Determine the sequence of the three billion chemical base pairs that makeup the human DNA.
- To store this information in databases.
- Improve tools for data analysis.
- Transfer related technologies to other sectors, such as industries.
- Address the ethical, legal and social issues (ELSI) that may arise from the project.

### 30. Salient features of Mutation Theory

- Mutations or discontinuous variation are transmitted to other generations.
- In naturally breeding populations, mutations occur from time to time.
- There are no intermediate forms, as they are fully fledged.
- They are strictly subjected to natural selection.

31.

| S.No | Description          | Bacillary Dysentery  | Amoebic Dysentery   |
|------|----------------------|--|---|
| 1.   | Causative agent      | <i>Shigella sp.</i>  | <i>Entamoeba histolytica</i>  |
| 2.   | Site of Infection    | Intestine  | Intestine (colon)   |
| 3.   | Mode of Transmission | Food and water contaminated by faeces / faecal oral route  | Food and water contaminated by faeces / faecal oral route                         |
| 4.   | Symptoms             | Abdominal pain, dehydration, blood and mucus in the stools | Bleeding abdominal pain, diarrhoea to dysentery with blood and mucus in the stool |

32.

| Sl.No | Active Immunity  | Passive Immunity  |
|-------|--|---|
| 1     | Active immunity is produced actively by host's immune system.  | Passive immunity is received passively and there is no active host participation. |
| 2     | It is produced due to contact with pathogen or by its antigen. | It is produced due to antibodies obtained from outside.                           |
| 3     | It is durable and effective in protection.                     | It is transient and less effective.   |
| 4     | Immunological memory is present.                               | No memory.  |
| 5     | Booster effect on subsequent dose is possible.                 | Subsequent dose is less effective.  |
| 6     | Immunity is effective only after a short period.               | Immunity develops immediately.  |

33. The use of naturally occurring or genetically engineered microorganisms to reduce or degrade pollutants is called bioremediation. Bioremediation is less expensive and more sustainable than other remediation available.

It is grouped into *in situ* bioremediation (treatment of contaminated soil or water in the site) and *ex situ* bioremediation (treatment of contaminated soil or water that is removed from the site and treated).

#### PART – IV

34. a) **Menstrual disorders**

Absence of menstruation is called **amenorrhoea**. If menarche does not appear till the age of 18, it is called **primary amenorrhoea**. Absence of menstruation for over three consecutive months is **secondary amenorrhoea**.

**Polymenorrhoea** is a term used to describe a menstrual cycle that is shorter than 21 days. It may be due to hyperactivity of the anterior pituitary gland causing frequent ovulation, psychological disturbances and malnutrition. Chronic pelvic inflammation by certain sexually transmitted diseases (STD) such as **chlamydia** or **gonorrhoea** can cause inflammation in the uterus causing polymenorrhoea.

Pain associated with menstruation is called **dysmenorrhoea**. It is the most commonly reported menstrual disorder. There are two types of dysmenorrhoea viz primary and secondary dysmenorrhoea. **Primary dysmenorrhoea** is pain or cramps during menstrual period and is caused by secretions of prostaglandin in the uterus. **Secondary dysmenorrhoea** is caused by a disorder in the reproductive system like endometriosis or uterine fibroids.

Heavy and prolonged menstrual period that disrupts a woman's normal activities is referred to as **menorrhagia**. Menorrhagia may be due to hormonal imbalance, ovarian dysfunction, and uterine fibroids and may also be due to cancer of the ovary, uterus or cervix.

**Oligomenorrhoea** is a condition with infrequent menstrual periods. It occurs in women of childbearing age. Some variation in menstruation is normal, but a woman who regularly goes more than 35 days without menstruating may be diagnosed with **oligomenorrhoea**.

### 34. b) **Intrauterine Devices (IUDs)**

Intrauterine devices are inserted by medical experts in the uterus through the vagina. These devices are available as copper releasing IUDs, hormone releasing IUDs and non-medicated IUDs. IUDs increase phagocytosis of sperm within the uterus. IUDs are the ideal contraceptives for females who want to delay pregnancy. It is one of the popular methods of contraception in India and has a success rate of 95 to 99%.

**Copper releasing IUDs** differ from each other by the amount of copper. Copper IUDs such as **Cu T-380 A, Nova T, Cu 7, Cu T 380 Ag, Multiload 375, etc.** release free copper and copper salts into the uterus and suppress sperm motility. They can remain in the uterus for five to ten years.

**Hormone-releasing IUDs** such as **Progestasert and LNG – 20** are often called as intrauterine systems (IUS). They increase the viscosity of the cervical mucus and thereby prevent sperms from entering the cervix.

**Non-medicated IUDs** are made of plastic or stainless steel. Lippes loop is a double S-shaped plastic device.

### 35. a) **Eugenics**

Application of the laws of genetics for the improvement of human race is called **eugenics**. The term **eugenics** means “well born” and was coined by **Francis Galton** in 1885. For the betterment of future generations it is necessary to increase the population of outstanding people and to decrease the population of abnormal and defective people by applying the principles of eugenics.

Two methods of Eugenics

- (i) Constructive method or Positive eugenics
- (ii) Restrictive method or Negative eugenics

#### **(i) Positive eugenics**

Positive eugenics attempts to increase consistently better or desirable germplasm and to preserve the best germplasm of the society. The desirable traits can be increased by adopting the following measures:

- (i) Early marriage of those having desirable traits
- (ii) Subsiding the fit and establishing sperm and egg banks of precious germplasm
- (iii) Educating the basic principles of genetics and eugenics
- (iv) Improvement of environmental conditions
- (v) Promotion of genetic research

#### **(ii) Negative eugenics**

Negative Eugenics attempts to eliminate the defective germplasm of the society by adopting the following measures:

- (i) Sexual separation of the defectives
- (ii) Sterilization of the defectives
- (iii) Control of immigration and
- (iv) Regulation of marriages

35. b) The salient features of genetic code are as follows:

- The genetic codon is a **triplet code** and 61 codons code for amino acids and 3 codons do not code for any amino acid and function as **stop codon** (Termination).
- The genetic code is universal. It means that all known living systems use nucleic acids and the same three base codons (triplet codon) direct the synthesis of protein from amino acids. For example, the mRNA (UUU) codon codes for phenylalanine in all cells of all organisms. Some exceptions are reported in prokaryotic, mitochondrial and chloroplast genomes. However similarities are more common than differences.
- A non-overlapping codon means that the same letter is not used for two different codons. For instance, the nucleotide sequence GUU GUC represents only two codons.
- It is comma less, which means that the message would be read directly from one end to the other i.e., no punctuation are needed between two codes.
- A degenerate code means that more than one triplet codon could code for a specific amino acid. For example, codons GUU, GUC, GUA and GUG code for valine.
- Non-ambiguous code means that one codon will code for one amino acid.
- The code is always read in a fixed direction i.e. from 5'→3' direction called polarity.
- AUG has dual functions. It acts as a initiator codon and also codes for the amino acid methionine.

36. a) Fossilization is the process by which plant and animal remains are preserved in sedimentary rocks. They fall under three main categories.

**i) Actual remains** – The original hard parts such as bones, teeth or shells are preserved as such in the earth's atmosphere. This is the most common method of fossilization. When marine animals die, their hard parts such as bones, shells, etc., are covered with sediments and are protected from further deterioration. They get preserved as such as they are preserved in vast ocean; the salinity in them prevents decay. The sediments become hardened to form definite layers or strata. For example, Woolly Mammoth that lived 22 thousand years ago were preserved in the frozen coast of Siberia as such. Several human beings and animals living in the ancient city of Pompeii were preserved intact by volcanic ash which gushed out from Mount Vesuvius.

**ii) Petrification** – When animals die the original portion of their body may be replaced molecule for molecule by minerals and the original substance being lost through disintegration. This method of fossilization is called petrification. The principle minerals involved in this type fossilization are iron pyrites, silica, calcium carbonate and bicarbonates of calcium and magnesium.

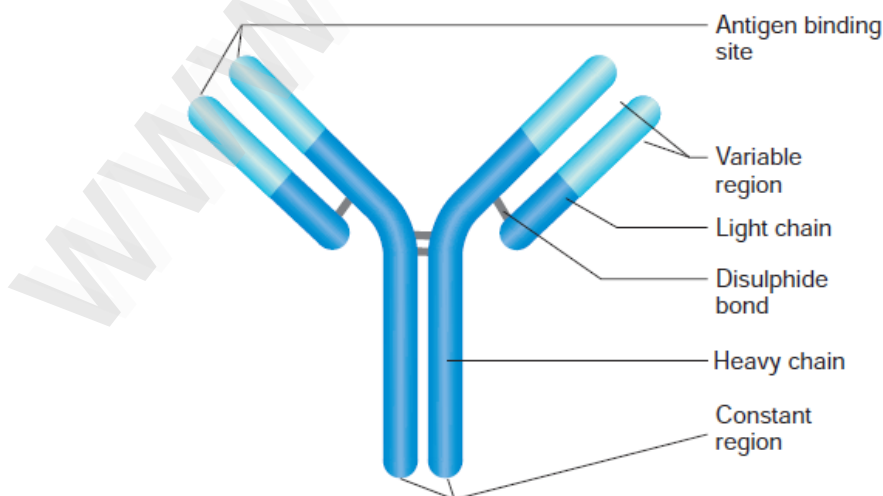
**iii) Natural moulds and casts** – Even after disintegration, the body of an animal might leave indelible impression on the soft mud which later becomes hardened into stones. Such impressions are called moulds. The cavities of the moulds may get filled up by hard minerals and get fossilized, which are called casts. Hardened faecal matter termed as coprolites occur as tiny pellets. Analysis of the coprolites enables us to understand the nature of diet the pre-historic animals thrived on.



## 36. b) Viral disease in Human beings

| S. No | Diseases        | Causative agent                                  | Site of infection                          | Mode of transmission                 | Symptoms  |
|-------|-----------------|--|--|--------------------------------------|---|
| 1     | Common cold     | <i>Rhino viruses</i>                             | Respiratory tract                          | Droplet infection                    | Nasal congestion and discharge, sore throat, cough and headache                       |
| 2     | Mumps           | <i>Mumps virus (RNA virus), Paramyxo virus</i>   | Salivary glands                            | Saliva and droplet infection         | Enlargement of the parotid glands   |
| 3     | Measles         | <i>Rubella virus (RNA virus), Paramyxo virus</i> | Skin and respiratory tract                 | Droplet infection                    | Sore throat, running nose, cough and fever, reddish rashes on the skin, neck and ears |
| 4     | Viral hepatitis | <i>Hepatitis - B virus</i>                       | Liver                                      | Parenteral route, blood transfusion  | Liver damage, jaundice, nausea, yellowish eyes, fever and pain in the abdomen         |
| 5     | Chicken pox     | <i>Varicella -Zoster virus (DNA Virus)</i>       | Respiratory tract, skin and nervous system | Droplet infection and direct contact | Mild fever with itchy skin, rash and blisters   |

## 37. a) Structure of immunoglobulin

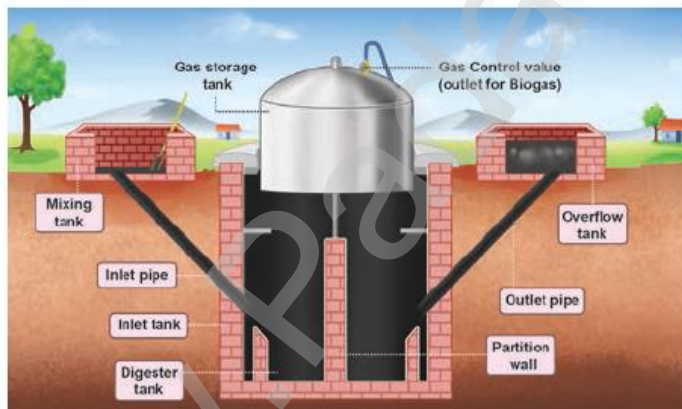


In the 1950s, experiments by **Porter and Edelman** revealed the basic structure of the immunoglobulin. An antibody molecule is **Y** shaped structure that comprises of four polypeptide chains, two identical light chains (**L**) of molecular weight 25,000 Da (approximately 214 amino acids) and two identical heavy chains (**H**) of molecular weight 50,000 Da (approximately 450 amino acids). The polypeptide chains are linked together by di-sulphide (S-S) bonds. One light chain is attached to each heavy chain and two heavy chains are attached to each other to form a Y shaped structure. Hence, an antibody is represented by H<sub>2</sub> L<sub>2</sub>. The heavy chains have a flexible hinge region at their approximate middles.

Each chain (**L** and **H**) has two terminals. They are C - terminal (Carboxyl) and amino or N-terminal. Each chain (**L** and **H**) has two regions. They have variable (**V**) region at one end and a much larger constant (**C**) region at the other end. Antibodies responding to different antigens have very different (V) regions but their (C) regions are the same in all antibodies. In each arm of the monomer antibody, the (V) regions of the heavy and light chains combines to form an antigen – binding site shaped to ‘fit’ a specific antigenic determinant. Consequently each antibody monomer has two such antigen – binding regions. The (C) regions that forms the stem of the antibody monomer determine the antibody class and serve common functions in all antibodies.

**The functions of immunoglobulin** are agglutination, precipitation, opsonisation, neutralization.

### 37. b) Production of Biogas:



In a biogas plant, anaerobic digestion is carried out in an air tight cylindrical tank known as digester. It is made up of concrete bricks and cement or steel. Bio-wastes are collected and slurry of dung is fed into this digester. It has a side opening into which organic materials for digestion are incorporated for microbial activity.

Anaerobic digestion is accomplished in three stages: solubilisation, acidogenesis and methanogenesis. The outlet is connected to a pipe to supply biogas. The slurry is drained through another outlet and is used as fertilizer. Biogas is used for cooking and lighting. The technology of biogas production was developed in India mainly due to the efforts of Indian Agricultural Research Institute (IARI) and Khadi and Village Industries Commission (KVIC).

38. a) **Protozoan Disease**

About 15 genera of protozoans live as parasites within the human body and cause diseases.

- **Amoebiasis** also called amoebic dysentery or amoebic colitis is caused by *Entamoeba histolytica*, which lives in the human large intestine and feeds on mucus and bacteria. Infective stage of this parasite is the **trophozoite**, which penetrates the walls of the host intestine (colon) and secretes histolytic enzymes causing ulceration, bleeding, abdominal pain and stools with excess mucus. Symptoms of amoebiasis can range from diarrhoea to dysentery with blood and mucus in the stool. **House flies** (*Musca domestica*) acts as a carrier for transmitting the parasite from contaminated faeces and water.
- **Malaria** is caused by different types of *Plasmodium* species such as *P. vivax*, *P. ovale*, *P. malariae* and *P. falciparum*. *Plasmodium* lives in the RBC of human in its mature condition it is called as **trophozoite**. It is transmitted from one person to another by the bite of the infected female *Anopheles* mosquito.
- **Kala – azar** or visceral leishmaniasis is caused by *Leishmania donovani*, which is transmitted by the vector *Phlebotomus* (**sand fly**). Infection may occur in the endothelial cells, bone marrow, liver, lymph glands and blood vessels of the spleen. Symptoms of Kala azar are weight loss, anaemia, fever, enlargement of spleen and liver.

38. b) **Innate immunity- types and mechanisms**

| Type of innate immunity          | Mechanism  |
|----------------------------------|--|
| <b>1. Anatomical barriers</b>    |  |
| Skin                             | Prevents the entry of microbes.<br>Its acidic environment (pH 3-5) retards the growth of microbes.   |
| Mucus membrane                   | Mucus entraps foreign microorganisms and competes with microbes for attachment.  |
| <b>2. Physiological barriers</b> |  |
| Temperature                      | Normal body temperature inhibits the growth of pathogens.<br>Fever also inhibits the growth of pathogens.  |
| Low pH                           | Acidity of gastric secretions (HCl) kills most ingested microbes.  |
| Chemical mediators               | Lysozyme acts as antibacterial agent and cleaves the bacterial cell wall.<br>Interferons induce antiviral state in the uninfected cells.<br>Complementary substances produced from leucocytes lyse the pathogenic microbes or facilitate phagocytosis. |
| <b>3. Phagocytic barriers</b>    |  |
|                                  | Specialized cells (Monocytes, neutrophils, tissue macrophages) phagocytose, and digest whole microorganisms.   |
| <b>4. Inflammatory barriers</b>  |  |
|                                  | Tissue damage and infection induce leakage of vascular fluid, containing chemotactic signals like serotonin, histamine and prostaglandins. They influx the phagocytic cells into the affected area. This phenomenon is called diapedesis.              |