*Unit - V
ANIMAL ASSOCIATIONS

- Animal associations are four types - **phoresis, mutualism, commensalism and parasitism**
- Phoresis means to carry.
- In this relationship the smaller one that is mechanically carried is the **phoront** and the other larger one is called **host.**
- In phoresis - **metabolic interaction or dependancy is absent**.

SYMBIOSIS

- The reason for biological relationship is- **Metabolism,food and shelter**
- Mutualism, commensalism and parasitism together called - **symbiosis.**
- Symbiosis means living together in closed proglonged association is approved by - **Society for experimental biology.**
- The term 'Symbiosis' was first coined by-**de Bary (1879)**

MUTUALISM

- A close association between two living organisms of different species which is beneficial to both partners is - **mutualism.**
- The mutualistic symbionts are - **incapable of living independently and metabolically interdependent.**
- Examples for mutualism are - ***Zootermopsis* and *Trichomonas* termopsidis or *Trichonympha* spp.**
- *Trichomonas termopsidis* is - **a flagellate protozoan**
- *Zootermopsis* is - **a genus of termites or white ants.**
- Termites feeds on - **cellulose containing material**
- Termites can not digest cellulose on their own because - **they can not secrete enzyme cellulase**.
- *Trichomonas termopsidis* secretes the enzyme - **cellulase.**
- *Zootermopsis* receives digested food.
- *Trichomonas termopsidis* receives - **shelter and nutrients.**
- *Chlorohydra* and *Chlorella* are another example for - **mutualism**
- *Chlorohydra viridissima* also called -**green *Hydra***
- *Chlorella* is known as - **green Alga.**
- C*hlorohydra* is green in colour due to the presence of algae called - ***Zoochlorella***
- *Zoochlorella* belongs to the genus - ***Chlorella***
- Zoochlorella lives in the muscular nutritive cells of - **endoderm of *Hydra***.
- *Chlorohydra* provides the algae - **shelter, protection, CO_2, Nitrates and phosphates**.
- Algae provides green *Hydra* - **Oxygen and starch**
- *Chlorella* can not carry on photosynthesis in darkness but they can live - **chemotrophically on the metabolic products of *Hydra***.
- *Chlorohydra* can survive longer periods in starvation because - **utilizes the photosynthetic products of *Chlorella.***

COMMENSALISM

- Association between individuals of two different species in which one is benefited and the other is neither benefited nor harmed is called- **commensalism**
- The one which is benefited is called - **commensal (small in size)**
- The other unaffected partner - **host (large).**
- Commensal and host are capable of living independently because - they are not metabolically dependent.
- Examples for Ectocommensalism: *Hydractinia echinata* (colonial coelenterate) and hermit crab (*Pagurus bernhardus*)
- *Hydractiana* - **taken to new feeding areas.**
- Hermit crab - **neither benifited nor harmed**.
- Example for Endocommensalism: Man and Bacteria :A continuous endocommensal in the colon of man is ***Escherichia coli***
- In this association man is uneffected.

PARASITISM

- An association between two individuals of different species, in which one is benefited, while the other one is harmed is called- **parasitism**
  In the parasitism, the one which is benefited is the - **parasite.**
  In the parasitism the one which gives shelter and effected is-**host**

Types of Parasites

- The parasites which lives on the body surface of host are - ectoparasites .**Eg :*Pediculus* (head louse) and mites**
- The parasites which live inside the body host are - **endoparasites**
- Parasites living in the cavities of the body of host are called - **coelozoic parasites. .Eg:*Trichomonos vaginalis,* roundworms and tapeworms.**
- Parasite that lives in the lumen of intestine - **enterozoic parasite. Eg: Round worm**

- The flagellate coeloparasite causing"Vaginitis"in the vagina of women is - ***Trichomonas vaginalis***
- The endoparasites which live inside the host cells are - intracellular parasites(or) cytozoic parasites **Eg : (i)** ***Plasmodium*** in the RBC and Liver cells of man
- **(ii)** ***Leishmania donovani*** in the reticulo- **endothelial cells of man**
- Parasites which live in the tissues or in between the cells are - intercellular parasites or histozoic parasites **Eg:** ***Entamoeba histolytica, Wuchereria bancrofti.***
- *Entamoeba histolytica* lives in the wall of the caecum and colon of man.
- *Wuchereria brancrofti* lives in the lymph vessels and lymph glands of man.
- A parasite which leads either a free living or parasitic existence - facultative parasite**.** Eg: ***Mycobacterium tuberculosis.***
- A parasite which is completely dependent upon its host for existence - obligate parasite**. Eg:** ***Plasmodium vivax.***
- A parasite that is found in locations in the host where they normally do not occur - aberrant parasite**.** Eg: Larvae of *Ascaris* migrating to the brain.
- The parasites which do not cause disease in the host are called - nonpathogenic parasites E.g. ***Taenia hominis***
- The parasites which cause disease in the host are called - pathogenic parasites E.g. ***Plasmodium*** and tapeworms (flatworms)**.**
- A parasite which lives as a parasite on another parasite is called -hyper parasite . **Eg:*****Nosema notabilis*** is (a cnidosporan) a hyperparasite on ***Sphaerospora polymorpha*** (a cnidosporan)**,** which is a parasite in the urinary bladder of toad fish.
- The parasites which obtain nourishment from the host time to time and not constantly associated with the host is called - intermittent parasites or periodic parasite. Eg: Blood sucking flies.
- A parasite completing the life cycle in one host (direct life cycle) - monoxenous parasite or monogenetic parasite**.** Eg: ***Enterobius vermicularis.***
- A parasite completing the life cycle in two or more hosts (indirect life cycle) - heteroxenous parasite. Eg: *Taenia solium.*
- A parasite in which reproduction is involving alternating sexual and asexual cycles in succeeding host organisms - digenetic parasite. **Eg**: malarial parasite, certain trematode worms.

Types of Hosts

- The host in which parasites attains sexual maturity - definitive host or primary host. Eg: Man for *Taenia.*
- The host in which larval stages of a parasite or asexual stages of a parasite lives - intermediate host**.** Eg: female ***Culex*** **for** ***Wuchereria.***
- The host in which the parasite is viable without development but remains encysted until it is consumed by the final host - **paratenic host or transfer host. Eg**: Second stage larva of *Toxocara* (a nematode parasite) in chicken, lambs, rodents, invertebrates etc.,
- The host essential for the maintainance of the infection during times when an active transmission is not occuring. - **Reservoir host**. Eg: ***Antelope*** **(Gnu) for** ***Trypanosoma gambiense.***

Vector

- The host which transfers infective forms of a parasite from one host to the other - vector (usually an arthropod).
- The vector in which the parasite does not undergo development before transfer to another host - **mechanical vector**. **Eg: House fly.**
- The vector characterised by the development of the parasite before its transfer to another host - **Biological vector. Eg:** ***Anopheles*** **for malaria.**
- An organism which has a light infection with a parasite but it is not harmed due to immunity resulting from previous infection is called**-carrier**

Effects of Parasites on their Hosts.

- The blood parasites such as *Plasmodium* and *Leishmania* causes - **Malaria and leishmaniasis**.
- Histozoic protozoan parasites like *Entamoeba histolytica* causes - **amoebiasis, intestinal ulcers and abscesses in liver and lungs.**
- *Leismania tropica* causes **Delhi boils** and *Ascaris lumbricoides* causes **ascariasis.**
- The condition characterized by an increase in the number of cells is known as - **hyperplasia**
- *Fasciola hepatica* causes hyperplasia in - **host bile duct (Sheep)**.
- The condition characterized by an increase in size of cells (or) organs due to a parasite is called- **hypertrophy**
- Cytozoic parasites like *Plasmodium* causes hypertrophy in - **the RBC of man**.
- The parasites cause abnormal increase in the size of host is called - **gigantism .** Eg : (i) Size of snails will be increased due to Trematode parasites
- The growth of the cells in a tissue to form new structure is called - **neoplasia**. Eg: Tumours induced by some virus.
- Degeneration of host gonads by the parasite - Parasitic castration. Eg: ***Sacculina*** (a crustacean) causes

degeneration of ovaries in the crab ***Carcinus maenas.***

Parasitic adaptations for survival in the host

- *Ascaris* and *Enterobius* have protective cuticle and resistance to the - **digestive enzymes of the human host.**
- The tapeworms have living protective tegument.
- Tapeworms develop hold- fast organs such as suckers and hooks - **to cling the intestinal wall of the host.**
- Intestinal parasites leading only anaerobic life - obligatory anaerobes. Eg: ***Entamoeba histolytica.***
- The parasites that can carry on aerobic respiration if oxygen is available and anaerobic respiration in the absence of oxygen - **facultative anaerobes.**

Adaptations of the parasites for propagation from host to host

- *Entamoeba histolytica* for its survival in moist faeces of the host to increase the chance of propagation enter in - **cystic stage**
- *Leishmania donovani* adapted for propagation through - **blood sucking intermediate host or vectors.**
- The system that shows greatest adaptations for survival of the parasites is - **reproductive system.**
- The well developed reproductive system ensures infection and perpetuation.
- The reproductive system of tape worms show greatest adoptation for the perpetuation of species.
- Ascaris lays - **200,000 eggs per day.**
- Digenetic parasite which has complex life cycle is - ***Fasciola hepatica* (liver fluke).**
- The parasite which shows sequential polyembryony is - ***Fasciola hepatica.***
- Polyembryony resulted because of the phenomenon- **parthenogenesis**.
- It is difficult to produce vaccine against malaria because - ***Plasmodium*** changes antigens from time to time.

Question Bank

SYMBIOSIS

LEVEL -I

1. Metabolic dependency is not observed in this type of relationship
   1) Phoresis 2) Commensalism
   3) Mutualism 4) Commensalism & Phoresis
2. Central to most biological relationships between organisms
   1) Food and shelter 2) Food and reproduction
   3) Reproduction and shelter filarial agents.
   4)Reproduction and migration
3) Symbiosis means
   1) Eating together of organisms of different species
   2) Living together of organisms of same species
   3)Eating together of organisms of same species
   4) Living together of organisms of different species
4) Symbiosis means living together in closed prolonged association is approved by
   1)Institute for experimental Biology
   2) Society for Experimental Biology
   3)Society for Environmental Biology
   4)Society for Physiology
5). The term symbiosis was coined by
   1) de Beer 2) Von Baer
   3) de Bary 3) A K Berry

MUTUALISM

LEVEL -I

6. Close association between two living organisms of different species which is beneficial to both partners is called
   1) Mutualism 2)Antagonism
   3) Commensalism 4) Parasitism
7. If the symbionts are incapable of living independently that symbiotic association is called
   1) Commensalism 2)Mutualism
   3)Predation 4) Parasitism
8. If the symbionts are dependent on each other metobolically that association is
   1) Symbiosis 2)Mutualism
   3) Parasitism 4) Commensalism
9. The association exhibited by *Zootermopsis* and *Trichomonas termopsidis* is
   1) Parasitism 2) Commensalism
   3) Mutualism 4) Antagonism
10. *Zootermopsis* is genus of
    1) Red ants 2) Black ants
    3) Ant eaters 4) White ants
11. Termites are also called
    1) Ants 2)White ants
    3) Red ants 4) Black ants
12. Termites can not digest
    1) Proteins 2) Fats
    3) Cellulose 4) Starch
13. Enzymes are not produced by termites
    1) Proteolytic enzymes 2) Lipase
    3) Amylase 4) Cellulase
14. *Trichomonas termopsidis* is a
    1) Commensalistic symbiont in the gut of white ants
    2) Parasitic symbiont in the gut of white ants
    3) Mutualistic symbiont in the gut of ants
    4) Mutualistic symbiont in the gut of white ants

15. If *Trichomonas termopsdis* are removed from the intestine of termite, the termite dies because it can not digest
    1) Proteins 2) Cellulose
    3) Fats 4) Starches
16. Green hydra
    1)*Hydra fusca* *2) Hydra oligactis*
    3) Hydractinia ehinata *4) Chlorohydra viridissima*
17. The association between green *Hydra* and *Chlorella is*
    1) Commensalism 2) Mutualism
    3) Parasitism 4) Antagonism
18. *Chlorohydra* is green in colour due to the presence of
    1) Chlorophyll in the nutritive muscular cell of its endoderm
    2) C*hlorella* in the nutritive muscular cells of its ecto derm
    3) Chrorophyll in the nutritive muscular cells of its ectoderm
    4) *Chlorella* in the nutritive muscular cells of its en doderm
19. *Chlorohydra* provides the algae with
    1) Shelter and protection 2) CO_2 and nitrates
    3)Phosphates 4) CO_2, nitrates, phos phates, shelter and pro tection
20. *Chlorella* provides the green hydra with
    1.Oxygen and starch 2. Shelter
    3. Phosphates 4. Nitrates
21. In darkness *Chlorella* can live
    1) Photo autotrophically
    2) Chaemotrophically on the organic matter of water
    3) Chaemotrophically on the products of metabolism of green *Hydra*
    4) Holozoically on the green *Hydra*

LEVEL -II

22. **S):** Symbiotic association between *Zootermopsis and Trichomonas termopsidis* is mutualism.
    R): The mutualistic symbionts are incapable of living independently, because they are mutually dependent on each other metabolically

23. **S)** *Chlorohydra* is kept in dark, though *Chlorella* cannot carry on photosynthesis in darkness can live.
    R): In darkness *Chlorella* can live chemotropically on the products of metabolism of the *Chlorohydra*

24. **S)**: *Chlorohydra* can survive longer than the other species of *Hydra* under similar conditions of starvation
    R):Under the conditions of starvation *Chlorohydra* can perform photosynthesis with the help of *Chlorella*

COMMENSALISM

LEVEL -I

25. In the association, between two individuals, one is benefited and the other one is neither benefited nor harmed, is known as
    1. Mutualism 2. Commensalism
    3. Parasitism 4. Neutralism
26. In commensalism, the commensal is
    1. Equal to host 2. Larger than host
    3. Smaller than host 4. less intelligent than host
27. In commensalism the partner that is benifitted is called
    1. Host 2. Parasite
    2. Predator 4. Commensal
28. In the association of *Hydractinia echinata* and *Pagurus bernhardus, Hydractinia* is
    1. A host 2. An ectocommensal
    3. An endocommensal 4. A parasite
29. Benifit to hermit crab from the *Hydractinia echinata*
    1. Free transport
    2. It is carried to new feeding areas
    3. Both 4. No benifit
30. The bacterium that is commensal in the intestine of human being
    1. *Mycobacterium tuberculosis*
    2. Vibrio cholera
    3. Escherichia coli
    4. Mycobacterium leprae
31. The assoication between *Escherichia coli* and human being is
    1. Ectocommensalism 2. Endocommensalism
    3. Predation 4. Mutualism

PARASITISM

LEVEL -I

32. In the association between two individuals one lives at the cost of the other by causing harm is known as
    1. Parasitism 2. Mutualism
    3. Neutralism 4. Commensalism
33. In parasitism, the loser is
    1. Host 2. Parasite
    3. Both 4. None
34. Which one of the following is an example for both histozoic and coelozoic parasites?
    1. Plasmodium *2. Giardia*
    3. Entamoeba *4. Trypanosoma*

35. Which of the following parasite becomes intracellular in the red blood cells and liver cells of man?
1. Trypanosoma *2. Giardia*
3. Plasmodium *4. Taenia*

36. Name the parasite which can be independent when the host is not available
1. Obligatory parasite 2. Facultative parasite
3. Hyperparasite 4. Coelozoic parasite

37. Organism which leads parasitic life throughout its life in a host
1. Facultative parasite 2. Obligatory parasite
3. Commensal 4. Histozoic parasite

38. *Nosema notabilis* leads hyperparasitic life on which protozoan parasite, that lives in the urinary bladder of toad fish?
1. *Spherospora polymorpha*
2. Trichomonas vaginalis
3. Plasmodium
4.Entameoba histolytica

39. *Trichomonas* is a coelozoic parasite, lives in this region of women
1. Breast 2. Vagina
3. Intestine 4. Urinary bladder

40. Monoxenous parasite among the following
1) Taenia solium *2) Plasmodium*
3) Enterobius vermicularis
4) Wuchereria bancrofti

41. A permanant ectoparasitic hexapod on man is
1. Bedbug 2. Head louse
3. Mite 4. Mosquito

42. Which of the following is not a coelozoic parasite of man
1. Tape worm 2. Round worm
3. Trichomonas vaginalis *4. Plasmodium*

43. Reservoir host of *Trypnosoma gambiense*
1) Antelope 2) Monkey
3) Chicken 4) Man

44. The endoparasite which lives in the spaces between cells of tissues (or) organs of host is
1. Histozoic 2. Cytozoic
3. Coelozoic 4. Mesozoic

45. An example for temporary parasite is
1. Female mosquito 2. *Cimex*
3. Housefly 4.Female mosquito & *Cimex*

46. *Mycobacterium tuberculosis* is
1. Temporary parasite 2. Obligatory parasite
3. Facultative parasite 4. Hyperparasite

47. Which of the following is a histozoic parasite.
1. *Wuchereria* *2. Trichomonas*
3. Giardia *4.Plasmodium*

48. *Enterobius vermicularis* is a
1) Monoxenous parasite
2) Digenetic parasite
3) Heteroxenous parasite
4) Polygenetic parasite

49. The following one is an aberrant parasite
1) *Taenia solium*
2) Wuchereria bancrofti
3) Ascaris lumbricoides
4) Plasmodium vivax

50. *Fasciola hepatica* is a digenetic parasite. Sheep and snail are two hosts. Snail is(EAMCET 2007)
(1) Intermediate host (2) Paratenic host
(3) Vector host (4) Reservoir host

51. From the following a digenetic parasite is(EAMCET 2008)
1) *Taenia solium*
2) Wuchereria bancrofti
3) Fasciola hepatica
4) Plasmodium vivax

LEVEL -II

52. **S)** *Entamoeba histolytica* is an enterozoic parasite

R): *Entamoeba histolytica* lives in the wall of the colon and caecum of human being

53. S)*Leishmania donovani* is an endoparasite

R): *L. donovani* lives in the reticuloendothelial cells of man

54. **S):***Mycobacterium tuberculosis* is a facultative parasite

R) : *M. tuberculosis* causes tuberculosis in human being

55 S): *Nosema notabilis* is a hyper parasite

R); *Sphaerospora polymorpha* is a parasite in the urinary bladder of the toad fish

56 **S)** *Plasmodium* is a digenetic parasite

R): *Plasmodium* completes its life cycle in different types of host species

57. Study the following

Type of parasite	Location	Example
I. Enterozoic	In the lumenof intestine	*Ascaris*
II. Histozoic	Lives between cells in the tissues	*Wuchereria*

III. Cytozoic Lives within the cells *Taenia*

IV. Intercellular Lives inside the cells *Plasmodium*

Which of the above are correct

1. I,II 2.II, III

3.II, III, IV 4. I, II, III, IV

58. Match the following regarding parasite

A. Obligate	I. *Trichomonas hominis*
B. Hyperparasite	II. *Taenia solium*
C. Nonpathogenic	III *Nosema notabilis*
D. Facultative	IV. *Mycobacterium tu berculosis*
E. Pathogenic	V. *Leishmania donovani*

1)A-II, B-III, C-I, D-V, E-IV
2)A-IV, B-III, C-I, D-II, E-V
3)A-V, B-IV, C-I, D-III, E-II
4)A-II,B-III, C-I, D-IV, E-V

59. Match the following

Type of parasite	example
A. Intracellular	I. *Leishmania donovani*
B. Digenetic	II *Fasciola hepatica*
C. Intercelluar	III. *Trichomonas*
D. Monogenetic	IV. *Diplozoon paradoxum*
	V. *Wuchereria bancrofti*

1.A-I, B-II, C-III, D-IV 2)A-I, B-II, C-V, D-IV

3.A-III, B-V, C-I, D-IV 4)A-I, B-II, C-V, D-III

60. Match the following

A. Ectoparasite	I. *Trichomonas vaginalis*
B. Intermittent	II. *Cimex*
C. Coelozoic	III. *Ascaris*
D. Enterozoic	IV. *Pediculus*
	V. *Trichomonas hominis*

1.A-IV, B-II, C-I, D-III

2.A-II, B-IV, C-V, D-III

3.A-IV, B-II, C-III, D-I

4.A-II, B-IV, C-V, D-III

61. Match the following

list I	List II
A. *Trichomonas vaginalis*	I Gall bladder
B. *Sphaerospora polymorpha*	II Vagina
C. *Leishmania donovani*	III Cavity of intestine
D. *Fasciola hepatica*	IV Reticulo endothelial cells
E. *Ascaris lumbricoides*	V Urinary bladder
	VI. Wall of intestine

	A	B	C	D	E
1	II	V	IV	I	VI
2	II	V	IV	I	III
3	II	VI	IV	I	III
4	V	II	I	III	VI

62. Match the following

Parasite	Host
I *Nosema notabilis*	A. Snail
II *Shaerospora polymorpha*	*B Sphaerospora polymorpha*
III *Fasciola hepatica*	C. Toad fish
IV *Sacculina*	D. Sheep
	E. C*arcinus moenas*

The correct match is

	I	II	III	IV
1)	B	D	A	E
2)	C	A	D	E
3)	B	C	D	E
4)	B	C	E	A

63. Study the following statements regarding the types of parasites

I. All ectoparasites are intermittent parasites
II. All intermittent parasites are ectoparasites
III. All coelozoic parasites are enterozoic parasites
IV. All enterozoic parasites are coelozoic parasites

In the above the following are correct

1.I, II, III, IV 2.II and IV

3. I and III 4. I, III, and IV

64. Study the following statements regarding the types of parasites

I. *Taenia solium* is a digenetic parasite as it completes the life cycle in two different hosts

II. *Diplozoon paradoxum* is a monogenetic parasite as its lifecycle in one type of host

III. *Mycobacterium tuberculosis* is a facultative parasite as its is capable of living independently if its host is not available.

IV. *Leishmania donovani* is an endoparasite as it lives in the reticuloendothelial cells of man

Identify the correct statements

1) I, II, III, IV 2)I, II, III

3) II, III IV 4)I, III

TYPES OF HOSTS

LEVEL -I

65. The host in which a parasite attains the sexual maturity and reproduces sexually is called
1) Definitive host 2)Intermediate host
3) Paratenic host 3) Vector host

66. The host in which the larval stages of a parasite live or asexual multiplication takes place for the completion of parasite's life cycle is
1. Reservoirs host 2. Paratenic host
3. Intermediate host 4. Definitive host

67. Carrier or transport host is also called
1. Reservoir host 2. Vector host
3. Paratenic host 4. Intermediate host

68. A parasite is viable without any development in
1. Definitive host 2. Intermediate host
3. Vector host 4. Paratenic host

69. In the absence of regular hosts, some parasites survive in
1.The reservoir hosts 2. Intermediate hosts
3. Paratenic hosts 4. Regular hosts

70. The intermediate host for the parasite that causes Tashkent ulcers is (EAMCET 2004)
1) *Glossina palpalis*
2) Phlebotomus argentipes
3) Phlebotomus papatassi
4) Triatoma infestans

LEVEL -II

71. **S):** Female *Anopheles* mosquito is the definitive host to *Plasmodium vivax*

R): *Plasmodium vivax* reproduces sexually in female *Anopheles* mosquito

72. **S):** *Musca* is paratenic host to *Entamoeba histolytica*

R): In Musca asexual life cycle of Entamoeba histolytica occurs

73. **S):** *Homo sapiens* is the definitive host to *Taenia solium.*

R): *Taenia solium* attains sexual maturity in *Homo sapiens*

VECTOR

LEVEL -I

74. The host in which a part of the life cycle of a parasite takes place and is also instrumental in the transmission of the parasite from one main host to the other is
1. Vector host 2. Paratenic host
2.Intermediate host 4. Reservoir host

75. Biological vector for malaria
1. Female *Anopheles* 2. Male *Anopheles*
3. Male *Culex* 3. Female *Culex*

LEVEL -II

76. **S)** Female *Anopheles* mosquito is the vector host of *Plasmodium*

R): Vector host is instrumental in the transmission of the parasite from one definitive host to the other

77. Match the following

List I	List II
I. Definitive host	A. Female *Culex*
II Intermediate host	B. *Homo sapiens*
III Paratenic host	C. *Periplaneta*
IV Vector host	D. Female *Anopheles*
V. Reservoir host	E.Monkey
	F. *Sus scrofa*

	I	II	III	IV	V
1)	D	F	C	A	E
2)	B	A	C	D	E
3)	A	F	E	D	C
4)	D	B	C	A	E

EFFECTS OF PARASITES ON THEIR HOSTS

LEVEL -I

78. Increase in the number of cells leading to thickening of bileduct in sheep due to stimultation by liver fluke is called
1. Hyperplasia 2. Hypertrophy
3. Hypermegaly 4. Hypoplasia

79. Parasitic castration in the host is effected by
1. *Sacculina* *2. Trypanosoma*
3. Nosema *4. Taenia*

80. The parasite that can cause the degeneration of ovaries in the crab is
1. *Fasciola* *2. Sacculina*
3. Trypanosoma *4. Schistosoma*

81. Parasites induce their hosts to produce antibodies
1. To develop immunity to these antibodies
2. To escape from the antibodies
3. To kill the host
4. To develop resistance to enzymes of the host

82. The growth of the cells in a tissue to form a new structure is called
1) Neoplasia 2) Hypertrophy
3) Gigantism 4) Hyperplasia

83. Due to the presence of *Plasmodium*, the RBC increase in their size, this condition is known as
1. Hyperplasia 2. Gigantism
3. Hypertrophy 4. Parasitic castration

84. Which of the following parasite, increase weight in sheep?
1. *Ascaris* *2. Ancylostoma*
3. Fasciola *4. Plasmodium*

LEVEL -II

85. Match the following and select the correct combination

Parasite	Effect on host
A). *Fasciola hepatica*	I. Degeneration of gonads
B). *Plasmodium vivax*	II. Gigantism
C). Trematode larvae	III. Hypertrophy
D). *Sacculina*	IV. Hyperplasia

1.A-IV, B-III, C-II, D-I

2.A-IV, B-III, C-I, D-II

3.A-III, B-IV, C-II, D-I

4. A-II, B-III, C-IV, D-I

PARASITIC ADAPTATIONS FOR SURVIVAL IN THE HOST

LEVEL -I

86. Most of the intestinal endoparasites protect themselves against the action of digestive enzymes by
1. The presence of thick cuticle
2. By secreting antienzymes
3. Antitoxins 4. Thick cuticle and enzymes

87. Which of the following shows polyembryony and parthenogenesis in the production of larval forms
1. Taenia solium 2.Fasciola hepatica
3. Ascaris 4. Entamoeba

88. These are reduced in endoparasites compared with ectoparasites as parasitic adaptation.
1. Locomotor organs
2. Sense organs and nervous system
3. Digestive tract and digestive glands
4. Locomotor organs, sense organs, nervous system and digestive system.

89. Parasitic adaptations present in endoparasites are
1. Presence of thick enzyme resistant cuticle, secretion of anti enzymes
2. Anaerobic respiration
3. Isotonic body fluid with the body fluids of the host
4. Enzyme resistant cuticle, anaerobic respiration and isotonic body fluid with hosts body fluids.

90. Which of the following sytems is well developed in most of the parasites
1. Nervous system 2. Sensory system
3. Respiratory system 4. Reproductive system

91. The system that is well developed in the enterozoic parasitic worms
1. Respiratory system 2. Digestive system
3. Excretory system 4.Reproductive system

92. Hold-fast organs are present in
1. Tapeworms 2. Round worms
3. Pinworm 4. Filarial worm

LEVEL -II

93. S): Reproductive system of parasites very well developed
R): Well developed reproductive system ensures perpetuation of the species

94. **S)**Though *Ascaris* and *Enterobius* are intestinal parasites they are not digested by the host
R): The protective cuticles of *Ascaris* and *Enterobius* resists the digestive enzymes of their human host

95. S): So far it made difficult for scientists to produce vaccine against malaria
R): *Plasmodium* changes its antigens from time to time

96. The following are the statements about the adaptations of parasites for survival in their hosts
I. Cuticle of *Enterobius* with microvilli helps in the absorption of nutrients from the host's intestine
II. Tape worms attach to the intestinal wall of the host

with hold fast organs to prevent their being discharged by the host to the outside

III. Facultative anaerobes can carry on aerobic respiration if oxygen is available.

IV. Tapeworms donot have living tegument

Identify the correct statements

1) I and II 2) II and III

3) I and IV 4) III and IV

PARASITES OF MAN

Entamoeba histolytica

Classification

- Phylum : **Protozoa**
- Sub Phylum : **Sarcomastigophora**
- Class : **Rhizopodea**

Introduction :

- Entamoeba was discovered by - **Lambell**.
- Its pathogenic nature proved by - **Losch**
- The name '*Entamoeba*' proposed by - **Cosagrandi**, **Barbogallow**
- It is a histozoic parasite in the colon of man; Diseases it causes in man are - Amoebiasis (or)Amoebic dysentery and HepaticAmoebiasis (or) Amoebic hepatitis
- It completes life cycle in single host- ***Homo sapiens***
- Most common protozoan parasite of man in China, Mexico, India - ***E. histolytica***

STRUCTURE

- *Entamoeba* is tissue invading (histozoic) parasite
- The size of the trophozoite of *Entamoeba* is- **20 to 30 microns**
- The form which dissolves the mucosa and then enters the deeper tissues in submucosa of the gut wall- **trophozoite**
- The trophozoite of *Entamoeba* releases proteolytic enzymes - **histolysins**
- The trophozoite of *Entamoeba* is **motile & nutritive**
- The stage of this parasite which causes harm or disease to the host is - **trophozoite**
- The method of feeding is- **holozoic (or) zootrophic**
- Trophozoite feeds on - **RBC, bacteria, tissue debris**
- The limiting membrane on the body is - **plasma membrane (or) plasmalemma**
- It has a single lobopodium, hence called - **monopodial organism**
- The cytoplasm does not contain contractile vacuoles, because it lives in - **isotonic medium**
- Outer - thick non granular clear protoplasm is- **ectoplasm**
- Inner granular protoplasm is - **endoplasm**
- The shape of its nucleus is- **cart wheel like (vesicular)**
- The spherical structure present in the centre of nucleus is - **endosome (Nucleolus)**.
- Much of the chromatin is in the form of - **minute beads attached to the inner surface of nuclear membrane.**
- Nucleoplasm is present in the form of- **spokes of a cart wheel (from endosome to chromatin beads)**
- Food vacuoles are filled with- **RBC & bacteria**
- The trophozoite of *E. histolytica* is identified by the presence of a- **cart wheel like nucleus and food vacuole with RBC**
- Trophozoite lacks - **mitochondria. (indication of anaerobic respiration)**

LIFE CYCLE :

- *Entamoeba histolytica* - **monoxenous parasite**.
- Mode of infection - **through contamination of food and water.**

PRECYSTIC :

- Type of reproduction - **binary fission.**
- Some daughter amoebae transform into trophozoites and the others reach the lumen of alimentary canal and becomes precystic stages.
- While preparing to encyst precystic stage looses - **food vacuoles, pseudopodium becomes small and rounded**
- Precystic stages store glycogen granules and rod shaped chromatoid bodies.
- Chromatoid bodies are said to be **ribonucleo protein in nature**.

CYSTIC STAGE :

- Formation of a delicate cyst is called - **encystation**
- Encystment occurs in **- large intestine.**
- Encystation is a means to tide over unfavourable conditions
- Soon after encystment the nucleus of parasite undergoes - **two successive mitotic divisions to form 4 nuclei (tetranucleate cyst)**
- The Ribonucleo protein bodies formed in the cytoplasm of cystic forms are called- **Chromatoid bodies (or) Chromidial bars**
- The reserve food materials are - **Glycogen granules and Chromatoid bodies**
- As cyst matures - **Chromatoid bodies & glycogen are absorbed**

INFECTION :

- The infective stage is- **Tetranucleate cyst**
- Type of transmission is - **contamination**

- The stages of the parasite which passes with faeces from the human host - **Tetra nucleated cysts**
- Agents for the transmission of tetranucleate cysts - **Houseflies and cockroaches**

EXCYSTMENT:

- The part of human alimentary canal where excystment of infective stages take place is- **Small intestine**
- The enzyme responsible for dissolving the cyst wall of the infective stage is - **Trypsin**
- After excystment parasite is called - **Metacystic form.**
- Metacystic form possess - **Four nuclei**.
- Each of the four nuclei of metacyst undergoes fission and form - **8 nuclei**
- Three successive cytokinesis results in the formation of - **8 uninucleate daughter amoebulae**
- The number of daughter amoebulae formed from each metacyst - **Eight**
- The amoebulae formed from the metacyst develop into - trophozoites.
- In the life cycle of *E. histolytica* multiplication **occurs at two stages- Intestinal trophozoite, Meta cystic stage.**

PATHOGENICITY :

- The digestive enzyme secreted by Trophozoites on the tissues of mucus membrane is- **Histolysin**
- Trophozoite produces ulcers - **in the wall of colon**
- The condition in which blood, mucus, pass out with stools due to rupture of ulcers- **Amoebiasis**
- Typical symptoms of Amoebiasis are - **acidic stools consisting blood and mucus having large number of trophozoites with RBC in the food vacuoles along with tetranucleate cysts.**
- Amoebiasis is confirmed due to presence of - **Tetranucleatecyst in stools and also trophozoite in faeces and mucus.**
- The persons in which *E.histolytica* does not cause any ill effects - **carriers or asymptomatic cyst passers.**
- Invasion of the parasite to the tissues other than the intestinal mucosa leads to - **secondary amoebiasis.**
- In severe infections trophozoites may be carried to **- liver and also rarely to lungs, brain or kidneys**.
- When settled in liver the parasite causes - **liver abscesses and amoebic hepatitis.**

Question Bank

Entamoeba histolytica

INTRODUCTION

LEVEL - I

97. *Entamoeba* belongs to the phylum
    1. Protozoa 2. Sarcodina
    3. Sarcomastigophora 4. Apicomplexa
98. *Entamoeba* belongs to the sub phylum
    1. Sarcomastigophora 2. Rhizopoda
    3. Amoebidae 4. Lobosa
99. *Entamoeba histolytica* belongs to which class?
    1. Sarcodina 2. Rhizopodea
    3. Lobosa 4. Amoebidae
100. *Entamoeba* was discovered by
    1. Lambell 2. Losch
    3. Laveron 4. Manson
101. The pathogenic nature of *Entamoeba* was proved by
    1. Lambel 2. Losch
    3. Dobel 4. Flemming
102. The name *Entamoeba* was proposed by
    1. Cosagrandi and Barbogallow
    2. Lambell and Losch
    3. Laveron and Golgi
    4. T.C. Cheng
103. *Entamoeba* is a
    1. Histozoic parasite
    2. Cytozoic parasite
    3. Intracellular parasite
    4. Intermittent parasite
104. Which one of the following parasites lives in the large intestine of man?
    1. *Trypanosoma* 2. *Plasmodium*
    3. *Entamoeba* 4. *Wuchereria*
105. *Entamoeba* is predominantly seen in
    1. China 2. Mexico
    3. India 4. China, Mexico, India

STRUCTURE

LEVEL -I

106. Motile and nutritive stage in *Entamoeba*
    1. Tetra nucleate cyst 2. Meta cyst
    3. Trophozoite 4. Pre-cyst
107. The proteolytic enzymes released by the trophozoite stage of *Entamoeba histolytica* are
    1. Haemolysins 2. Cytolysins
    3. Histolysins 4. Haemozoin
108. Nutrition in trophozoite form of *E.histolytica* is
    1. Holozoic. 2. Saprozoic
    3. Coprozoic 4.Mixotrophic
109. Occurrenceof RBC in the food vacuoles is the characteristic of this stage of *Entamoeba*

histolytica
1. Precystic stage 2. Trophozoite stage
3. Cystic stage 4. Metacystic stage

110. The trophozoite of *Entamoeba histolytica* is sur rounded by
1. Sarcolemma 2. Plasmalemma
3. Pellicle 4. Cuticle

111. Nucleus is cart wheel like
1. *Plasmodium vivax* 2. *Amoeba proteus*
3. *Entamoeba histolytica*
4. *Trichomonas vaginalis*

112. The nucleus of the trophozoite of *Entamoeba histolytica is*
1. Vesicular nucleus 2. Compact nucleus
3. Macronucleus 4. Micronucleus

113. This lies in the centre of the nucleus of *Entamoeba*
1. Centrosome 2. Endosome
3. Chromatin bed 4. Endoplasm

114. The food vacuole consists of red blood corpuscles and bacteria in
1. *Plasmodium* 2. *Trypanosoma*
3. *Entamoeba* 4. *Leishmania*

115. Contractile vacuoles are absent in *Entamoeba* be cause it lives in
1. Hypotonic medium 2. Isotonic medium
3. Hypertonic medium 4. Acidic medium

116. All these structures are present in *Entamoeba* except.
1. Plasmalemma 2. Contractile vacuole
3. Food vacuole 4. Nucleus

LEVEL - II

117. Study the following statements regarding *Entam oeba histolytica*
I. The trophozoite stage dissolves the mucosa and then enters the deeper tissue in the submucosa of the gut wall.
II. Trophozoite dissolves the walls of blood vessels by releasing haemolysins
III. Trophozoite is the pathogenic stage
IV. Occurrence of erythrocytes in the contractile vacuoles is characteristic of trophozoite stage
Identify the correct statements
1)I and II 2)I, II and III
3)I and III 4)I, III and V

118. The following are the statements about the nucleus of trophozoite of *Entamoeba histolytica*
I. It is a vesicular nucleus
II. A small nucleolus lies in the center of it
III. Filaments of chromatin radiate from the endosome to the peripheral beads
IV. It is cart wheel like
V. Much of the chromatin occurs peripherally as minute beads
Identify the correct statements
1)All except III 2)All except III and V
3)All except II and IV 4)All except I and V

119. S): Trophozoite of *Entamoeba* h*istolytica* is pathogenic stage
R): Trophozoite of *Entamoeba histolytica* dissolves the mucosa of the gut wall and the walls of blood vessels and ingests erythrocytes

120. **S)**): *Entamoeba histolytica* is anaerobic.
R): Mitochondria are absent in it.

LIFE CYCLE - PRECYSTIC

LEVEL - I

121. The trophozoite of *Entamoeba histolytica* repro duces by
1. Multiple fission 2. Binary fission
3. Budding 4. Amitosis

122. The daughter amobae of *Entamoeba* if stay in the wall of intestine they transform into
1. The trophozoites 2. Precystic stages
3. Cystic stages 4. Metacystic stages

123. In *Entamoeba* the daughter amoebae released into the lumen of host's alimentary canal assume
1. Precystic stage 2. Cystic stage
3. Trophozoite 4. Metacystic form

124. In the life cycle of *Entamoeba histolytica* glycogen granules and chormatid bodies are formed in
1. The cystic stage 2. Trophozoite stage
3. Precystic stage 4. Metacystic form

125. The nature of chormatid bodies of precystic stage of *Entamoeba histolytica*
1. Glycoproteins 2. Lipoproteins
3. Ribonucleoproteins 4. Glycogen

126. The reserve food materials in cystic stage
1. Oil droplets 2. Glycogen
3. Chitin 3. Starch

CYSTIC STAGE

LEVEL -I

127. The stage secretes a delicate cyst around itself in the life cycle of *Entamoeba*
1. Cystic stage 2. Precystic stage
3. Metacystic form 4. Trophozoite stage

128. The process of formation a cyst wall is termed
1. Sporulation 2. Excystment
3. Encystment 4. Gemmation

129. Encystation in *Entamoeba* always occurs in
1. Large intestine of man

2. Stomach of man
3. Duodenum of man
4. Small intestine of man

130. This is a mean to tide over unfavourable conditions in *Entamoeba*
1. Excystment 2. Encystment
3. Parasitism 4. Reproduction

131. In *Entamoeba histolytica* soon after encystment the nucleus undergoes
1. Two successive meiotic divisions
2. Two successive mitotic divisions
3. Three successive mitotic divisions
4. Four successive mitotic divisions

132. Tetranucleate cyst is the characteristic of
1. *Amoeba proteus* *2. Euglena viridis*
3. Entamoeba histolytica *4. Plasmodium vivax*

133. Glycogen reserve and chromatoid bodies disappears in
1. Pre cystic 2. Meta cystic stage
3. Young tetranucleate cyst
4. Mature tetranucleate cyst

INFECTION

LEVEL -I

134. Infective stages of *Entamoea histolytica* to a new human host
1. Precystic 2. Metacystic
3. Tetranucleate 4. Trpophozoite

135. Mode of transmission in *Entamoeba histolytica* is through contaminated
1. Drinking water 2. Food
3. Fruits and Vegetables
4. Food, drinking water & Fruits and vegetables

136. Houseflies and cockroaches act as
1. Intermediate host of *Entamoeba*
2. Vector hosts of *Entamoeba*
3. Reservoir hosts of *Entamoeba*
4. Paratenic hosts of *Entamoeba*

EXCYSTMENT

LEVEL -I

137. In this part of new humanhost the cyst wall of *Entamoeba histolytica* is dissolved
1. Lumen of large intestine
2. Lumen of small intestine
3. Lumen of stomach
4. Lumen of colon

138. The enzyme that dissolves the cyst wall of *Entamoeba histolytica is*
1. Trypsin 2. Pepsin
3. Chymotrypsin 4. Dipeptidase

139. The tetranucleate *Entamoeba* emerges out from the cyst into the lumen of
1. The duodenum 2. The ileum
3.The large intestine 4. The stomach

140. The process of emergence from the cyst termed
1. Encystment 2. Encryptment
3. Excystment 4. Exflagellation

141. After excystement the *Entamoeba* is referred to as
1. Metacystic form 2. Metastatic form
3. Metamorphic form 4. Mutagenic form

142. The number of daughter amoebulae formed from each metacystic form of *Entamoeba histolytica*
1). 4 2). 1 3). 8 4).16

143. The formation of eight daughter individuals from each metacystic form is a characteristic feature of
1. *Entamoeba histolytica*
2. Entamoeba gingivalis
3. Entamoeba hertmani
4. Vorticella nebulifera

144. In the life cycle of *Entamoeba histolytica* multiplication of species occurs in
1. Precystic stage and metacystic form
2. Metacystic from and tetranucleate cyst stage
3. Tetranucleate cyst stage and trophozoite stage
4. Trophozoite stage and metacystic form

PATHOGENICITY

LEVEL -I

145. Trophozoites produce ulcers in the wall of colon by secreting an enzyme called
1. Haemolysin 2. Histolysin (or) proteolysin
3. Lipases 4. Hydrolases

146. Trophozoite produces ulcers in
1. Mouth 2. Stomach
3 Wall of colon 4. Small intestine

147. Discharge of blood with mucus and tetranucleate cysts in the faeces of the host is the symptom of
1. Taeniasis 2. Amoebiasis
3. Malaria 4. Cancer

148. In a clinical analsysis of stools of a patient mucus, blood, large number of trophozoites with RBC and tetranucleate cysts ar noticed. This confirms the infection by
1. *Entamoeba histolytica*
2. Entamoeba gingivalis
3. Entamoeba hertmani
4. Vorticella nebulifera

149. Asymptomatic cyst passers means
1) The persons that donot spread the parasite to other persons
2) The persons in which *E. histolytica* causes ill effects

3) The persons not subjected to the ill effects of the parasite but spread the parasite to the other persons

4) The persons subjected to the ill effects of the parasite but donot spread the parasite to the other persons.

150. Invasion of tissues other than the intestinal mucosa by *Entamoeba histolytica* leads to
1. Primary amoebiasis
2. Secondary amoebiasis
3. Amoebic dysentery
4. Primary and secondary amoebiasis

151. The organs not effected due to secondary amoebiasis
1) Liver 2) Brain
3) Kidneys 4) Eyes

152. When the trophozoite of *Entamoeba histolytica* settle in this organ they cause amoebic hepatitis
1. Brain 2. Kidney
3. Lung 4. Liver

153. *Entamoeba histolytica* causes
1. Amoebic dysentery 2. Peritonitis
3. Amoebic dysentery, Peritonitis, appendicities
4. Appendicitis only

LEVEL -II

154. The following are the statements about the pathogenicity of *Entamoeba histolytica*
I. Amoebiasis is characterized by the discharge of blood and mucus in the faeces
II. The trophozoites carried to liver, lungs, brain or kidneys cause abscesses
III. When the trophozoites settle in the liver they cause amoebic hepatitis
Which of the above are applicable to secondary Amoebiasis?
1)I, II, III, IV 2)I and II
3)I and III 4)II and III

155. Statement (S)) : Trophozoite is the pathogenic stage of *Entamoeba histolytica.*
Reason (R) : Trophozoite reproduces in the wall of the alimentary canal of the host

Plasmodium vivax

- Phylum - **Protozoa**
- sub phylum - ***Apicomplexa***
- Class - **Telosporea**

Introduction

- Common name of *Plasmodium* - **malarial parasite**
- The species of Plasmodium which cause malaria in man are***(a) Plasmodium falciparum (b) Plasmodium malariae (c) Plasmodium ovale (d) Plasmodium vivax***
- The most uncommon species is - ***P. ovale***
- Most dangerous species i*s* - ***P. falciparum***
- Most harmful protozoan parasite of man- ***Plasmodium falciparum***
- Most common human malarial parasite in the world- ***P.vivax***
- *The* meaning of malaria is - **Bad air**
- The word malaria was first suggested by- **Mucculoch in 1827**
- The branch of science which deals with the study of *Plasmodium* and the disease it causes is- **Malariolgy**
- The scientist who received Nobel prize for medicine in 1902- **Ronald Ross (1902)**
- The French Doctor who discovered *Plasmodium* in the blood of a Malaria patient is- **"Charles Laveran" (1880)**
- Father ofMalarialogy is - **Charles Laveran**
- The British Army Doctor who discovered that Female *Anopheles* mosquitoes are vector and Intermediate host of *Plasmodium* - **Sir Ronald Ross**
- Sir Ronald Ross observed *"Oocysts"* on the stomach of- **Female *Anopheles***
- Malarial day is - **20 th August of every year.**
- Life cycle of *Plasmodium* in the R.B.C. of man or Endo erythrocytic cycle was described by - **Camillo Golgi (1885)**
- Monograph of *P. vivax* life cycle is described by - **"Garnham"(1966)**
- Complete life cycle of *Plasmodium vivax*, in female *Anopheles* mosquito was described by - **Grassi (1898)**

Structure of a sporozoite

- Electron Microscopic structure of sporozoite of *P.vivax* studied by - **Garnham**
- The shape of sporozoite is -spindle **shape**
- The body is covered by - **Pellicle**
- No of layers in pellicle are - **3**
- The part of the sporozoite which secretes cytolytic enzymes - a pair of **secretory organelles** called **rhoptries.**
- Function of cytolytic enzymes **- Penetration of sporozoite into the liver cells.**
- Rhoptries open into **- apical cup or apical sucker (a cup like depression at the anterior end).**
- Movement of sporozoite **- Wriggling movements.** Wriggling movement is caused by **- hollow peripheral fibres or microtubules present in the pellicle.**

- The sexual phase of the life cycle is completed in the female *Anopheles* mosquito.
- Plasmodium - digenetic parasite.
- Primary host and vector of *Plasmodium* is **- Female Anopheles mosquito**
- Secondary or intermediate host is **- Man**
- Reservoir host of *Plasmodium* **- Monkey**
- The vector of the *Plasmodium* - **Mosquito**
- Structures with unknown function - **Convoluted tubules**

LIFE CYCLE IN MAN
EXO ERYTHROCYTIC GENERATION:

- The life cycle of *Plasmodium* in man is called - **"Schizogony (or) Asexual life cycle"**
- The life cycle in the man includes - **Exo erythrocytic schizogony and Endo- erythrocytic schizogony**
- Exoerythrocytic stage occurs in - **hepatic cells of liver.**
- Erythrocytic stage occurs in - **erythrocytes in the blood.**
- Exo- erythrocytic schizogony is divided into two types of generations called - **pre-erythrocytic and exoerythrocytic generations.**
- The hepatocytic life cycle not present in the life cycle of P.falciparum - **Exo erythrocytic cycle**
- Infective stage of plasmodium to man - **Sporozoite.**
- Method of infection - **inoculation (mosquito bite).**
- According to Shortt and Garnham the sporozoites enter the liver cells from the blood within - **half an hour.**
- Sequence of stages in preerythrocytic generation - **sporozoite, trophozoite, schizont and cryptozoites or first generation merozoites.**
- Cryptozoites may either enter into the erythrocytes or may again invade liver cells
- The number of cryptozoites produced from each schizont will be about - **12,000**
- The time required for preerythrocytic generations is - 8days
- The cryptozoites enter fresh liver cells and transform into - **Trophozoite**
- The sequence of stages in exoerythrocytic generation are - **cryptozoite, trophozoite, schizont and metacryptozoite or second generation merozoite.**
- Second generation merozoites are liberated into liver sinusoids.
- Metacryptozoites based on size - **two types**
  i) Micrometacryptozoites - **infect erythrocyte**s.
  ii) Macrometacryptozoites - **infect hepatocytes.**
- Cryptozoites of preerythrocytic generation and micro meta cryptozoites of the exoerythrocytic generations are infective stages to RBC

ERYTHROCYTIC SCHIZOGONY
(CYCLE OF GOLGI)

- Life cycle of *Plasmodium* in RBC of man is called - **Golgi cycle, (or) Endo Erythrocytic Cycle (or) Erythrocytic Schizogony**
- Life cycle in the liver of man is called - **Tissue phase**
- No clinical symptoms of Malaria appear in man during the tissue phase, because - **Haemozoin is not released**
- Sequence of stages during the Golgi cycle are - **Trophozoite, signet ring stage, Amoeboid stage,Schizont stage and Erythrocytic Merozoites**
- During the Golgi cycle, *Plasmodium* feeds upon - **Haemoglobin of RBC**
- Ingested haemoglobin is broken down into **- globin and haematin.**
- Digested haematin forms **- haemozoin granules.**
- Signet ring stage of Golgi cycle is absent in the life cycle of - ***P. falciparum***
- Parasite that develops pseudopodia and feeds on RBC is - **Amoeboid stage**
- Schuffner's dots appear in the cytoplasm of RBC when the *Plasmodium* is in - **Amoebula stage**
- Infected RBC increases almost double to their size called - **Hypertrophy**
- The Schuffner's dots are identified as - **Antigens secreted by the parasite**
- The stage of Erythrocytic cycle which undergoes multiple fission is **- Schizont**
- The number of erythrocytic merozoites produced from each schizont of *P. vivax* - **15 - 20**
- In *P. vivax* merozoites are arranged **- irregularly in the RBC.**
- The toxic substance released into plasma along with erythrocytic merozoites is- **Haemozoin (Brown colour)**
- Malaria fever is caused in man due to the release of - **Haemozoin**
- When sufficient amount of haemozoin is accumulated in the blood plasma, then only, the man will suffer from - **Malaria**
- The period of endoerythrocytic cycle is equal to the period of repetition of - **Malaria fever**
- The period of endoerythrocytic cycle in *P. vivax* - **48 hours**.
- The time interval between the initial infection by the sprozoites and the first reappearqance of the parasites in the blood of man is called - **Prepatent**

period.

- During prepatent period - host does not exhibit the symptoms of the disease.
- The Interval between entry of sporozoite into the body till the release of merozoites, Haemozoin into blood or first appearance of malarial symptoms is called - **Incubation period**
- Pre-patent period + Period of Endo erythrocytic schizogany - **Incubation period**
- Incubation period - Endo Erythrocytic schizogony is - **Pre patent period**
- Prepatent period for *P. vivax* - **8 days**
- Incubation period of *P. vivax* = **10 to 14 days**

GAMETOGONY

- The dormant stage of the life cycle of *Plasmodium* in man are **- Gametocytes**
- The maturation of gametocytes takes place in - **spleen and bone marrow.**
- The gametocytes are formed in the - **RBC of man**
- The gametocytes can develop further in - **the stom ach of female *Anopheles* mosquito**
- The stages of Golgi cycle which develop into gametocytes are - **Erythrocytic merozoites**
- The stages in the asexual cycle of *Plasmodium* which exhibit dimorphism - **Gametocytes**
- Small in size, large, centrally placed nucleus, the gametocyte is- **Male (or) microgametocyte (more in number)**
- Large in size, contains small, compact and eccentric nucleus. The gametocyte is- **Female (or) macrogametocyte**
- The life span of gametocytes - **7 days**
- The infective stage of *Plasmodium* in the female Anopheles are - **Gametocytes**

MOSQUITO PHASE

- Conditions favourable for gametocytes for their further development in the female *Anopheles*: **(a) low body temperature (b) pH value of the digestive fluids.**
- Life Cycle in mosquito comprises of - **Gametogony, fertilization and sporogony.**
- The stage with eight daughter nuclei along with eight flagella like cytoplasmic processes is called - **flagellated body**
- The process of formation of male gametes is called - **Exflagellation**
- The type of movement exhibited by male gametes is called - **Lashing movement**
- The type of division the nucleus of male gametocyte undergoes during Exflagellation - **Mitosis**
- Number of male gametes formed from each male gametocyte **- 8**
- The process of formation of ovum is called - **Maturation**
- Ovum also called - **Megagamete/ Female gamete/Macrogamete**
- Number of Polar bodies formed during the formation of a ovum - **one**
- Since the gametes are formed by mitosis division, they are called - **Merogametes**
- Formation of gametes from gametocyte called - **Gametogony**
- The part of the ovum through which a sperm enters into it is called **- Reception cone or fertilization cone.**

FERTILIZATION

- The type of movement exhibited by male gametes is called - **Lashing movement**
- The pronucleus of microgamete fuses with that of macrogamete
- Fusing gametes are dissimilar in form- **The fusion is described as anisogamy**
- The formation of zygote in - **stomach of mosquito**
- The shape of zygote is - **spherical**

SPOROGONY :

- The fusion of dissimilar gametes is called- **Anisogamy**
- The shape of zygote during inactive period - **spherical.**
- The long slender, highly motile zygote is called- **ookinete or vermicule**
- The ookinete penetrates through the wall of the crop and lies benath - **basement membrane.**
- The part of the life cycle which takes place in the cavity of stomach in mosquito- **Gametogony, fertilization.**
- The part of life cycle which takes place on the crop of mosquito is - **Sporogony**
- The encysted, and round zygotes on the wall of the crop are called - **oocysts.**
- The cyst is secreted by **- Zygote**
- The scientist who observed that the of oocyst nucleus undergoes one reduction division and subsequent mitotic divisions - **Bano (1959)**
- In distinct cytoplasmic masses containg bits of nuclei - **sporoblasts.**
- The cyst with sporoblast is called - **Sporocyst**
- Sporoblasts are formed into **- Sporozoites.**
- Formation of sporozoite from sporoblasts is called- **sporulation**
- The sporozoites are first released into the- **Haemocoel**

- The number of sporozoites that may be present in the salivary glands of an infective mosquito - **about 2 lakhs**
- Sporozites are motile in haemocoel and majority of them reach - **Salivary glands of mosquito**
- Asexual phase alternates with sexual phase is called- **metagenesis (or) alternation of generation**
- The period to complete sexual cycle is-**10-24 days**
- Duration of life cycle in mosquito depends on - **ambient temperature.**

PATHOGENICITY:

- *P. vivax* causes - **benign tertian malaria.**
- Clinical features of malaria -
  i) Febrile paroxyms. (bouts of fever)
  ii) Anaemia
  iii) Splenomegaly (enlargement of spleen)
- Febrile paroxysms include - 3 stages
  i) Cold stage - **Chill, headache and giddiness.**
  ii) Hot stage - **body temperature raising upto 106°F, increased breathing rate and pulse rate.**
  iii) Sweating stage - **profuse sweating and the tem perature recedes to normal.**
- The macrometacryptozoites that may survive for long periods in liver as dormant stages - **Hypnozoites.**
- Reactivation of hypnozoites leads to - **initiation of fresh erythrocytic cycles (relapse of malaria).**
- Duration of malaria fever - **6 to 10 hours.**
- Tertian fever means **- fever that recurs every third day.**
- Benign means **- less dangerous.**

Prevention:

- The larvicidal fish grown in ponds and fields to eat away mosquito larvae is -***Gambusia affinis***
- The insectivorous plant grown in ponds for the elimination of mosquito larvae is-***Utricularia***
- Insecticides used to kill the larval forms are - **BHC, DDT etc.,**
- Fumigation in human dewellings etc.to avoid mosquitoe bites
- Chemicals sprayed on stagnant water is - **Pyrethrum oil and kerosene.**

Question Bank

Plasmodium vivax

INTRODUCTION

LEVEL -I

156. *Plasmodium* belongs to which phylum?
1. Sarco mastigophora 2. Cnidospora
3. Apicomplexa 4. Porifera

157. *Plasmodium vivax* belongs to this class
1. Telosporea 2. Sporozoa
3. Coccidia 4. Protozoa

158. Father of malariology
1. Ronald Ross 2. Patrick Manson
3. Charles Laveran 4. Camillo Golgi

159. Complete life cycle of *Plasmodium vivax* in female *Anopheles* mosquito was described by
1. Grassi 2. Shortt and Garnham
3. Ronald Ross 4. Manson

160. Intracellular parasite in the blood of man
1. *Eimeria* 2. *Gregarina*
3. *Monocystis* 4. *Plasmodium*

161. *Plasmodium* is
1. Monoxenous parasite 2. Intracellular parasite
3. Facultative parasite 4. Hyperparasite

162. Who first discovered the malarial parasite in the blood of the patient?
1. Sir Patric Manson 2. Richard Pfeiffer
3. Charles Laveran 4. Ronald Ross

163. The life cycle of *Plasmodium* in the RBC of man was described by
1. Manson 2. Golgi
3. Ronald Ross 4. Richard Pfeiffer

164. A detailed monograph on *P.vivax* was published by
1. Ronald Ross 2. Macculoch
3. Golgi 4.Garnham

165. Malaria day is celebrated on
1. 15th August 2. 20th August
3. 6th June 4. 16th June

166. Who first discovered the oocysts of *Plasmodium* on the stomach wall of female Anopheles?
1. Golgi 2. Laveran
3. Grassi 4. Ronald Ross

167. Who described the life cycle of *Plasmodium*, in the stomach wall of female *Anopheles*?
1. Ronald Ross 2. Golgi
3. Grassi 4. Charles laveran

168. Who reported that the sprozoites enter the liver cells from the blood within half an hour after infection
1. Grassi 2. Charles Laveran
3. Shortt and Garnham 4. Ronald Ross:

169. When the cause of malaria was not known it was supposed to be caused by
1. Dirty water 2. Harmful vapours
3. Mosquito 4. Housefly

LEVEL -II

170. Study the following statements
I. Lavern for the first time observed the *Plasmo dium* in the RBC of malarial patient

II. Ross described the complete life cycle of *Plasmodium vivax* in the female *Anopheles* mosquito
III. A detailed monograph on *Plasmodium vivax* was published by Garnham
IV. Shortt and Garnham reported that within half an hour the sporozoites enter the RBC from liver cells
In the above
1)All are wrong 2)All except I are wrong
3)All except III are wrong
4)All except IV are wrong

STRUCTURE OF A SPOROZOITE
LEVEL -I

171. Shape of sporozoite is
1. Sickle shape 2. Dumbell shape
3. Cylindrical 4. Irregular
172. Sporozoite is covered by
1. Plasma lemma 2. Elastic pellicle
3. Non elastic pellicle 4. Thick cuticle
173. Infective stage of plasmodium to man
1. Merozoite 2. Sporozoite
3. Trophozoite 4. Gametocyte
174. What is the status of the nucleus present in the sporozoite of plasmodium?
1. Haploid 2. Diploid
3. Triploid 4. Polyploid
175. The number of layers in the pellicle of *Plasmodium*
1. 2 2. 3
3. 6 4. 8
176. The stage of *Plasmodium* which has apical cup and
paired secretory organelles
1.Sporozoite 2. Schizont
3. Gametocyte 4. Ookinete
177. Which cell organelles of the sporozoite release cytolytic enzyme?
1. Mitochondria
2. Pellicle
3. Paired secretory organelles
4. Convoluted tubules
178. The stage of *Plasmodium* which has convoluted tubules in its pellicle
1. Sporozoite 2. Schizont
3. Gametocyte 4. Ookinete
179. Wriggling movements of sporozoite of *Plasmodium* are due to
1. Convuluted tubules
2. Longitudinal microtubules
3. Transverse microtubules
4. Myonemes
180. The definitive host of *Plasmodium* is
1. Man 2.Female Anopheles
3. Aedes 4. Female Culex
181. Secondary host of *Plasmodium* is
1. Man 2. Female anopheles
3. Aedes 4. Female culex

LEVEL -II

182. S): Sporozoite of *Plasmodium* shows wriggling movement
R): Microtubules of sporozoite are helpful in wriggting movement
183. S): *Plasmodium* sporozoite penetrates the liver cells
R): Sporozoite possess secretory organelles which secretes cytolytic enzymes helps in penetration

EXOERYTHROCYTIC GENERATION
LEVEL -I

184. Who described that the sporozoites of *Plasmodium*, soon after entering man, penetrate the liver cells with in 30 minutes?
1. Garnham and Shortt 2. Grassi
3. Ronald Ross 4. Macculoch
185. Which of the following stages are released at the end of pre-erythrocytic cycle of *Plasmodium*?
1. Micro-metacry ptozoites
2. Cryptozoites
3. Metacryptomerozoites
4. Erythrocytic merozoites
186. Which of the following stages are also called phanerozoites?
1. Sporozoites 2. Metacryptozoites
3. Cryptozoites 4. Gamont stages
187. The scientists who first studied the pre-erythrocytic and exoerythrocytic cycles of *Plasmodium* in man are
1. Shortt and Garnham 2. Laveran and Golgi
3. Ross and Manson 4. Pfeiffer and King
188. Micrometacryptozoites and
macrometacryptozoites are produced at the end of
1. Cycle of Golgi 2. Cycle in mosquito
3. Pre-erythrocytic cycle
4. Exo-erythrocytic cycle
189. Duration of preerythrocytic cycle
1) 2 days 2) 8 days
3) 10 - 20 days 4) 12 days
190. The Cryptozoite and Metacryptozoites feed on
1. Liver cells 2. RBC
3. WBC 4. Blood

191. The asexual reproduction of *Plasmodium* in man, is also known as
1.Sporogony 2. Gametogony
3. Schizogony 4. Sporulation

ERYTHROCYTIC SCHIZOGONY OR GOLGI CYCLE
LEVEL -I

192. Which one of the following is known as cycle of Golgi?
1. Pre-erythrocytic cycle
2. Exo-erythrocytic cycle
3. Erythrocytic cycle
4. Sporogony

193. In *Plasmodium vivax* the stages which start erythrocytic cycle
1.Cryptozoites
2. Micrometacrytozoites
3. Trophozoites
4. Cryptozoites and Micrometacryptozoites

194. Nutritive stage of *Plasmodium* is
1. Sporozoite 2. Trophozoite
3. Schizont 4. Rosette stage

195. Trophozoite of Golgi cycle feeds on
1. Haematin 2. Haemoglobin
3. Liver cell 4. Whole RBC

196. In the erythocytic cycle of *Plasmodium*, the stage after the signet ring is
1. Schizont 2. Amoebula
3. Rosette 4. Merozoite

197. Dormant stage of *Plasmodium*
1.Sporozoite 2. Hypnozoite
3. Amoebula 4. Signet ring

198. Which of the following substance causes malaria fever?
1. Haemozoin 2. Haemolysin
3. Schuffner's dots 4. Haemoglobin

199. The colour of haemozoin in *P.vivax* is
1. Brown 2. Black
3. Yellow 4. Red

200. Malarial toxin haemozoin is derived.from
1. Globin of haemoglobin
2. Haematin of haemoglobin
3. Whole haemoglobin
4. Haemosporidin

201. These are considered as. "antigens" secreted by malarial parasite.
1. Schuffner's dots 2. Haemoxin granules
3. Volutin granules 4. Haemolysin granules

202. The sequence of asexual lifecycle of *Plasmodium* in man
1. Erythrocytic, Pre erythrocytic, Exo - erythrocytic cycle
2. Exo - erythrocytic, Pre - erythrocytic, Endo-erythrocytic cycle
3. Pre - erythrocytic, Exo - erythrocytic, Endo - erythrocytic cycle
4. Pre - erythrocytic, Endo - erythrocytic, Exo - erythrocytic cycle

203. Which of the following stage is absent in the erythrocytic cycle of *Plasmodium vivax*?
1. Amoebula stage 2. Signet-ring stage
3. Ookinete stage 4. Schizont

204. Schuffner's dots are present in
1. *Entamoeba*
2. *Balantidium*
3. Schizont stage of *Plasmodium*
4. Ookinite stage of *Plasmodium*

205. Haemozoin is released into blood during the infection of *Plasmodium vivax* for every (EAMCET 2005):
1) 24 Hrs 2) 48 Hrs
3) 72 Hrs 4) 12 Hrs

206. In Gogi cycle the trophozoite feeds on
1) The liver cell
2)The nucleus of RBC
3) The cytoplasm of RBC
4)The haemoglobin of RBC

207. In *Plasmodium* the digested haematin forms the characteristic brown colored
1) Schuffner's dots 2) Haemozoin granules
3) Maurer's dots 4) Haemolysin

208. The symptoms of malaria are bacause of
1) Schuffner's dots 2) Haemozoin
3) Sporozoite 4) Signet ring stage

209 In tertian malaria fever recurs
1) After every third day
2) Fever recurs on every second day
3) After every 48 hours
4) After every 72 hours

210 The time interval between the entry of sporozoites into the body and the on set of malraial fever is called
1) The prepatent period
2)The latent period
3) The gestation period
4) The incubation period

211 The incubation period of *Plasmodium vivax* is
1) 8 days 2) 10-14 days
3) 48 hours 4) 3 days

212 Certain stages of *Plasmodium vivax* may survive for a long period in the liver of man as dormant stages and on reactivation enter into one of the following cycles :(EAMCET 2008)

1) Erythrocytic schizogony
2) Exoerythrocytic schizogony
3) Cycle of Ross
4) Gametogony

LEVEL -II

213. Match the following regarding Plasmodium

Stage	Description
A. Sporozoite	I. With a vacuole
B. Schizont	II With apical sucker
C. Signet ring stage	III With pseudopodia
D. Amoeboid stage	IV With food laden cytoplasm
	V. Multinucleate

	A	B	C	D
1)	II	V	I	III
2)	II	IV	I	III
3)	II	V	IV	III
4)	III	V	I	IV

214. Study the following statements.
I. Schuffner's dots are the antigens excreted by *Plasmodium.*
II.The globin digested by the trophozoite of Golgic cycle forms the brown colored haemozoin granules.
III. Haemozoin causes the symptoms of malaria.
IV. In *Plasmodium vivax* haemozoin is released into the blood every 48 Hours along with the merozoites after the completion of Golgi cycle.
Identify the correct statements
1) I, II, III, IV 2) All except II
3) All except III 4) All except IV

215. S): In *Plasmodium* the prepatent period donot shows any symptorm of the disease
R): During prepatent period toxic substance not released

GAMETOGONY

LEVEL -I

216. Small sized gametocytes with large nucleus and small clear cytoplasm formed in the life cycle of *Plasmodium* are
1. Microgametocytes 2. Male gametocytes
3. Macrogametocytes
4. Micro & Male gametocytes

217. Large sized gametocytes with small nucleus and large yolk laden cytoplasm formed in the life cycle of *Plasmodium*
1. Marco gametocytes 2. Female gametocytes
3. Male gametocyte
4.Macro & Female gametocytes

218. Maturation of gametocytes of *Plasmodium* takes place in
1. Spleen and bone marrow of man
2. Blood of mosquito
3. Kidneys of man
4. liver of man

219. All stages of *Plasmodium* are digested in the alimentary canal of mosquito except or the stage that survives in the stomach of mosquito are
1. Gametocytes 2. Sporozoites
3. Erythrocytic merozoites
4. Rosette stage

LEVEL -II

220. Study the following statements regarding the gametocytes of *Plasmodium vivax*
I. Production of gametocytes is called game togony
II. In spleen and bone marrow maturation of gametocytes takes place
III. Gametocytes are sexual stages and dimorphic
IV. The gametocytes undergo further develop ment only the stomach of male *Anopheles* mosquito
Identify the correct statements
1)I, II and III 2)II, III and IV
3)I, III and IV 4)I, II, III, IV

221. Match the following and select the correct combination regarding *Plasmodium*

A) Macrogametocyte	I) Formation of generation merozoites
B) Macrometacryptozoite	II) Forms male gamete
C) Microgametocyte	III) Forms female gamete
D) Micrometacryptozoite	IV) Begins erythrocytic schizogony

1)A-II. B-I, C-III, D-IV
2)A-III, B-IV, C-II, D-I
3)A-III, B-I, C-II,D-IV
4)A-II, B-IV, C-III, D-I

222. S): Gametogony of *Plasmodium vivax* occurs in the gut of female *Anopheles* mosquito
R): The pH of the digestive fluid and thebody temperature of the female *Anopheles* mosquito are favourable for the further development of the gametocytes of *Plasmodium*

223. S): Sexual stages of *Plasmodium* exhibit dimorphism
R): Gametocytes of *Plasmodium* are of two kinds, macrogametocytes and microgametocytes

MOSQUITO PHASE

LEVEL -I

224. During the gametogony of *Plasmodium*, the separation of male gametes by their lashing movements is known as
1. Ex - flagellation 2. Syngamy
3. Sporogony 4. Anisogamy

225. Reduction division in the life cycle of *Plasmodium* occurs in
1. Ookinete 2. Oocyst
3. Gametocyte 4. Sporocyst

226. End products of gametogony are known as
1. Merozoites 2. Gametes
3. Sporozoites 4. Merogametes

227. During gametogony the nucleus of male gametocyte divides into 8 daughter haploid nuclei by
1. Meiosis 2. Mitosis
3. Amitosis 4. Unequal meiosis

228. The diploid stage, in the life cycle of *Plasmodium* is
1. Zygote, Vermicule, Schizont, Oocyst
2. Zygote, Vermicule, Ookinete, Oocyst
3. Zygote, Ookinete, Cryptozoite
4. Zygote, Sporozoite, Merozoite

229. In the life cycle of *Plasmodium* the round and non- motile zygote transforms into long slender vermiform, motile structure known as
1. Ookinete
2. Vermicule
3. Ovum
4. Ookinete and vermicule

LEVEL -II

230. S):*Plasmodium* shows alternation of generations.
R): The life cycle of *Plasmodium* alternates reguarly between the mosquito and man.

231. S)In *Plasmodium* gametes are not produced by meiosis
R) In *Plasmodium* gametocytes forming this gametes
are haploid

232. Study the following statements regarding the formation of gametes in *Plasmodium*
I. Male gametes are formebyexflagellationprocess.
II. First nuclear division in the male gametocyte is reduction division.
III. The female gamete is formed by meiosis
IV. Lashing microgamete penetrates. into the macrogamete through the fertilization cone.
Identify the correct statements
1) I and III 2) I and IV
3) II and III 4) I, II and IV

FERTILIZATION

LEVEL -I

233. The fusing gametes are dissimilar in *Plasmodium,* so this fusion is called
1. Isogamy 2. Autogamy
3. Merogamy 4. Anisogamy

234. The place of fertilization in *Plasmodium*
1. The wall of stomach of female mosquito
2. The lumen of stomach of male mosquito
3. The lumen of stomach of female mosquito
4. The wall of stomach of female mosquito

LEVEL -II

235. S): Fusion of gametes in *Plasmodium* is anisogamy
R): In *Plasmodium* the fusing gametes are dissimilar

SPOROGONY

LEVEL -I

236. Ookinete-stage of *Plasmodium* penetrates and settles on the outerside of the stomach wall and developes into
1. Vermicule 2. Ookinete
3. Sporoblast 4. Sporocyst

237. The cyst around the ookinete is secreted by
1. Partly by ookinete and partly derived from stomach wall
2. Completely secreted by ookinete
3. Completeiy derived from the stomach wall
4. Completely derived from the coelomic fiuid

238. According to Bano the cell divisions in oocyst of Malarial parasite are
1. First Mitosis and next meiosis
2. First meiosis and later mitosis
3. All are mitosis only
4. All are meiotic divisions

239. Which of the following stages are present on the stomach wall of female *Anopheles*?
1. Ookinete 2. Gametocyte
3. Gamont 4. Sporont or oocyst

240 Which one of the following stages of *Plasmodium* is present in the lumen of stomach of mosquito
1. Sporozoite 2. Merozoite

3. Ookinete 4. Crypto Merozoite

241. The number of sporozoites formed from each oocyst of *Plasmodium* approximately is
1.10 2.100
3. 1000 4. Many thousands

242. All stages of *Plasmodium* are haploid except
1. Gametocytes 2. Ookinete
3. Sporozoite 4. Merozoite

243. End products of sporogony are known as
1. Merozoites 2. Gametes
3. Sporozoites 4. Merogametes

LEVEL -II

244. S) Meiosis or reduction division does not occur during gamete formation in the life cycle of P.*vivax*
R) : Most of the stages in the life cycle of *Plasmodium vivax* including gametocytes are haploid in nature

245. Study the following
I. Motile zygote of *Plasmodium* is called ookinete
II. Encysted zygote of *Plasmodium* is called oocyst
III. Cysts of *Plasmoidum* containing sporoblasts are called sporocysts
IV. The multiple fission in mosquito is called schizogony
Identify the correct statements
1) I, II and IV 2) II, III and IV
3) I, II and III 4) I, II, III, IV

246. Following are the stages of *Plasmodium* seen in Ross cycle.Arrange them in correct sequential order
A) Ookinete B) Exflagellation C) Meiosis
D) Oocyst E) Sporocyst
1)A-B-C-D-E 2)E-D-C-B-A
3)B-A-D-C-E 4)B-A-C-D-E

247. S): Female *Anopheles* mosquito is considered as the primary host for *Plasmodium*
R): Sexual phase of the life cycle is completed in the mosquito

PATHOGENICITY
LEVEL -I

248. *Plasmodium vivax* causes
1. Benign malignant malaria
2. Benign tertian malaria
3. Acute malignant malaria
4. Malignant quartnery fecer

249. Chills, headache, and giddiness are seen in this stage of malaria
1. Cold stage 2. Hot stage
3. Sweating stage 4. Final stage

250. In malaria highfever, increased breathing rate and pulse rate are the symptoms of
1. First stage 2. Cold stage
3. Hot stage 4. Sweating stage

251. Final stage in the febrile paraxysom of malaria
1. Cold stage 2. Hot stage
3. Sweating stage 4. Spleenomegaly

252. The dormant stage of *Plasmodium vivax* in liver
1. Cryptozoites 2. Gametocytes
3. Hypnozoites 4. Metacryptozoites

253. Relapse of malaria is due to the reactivation of
1. Hypnozoites 2. Cryptozoites
3. Merozoites 4. Metacryptozoites

254. Reactivation of hypnozoites leads to initiation of fresh
1. Exoerythrocytic schizogony
2. Preerythrocytic generation
3. Exoerythrocytic generation
4. Erythrocytic cycle

LEVEL - II

255. Study the following regarding the pathogenicity of *Plasmodium vivax*
I. *Plasmodium vivax* causes malignant tertian malaria in which fever recurs after intervals of 48 hours
II. Clinical features of malaria include series of febrile paroxysms followed by anemia and splenomegaly
III. A bout of fever includes cold stage, hot stage and sweating stage
IV. Increased pulse rate and breathing rate are noticed in the sweating srage
In the above
1) II and III are correct
2) II, III, and IV are correct
3) I,III and IV are correct
4) I, II, III, IV are correct

256. S): The malaria caused by *Plasmodium vivax i*s benign tertian malaria
R): In the malaria caused by *Plasmodium vivax* fever recurs after intervals of 48 hours and it is less dangerous

257. S): *Plasmodium* causes a disease Malaria
R): *Plasmodium* releases a toxic substance Haemozoin

258. Match the following

List I	List II
A) Prepatent period	I) No symptoms
B) Hot stage	II) Splenomegaly and anaemia
C) Cold stage	III) Temperature recedes to normal
D) Sweating stage	IV) Headache and giddiness
	V) Increased breathing rate and pulse rate

1.A-II, B-III, C-V, D-I
2.A-I, B-V, C-IV, D-III
3.A-I, B-V, C-IV, D-II
4.A-II, B-V, C-I, D-III

PREVENTION

LEVEL -I

259. Fumigation in human dwellings and repellents are recommended to
1. Kill mosquitoes
2. Kill mosquito larvae
3. Avoid mosquito bites
4. Prevent reproduction in mosquitoes

260. In the biological control of mosquito this is used
1. Kerosene 2. Pyrethrum oil
3. Gambusia 4. DDT

LEVEL -II

261. I. Fumigation in human dwellings is adopted to kill the mosquitoes
II. Use of mosquito nets is the safest method to avoid mosquito bites
III. Larvivorous fish *Gambusia i*s used in biological control of mosquitoes
IV. Repellents are used to avoid mosquito bites
V. Spraying of pyrethrum oil on stagnant waters is recommended to kill the mosquito larvae
Which of the above are not applicable for controlling mosquitoes
1)I, III and V 2.II and IV
3)I, III and IV 4. II, III, IV and V.

Taenia solium

- Phylum : Platyhelminthes
- Class : Cestoda
- The common cestode parasite of man - ***Taenia solium*** **(Pork tape worm)**
- The beef tapeworm in which hooks are absent in the scolex - **T*aenia saginata.***
- Common name- **Pork tapeworm (or) Armed tapeworm**
- Taenia solium **- Heteroxenous parasite.**
- Primary host - **Man**
- Secondary host (or) intermediate host- **Pig (*Sus scrofa)***
- It is a coelozoic parasite living the small intestine of- **Man**
- When present in the intestine, it causes- **Taeniasis**
- Due to the infection of *Taenia solium,* host gets either a complete or partial immunity. This phenomenon is called **- Premunition.**
- Beef tape worm - ***Taenia saginata***
- Hooks are absent in - ***Taenia saginata***
- Intermediate host for Beef tapeworm - **cattle**

EXTERNAL CHARACTERS:

- Normal length - **2 to 4 meters**
- Body parts - **scolex, neck, strobila**
- Pear shaped, anterior most part of the body - **scolex**
- The scolex as a whole is useful to attach to the mucus membrane of host intestine, hence called- **Hold fast organ**
- Conical and muscular structure present at the anterior most part of scolex is- **Rostellum**
- The number of movable hooks present below the level of rostellum - **22 to 32 (in two circlets)**
- The hooks are made of - **Chitin**
- The number of suckers present below the level of hooks - **Four**
- The suckers possess only - **Circular muscles**
- Due to the presence of rostellum, hooks and suckers, it is called - **Armed Tapeworm**
- Narrow short unsegmented region **- Neck**
- New proglottids are formed from the posterior part of the neck - **Zone of segmentation (or) Growth Zone (or) Zone of Proliferation (or) Budding Zone**
- The method by which new proglottids are formed is called - **Strobilization**
- The ribbon like part of the body is called - **Strobila**
- The strobila is formed of about - **800-900 proglottids**
- The division of the body into proglottids is called - **Pseudo metamerism**
- In the tapeworms young proglottids are present at the anterior part of the body while the older ones near the posterior part.
- In Annelida and Arthropoda young segments are present at the posterior part of the body, while the older segments are present at the anterior end of the body.
- The first 200 proglottids are wider than their length, do not possess reproductive organs. They are called- **Immature Proglottids**

- The middle 450 proglottids are squarish and possess well developed reproductive organs. They are called - **Mature Proglottids**
- About 250 proglottids in the posterior end of the strobila are more longer than their width, almost all the organs except uterus are degenerated in them. They are called - **Gravid proglottids**
- In the chain like formation of strobila, the proglottids are tightly attached to one other with the help of - **Longitudinal excretory canals and nerve cords**
- The surface of the proglottids to which male reproductive system is nearer is called - **Dorsal surface**
- The symmetry of tapeworm is - **Bilateral symmetry except scolex.**
- The shedding of gravid proglottids from the posterior part of the body is called **- Apolysis**

Uses of Apolysis:

- Provides a chance for the gravid proglottids with onchospheres to reach pig
- Maintains constant length of strobila

BODY WALL :

- The protective membrane around the proglottid is - **Tegument**
- The living cytoplasmic layer in syncytial condition containing Mitochondria, Lysosomes and ER is called -**Tegument**
- Tegument is secreted by **- tegument secretory cells.**
- Function of microtriches and pores present on the outer surface of the tegument - **absorption of pre digested food from the host.**
- Tegumentary musculature - **Outer circular and in ner longitudinal muscles**
- The parenchymal musculature consists of - **Longitudinal, Circular and Dorsoventral muscles.**
- The space around internal organs of the proglottid are filled with - **Parenchyma**
- Mesenchyma is differentiated into tegument forming cells, parenchyma, flame cells and muscles.
- Parenchyma is a syncitial net work formed by - branched mesenchymal cells.
- Tapeworm does not possess coelom. Hence it is - **Acoelomate**
- Parenchyma helps in - t**ransport of substances to the tissues and provides packing material for internal organs.**
- Each proglottid contains - **excretory canals and nerve cords laterally.**

ORGANS IN A MATURE PROGLOTTID:

- *T.solium* is hermophrodite and shows- **protandry**
- Testes - **numerous and scattered in the anterodorsal part of the proglottid.**
- Vas efferens - **a delicate tube arising from each testis.**
- Vas deferens - **a large tube formed by the union of all vasa efferentia**.
- Vas deferens ends as - **muscular copulatory structure called cirrus.**
- Cirrus opens into - **genital atrium which inturn opens out through gonopore.**
- The sequential route for the passage of sperms in *T. solium* - **testes - vasa efferentia - vas deferens - cirrus - genital atrium**.
- Each proglottid contains a large bilobed ovary in the **postero - ventral part.**
- The two lobes of the ovary are connected by **- isthmus.**
- Common oviduct **- arise from the isthmus and opents into ootype.**
- The oviduct is connected to genital atrium through **- Vagina.**
- Function of vitelline gland - **produce yolk cells**.
- Unicellular glands surrounding the ootype **- Mehlis lands.**
- Passage of capsules into uterus is lubricated by **- Mehlis glands.**
- Blind sac like structure opening into the ootype **- Uterus**
- Uterus stores **- fertilized eggs.**
- The excretory cells present in the mesenchyma and open into lateral longitudinal excretory canals are- **Flame cells (or) Protonephridia.**
- The chief function of flame cells in tapeworms is - **Osmoregulation (also useful in excretion).**
- In immature proglottids reproductive organs are - absent.
- Mature proglottids exhibit - **Protandry**

FERTILIZATION

- Fertilization takes place in - **Ootype**
- The shelled zygote is called - **Capsule**
- Each capsule contains - **One zygote and one yolk cell or vitelline cell and shell.**
- Shell is secreted by - **vitelline cell**.
- A proglottid containing 7 to 14 lateral branched uterus with capsules is called - **Gravid proglottid**
- Development upto the formation of "onchospheres" takes place in - **Man**

LIFE CYCLE IN MAN :

- Shelled zygotes are called - **Capsules**
- Each capsule has - **one zygote cell, one yolk cell or vitelline cell and shell.**
- The zygote divides into two unequal cells - **Larger one is "Megamere, Smaller one is "Embry-**

onic cell"

- The embryonic cell divides unequally into "Mesomere" and a "Micromere"
- The micromere divide repeatedly and form a ball of cells called - **Morula**
- The mesomere divide repeatedly and form an **inner embryonic membrane or - Embryophore**
- The embryophore later secrete an inner -**Basement membrane**
- The megamere forms the- **Outer embryonic membrane**
- Vitelline cell supplies nutritive materials for- **Embryo Onchoblasts of morula secretes - 3 pairs of chitinius hooks.**
- The six hooked embryo is called - **Hexacanth**
- A pair of penetration glands present in - **Hexacanth**
- The hexacanth surrounded by - **two embryonic membranes is called - "Onchosphere"**
- The number of capsules (or) shelled zygotes present in the branched uterus of a gravid proglottid are - **30,000 - 40,000**
- At the time of Apolysis, the gravid proglottids contain - **Onchospheres**
- Gravid proglottids in group of five or six will be separated from the strobila and expelled out by a process called - **Apolysis**

LIFE CYCLE IN PIG: (S*us scrofa*)

- Infective stages to the pig are - **Onchospheres**
- In the pig onchospheres are released into -**stomach**
- Shell and the embryophore are dissolved and the hexacanth larvae are get free in - **duodenum.**
- Hexacanth larvae attaches to the mucous layer of the intestine with the help of - **hooks.**
- Hexacanth penetrates through the wall of the intestine with the help of the secretions of - **"Paired Penetration glands"**
- Hexacanths reaches liver, heart through the - **Hepatic portal vein**
- The Hexacanth settles in the voluntary or striped muscles of- tongue, neck, elbows and limbs of the pig
- Hexacanth sometimes may also enter organs like- lungs, eyes, kidney, brain and other organs
- The sequence of the passage of hexacanth from the intestine to the voluntary muscles of the pig - **Intestine** $\xrightarrow{\text{hepati portal vein}}$ **Liver** $\xrightarrow{\text{post caval vein}}$ **Heart** $\rightarrow$ **Voluntary muscles.**
- Hexcanth loses its hooks in the- **"Voluntary muscles of Pig"**
- The hookless hexacanth in the voluntary muscles of the pig develops into - **"a bladder worm" or Cysticercus larva (metacestode phage)**
- Cysticercus has 2 layers - **outer cuticle - inner - Germinal layer or mesenchymal layer.**
- The fluid in the cysticercus is- **plasma of the Host (Pig)**
- The invaginated part of the bladder on which rostellum, hooks and suckers developed is called- **Proscolex**
- The embryo with 'proscolex' is called - **Cysticercus larva or Bladder worm (or) *Cystecercus cellulosae***
- The time taken by Hexacanth to transform into cysticercus is - **10 days**
- The pork containing cysticercus larvae shows light brown patches and it is called- **"Measly pork"**

INFECTION

- Dormant stage in the life cycle of Tapeworm is - **Cysticercus larva**
- The viability of cysticercus cellulosae in the pig muscles is - **5-6 years**
- Entry into fresh human host takes place through - **improperly cooked measly pork (or) contami nated food**
- Fibrous capsule of the bladder is dissolved in **- the stomach of man.**
- Evagination of proscolex into scolex takes place in **- intestine of man.**
- The bladder worm develops into adult Tape worm within **- 2 to 3 months.**

PARASITIC ADAPTATIONS

- Absence of digestive system
- . Presence of an enzyme resistant tegument
- Presence of hooks and suckers for attachment to host tissues
- Presence of complex reproductive organs

PATHOGENICITY:

- Taenia solium causes two diseases these are **1. Taeniasis, 2. Cysticercosis**
- Cysticercosis symptoms are **(a) Necrosis in the**

Brain (b) Epilepsy is most common manifestation.

- Cysticercosis may be caused due to **- autoinfection or heteroinfection.**
- Autoinfection includes **- retroinfection and digital infection**
- Retroinfection **- in this method gravid proglottids are pushed back into the stomach due to re verse peristalisis.**
- Heteroinfection **- in this method onchospheres may infect non pork eaters through contamination of food and water.**
- Symptoms of Taeniasis are - **Pain in Stomach Anaemia, Vomiting, Giddiness, Indigestion Eosinophilia**

Question Bank

Taenia solium

EXTERNAL CHARACTERS

LEVEL -I

262. *Taenia solium* belongs to which class?
1. Cestoda 2. Nematoda
3.Turbellaria 4.Trematoda

263.Pork tapeworm is
1. *T. solium* 2. *T. saginata*
3. *Fasciola* 4. *Wuchereria*

264.Beef tapeworm is
1. *T. solium* 2. *T. saginata*
3. *Fasciola* 4. *Wuchereria*

265.Hooks are absent in the scolex of
1. *T. solium* 2. *T. saginata*
3. *Fasciola* 4. *Wuchereria*

266. Intermediate host of *T. saginata*
1.Pig 2. Cattle
3. Fish 4. Dog

267. *Taenia solium* is
1. Dorsoventrally compressed and ribbon like
2. Laterally compressed
3. Cylindrical
4. Leaf like

268. Colour of *Taenia solium*
1. Cream colour 2. Green colour
3. Blue colour 4. Brown colour

269. Shape of scolex of *Taenia solium* is
1. Pear shape 2. Pyramid shape
3. Bell shape 4. Urn shape

270. The median prominence of scolex is
1. Apical lobe 2. Rostellum
3, Dorsal lip 4. Buccal capsule

271. Hooks in T*aenia solium* are
1. 22 to 32 chitinous hooks in two rows
2. 20 chitinous hooks in two rows
3. 30 chitinous hooks In one row
4. 25 chitinous hooks in two rows

272. Hold fast organ of tapeworm is
1. Strobila 2. Neck
3. Scolex 4. Penis

273. The scolex of *Taenia solium* attaches to the intestinal wall of human being with the help of
1. Hooks 2. Rostellum
3. Sucker
4. Rostellum, hooks & suckers

274. Suckers in the scolex of T*aenia solium* are
1. 4 2. 3
3. 2 4. Absent

275. Muscles associated with suckers / acetabulae
1. Longitudinal 2. Circular
3. Dorsoventral 4. Abductar

276. Scolex of tapeworm is not considered as head because
1. Mouth and sense organs are absent
2. Brain is absent
3. Brain and nerves are absent
4. Brain and mouth are absent

277. Symmetry in scolex of tapeworm is
1. Bilateral 2. Radial
3. Biradial 4. Asymmetrical

278. Neck in tapeworm is
1. Budding zone 2. Growth zone
3. Zone of proliferation
4.Zone of budding, growth and proliferation

279. In which part of *Taenia*, new segments are formed?
1. Scolex
2. Neck
3. Gravid proglottid region
4. Matured proglottid region

280. Which proglottids of tape worm are squarish.
1. Immature proglottids
2. Mature proglottids
3. Gravid proglottids
4. Both immature and mature proglottids

281. Immature proglottids are
1. Squarish 2. Rectangular
3. Wider than long 4. Cuboidal

282. Number of mature proglottids in *T.solium*
1. 200 2. 300
3. 450 4. 150

283. The region of strobila from 650- 900 proglottids is formed by
1. Longer than wide proglottids
2. Squarish proglottids
3. Cylindrical proglottids 4. Conical proglottids

284. The number of proglottids in the strobila of *Taenia solium is*
1. 800 2. 800-900
3. 1000 4. 600

285. The part of reproductive system which becomes - branched and occupies the entire gravid proglottid
1. Vagina 2. Ovary
3. Uterus 4. Vitelline gland

286. The specific name solium in Syrian language means
1. Chain 2. Ribbon
3. Leaf 4. None

287. The process of detachment of gravid proglottids in a batch of 5-6 from the posterior end of strobila is known as
1. Strobilation 2. Apolysis
3. Autolysis 4. Dissemination

288. Segmentation in tapeworm is known as
1. Homonomous metamerism
2. Heteronomous metamerism
3. Pseudometamerism
4. Homaxial

289. The structures that extend continuosly throughout the length of Strobila
1. Lateral nerve cords and longitudinal lateral excre tory canals
2. Dorsal excretory canals
3. Dorsal nerve cords
4. Gonoducts

290. The pocess that keeps the length of strobila constant
1. Apolysis 2. Anapolysis
3. Proglotisation 4. Metamerism

291. The reproductive organs in the first 200 proglottids are
1. Well developed 2. Degenerated
3. Not developed 4. Poorly developed

292. Segmented acoelomate animal is
1. *Fasciola* *2. Taenia*
3. Pheretima *4. Ascaris*

293. Proglottids of *Taenia solium* which are wider than long are
1. Mature 2. Immature
3. Gravid
4. All proglottids are of same dimensions

294. Youngest segment in *Taenia*
1. First immature proglottid
2. First mature proglottid
3. First gravid proglottid
4. Last gravid proglottid

LEVEL -II

295 Study the following statements regarding *Taenia*
i) Longer region in the body is strobila
ii) Large sized proglottid is gravid proglottid
iii) Large numbered proglottids are mature pro glottids
iv) Widthwise larger proglottids are immature proglottids
The correct statements are
1)I, II only 2)II, III only
3)I, II, III only 4)I, II, III, IV

296. Study the following regarding tapeworm
I. *Taenia solium* induces primunition in human beings as long as it is present in him
II. Scolex is the hold fast organ of tape worm
III. The narrow short and segmented region behind the scolex is known as the neck
IV. New segments are formed from neck and pushed backwards
In the above
1) I, II and IV are correct
2) I, II and III are correct
3) II, III and IV are correct
4) I, II, III, IV are correct

297. Study the following statements regarding apolysis of tapeworm
I. In *Taenia solium* gravid proglottides are regularly detached from the posterior end of strobila and are sent out with the faeces of the host
II. Shedding of gravid proglottides by the tapeworm is called apolysis
III. Apolysis is useful to the parasite in regulating the length of the body
IV. Apolysis is useful in transferring the gravid proglottides to theintermediate host
Identify the correct statements
1) Only I 2) Only I and II
3) Only I, II and III 4) I, II, III and IV

298 Study the following statements regarding the proglottides of tapeworm.
I. In the strobila old segments are present at the posterior end while the new segments are added at the anterior end.
II.The first 200 proglottides are unisexual proglottides as tapeworm is protandrous.
III. Squarish proglottides are mature proglotti des as they possess reproductive organs.
IV. Oldest proglottides are gravid proglottides

with laterally branched uterus filled with 30,000 to 40,000 eggs / onchospheres.
Identify the correct statements
1) All except IV 2) All except III
3) All except II 4) I, II, III, IV

299. S): Scolex is the hold fast organ of tapeworm

R): Scolex of tapeworm is attached to the wall of intestine of man with the help of hooks only

300. S): Neck is called as the zone of segmentation in tapeworms

R): In animals new segments are always produced from neck

301. S): The segmentation in tapeworms is referred to as pseudometaemerism

R): In tapeworms new proglottides are added from the neck region

302. S): The anterior 200 proglottides of *Taenia solium* are called immature proglottids

R) In the anterior 200 proglottides of *Taenia solium* reproductive organs are not developed

303. S): The genital pores are present irregularly alternate between right and left margins of mature proglottides of tapeworm

R): The alternate arrangement of genital pores facilitates the exchange of gametes among different proglottides

304 S): Though new proglottides are added continuously at the anterior end, *Taenia solium* maintains constant length of the body

R): In *Taenia solium* gravid proglottides are regularly detached from the posterior end of strobila

BODY WALL

LEVEL -I

305. This structure increases the surface area of absorption of nutritional substances in tape worm
1. Villi 2. Microtrichus
3. Typhlosole 4. Rugae

306. The muscles present in tegument (tegumentary musculature) of *T. solium* is
1. Outer circular inner longitudinal
2. Inner longitudinal, outer circular
3. Outer circular, middle oblique, inner longitudinal
4. Circular, longitudinal, Dorsoventral, oblique

307. The muscles present in the body of *T. solium* are
1. Longitudinal, circular
2. Transverse, dorsoventral
3. Longitudinal, dorsoventral
4. Longitudinal, circular or transverse & dorsoventral

308. Homeostasis in *Taenia solium* is due to
1. Parenchyma 2. Tegument
3. Lime cells 4. Flame cells

309. Protective and absorptive layer of body wall of tapeworm
1. Tegument 2. Cuticle
3. Epidermis 4. Muscle layer

310. Nature of tegument
1. Living multicellular layer
2. Living and syncytial
3. Non living and syncytial
4. Living and unilaminar layer

311. Tegument is formed by
1. Proteins and carbohydrates
2. Proteins and lipids
3. Lipids and calcium carbonate
4. Glycoproteins and calcium phosphate

312. Tegument is secreted by
1. Epidermis 2. Mesenchymal gland cells
3. Endodermal gland cells 4. Salivary glands

313. Tegumentary musculature includes
1. Outer longitudinal and inner circular muscles
2. Inner longitudinal and outer circular muscles
3. Dorsoventral muscles
4. Protractor muscles

314. In *Taenia,* the gaps between organs of progtottid are packed with
1. Parenchyma 2. Mesoglea
3. Endoderm 4. Muscles

315. Hydraulic skeleton in tapeworm
1. Coelomic fluid 2. Tegument
3. Tegument forming cells 4. Parenchyma

LEVEL - II

316 Study the following statements regarding tape worm
I. Tegument is a protective and absorptive syncytial cytoplasmic layer.
II. Tapeworm absorbs predigested food of host as alimentary canal is absent
III Tegument forming cells are a part of mesenchyme
IV. Parenchyma is a syncytial network formed by branched mesenchymal cells
Identify the correct statements
1) I, II, III, IV 2) only I and III
3) Only I, II and IV 4) Only I and IV

317. S): In *Taenia solium* the tegument increases the surface area of absorption
R): Tegument of tape worm is provided with microtrichus

318. S): *Taenia solium* is acoelomate
R): In *Taenia solium* the body cavity is occupied with mesenchyma

319 S): Tapeworm absorbs predigested food from the host with the help of tegument
R): In tapeworm the alimentary canal is absent

320 Arrange the following parts of body wall of tapeworm in a correct sequence
A) Tegument B) Microvilli C) Circular musclesD) Basement membrane E) Longitudinal muscles
1) B-A-D-E-C 2) B-A-D-C-E
3) A-B-D-C-E 4) A-B-C-E-D

321. Match the following of tapeworm and select the correct combination

List I	List II
A. Tegument	I Syncytial cytoplasmic layer
B. Microvilli	II Syncytial network
C. Parenchyma	III Hydrostatic skeleton
D. Dorsoventral muscle fibres	IV Mesenchymal musculature
	V Increases the area of absorption

	A	B	C	D
1)	II	I	III	IV
2)	V	I	II	III
3)	I	V	III	IV
4)	I	V	II	III

ORGANS IN THE MATURE PROGLOTTID

LEVEL -I

322. In tapeworm minute ducts arising from the testes are
1. Spermducts 2. Vasa deferentia
3. Vasa efferentia 4. Seminal receptacles

323. In tape worm the vasa deferens opens into
1. Genital atrium 2. Sminal receptacles
3. Ootype 4. Vagina

324. Muscular copulatory organs of tapeworms
1. Cirrus 2. Clasper
3. Hemipenis 4. Psudopenis

325. In female reproductive system mature proglottid possess
1. Two ovaries 2. Two bilobed ovaries
3. One bilobed ovary 4. Many ovaries

326. In tapeworm the lobes of ovary are connected by
1. Isthmus 2. Ootype
3. Vagina 4. Common oviduct

327. Blind sac opening into the ootype
1. Vagina 2. Common oviduct
3. Vitelline duct 4. Uterus

328. Unicellular glands surrounding and opening into the ootype
1. Vitelline gland 2. Mehli's gland
3. Vitelline and Mehlis 4. Yolk glands

329. Vitelline duct opens into
1. Ootype 2. Uterus
3. Isthmus 4. Vagina

330. In tapeworm the secretions of these glands lubricate the passage of capsules into uterus
1. Cowper's glands 2. Bartholins glands
3. Mehlis glands 4. Vitelline glands

331. In tapeworms these cells open into excretory canals
1. Mehli'sgland cells 2. Renette gland cells
3. Solenocytes 4. Flame cells

332. The primary functon of flame cells
1. Excretion 2. Osmoregulation
3. Secretion 4. Protection

333. In tapeworm excretion occurs with the help of
1. Flame cells 2. Solenocytes
3. Renette cells 4. Tracheole cells

LEVEL - II

334. Study the following statements
I. Tapeworm is protandrous hermaphrodite
II. In each mature proglottid of tapeworm a large number of testes are scattered in the parenchyma
III. In each proglottid of tapeworm a bilobed ovary is present
IV. The two lobes of ovary in tapeworm are con nected by isthmus
Identify the correct statements
1)I, II, III, IV 2)I, II andIV
3)I, IIand III 4)II, III and IV

335. Arrange the following parts of female reproductive organs of tapeworm in a sequence of their involvement up to the formation of onchospheres
A) Uterus B) Vitelline gland C) Ootype
D) Mehli's gland E)Ovary
1)E-C-B-D-A 2)E-C-D-B-A
3)E-B-C-D-A 4)E-A-B-D-C

336. Arrange the following parts of male reproductive organs of tapeworm in a sequence as per the direction of conduction of speramtozoa
A) Cirrus B) Vasa deferens
C)Vasa efferentia D) Testes
1)D-B-C-A 2)D-A-B-C
3)D-C-B-A 4)D-C-A-B

337. S): In *Taenia solium* the mehli's glands are present surrounding the ootype.
R): Mehli's glands secretion helps in lubricating the capsules into uteres.

338. S): In Tapeworm the flame cells primary function is osmoregulation.
R): *Taenia solium* absorbs the already digested food.

FERTILIZATION

LEVEL -I

339.Which of the following is called cross-fertilization in tapeworm
1. Copulation between different proglottids of the same tape worm
2. Copulation between different proglottids of different tape worm
3. Sperms of one proglottid fuses with the ovum of the same proglottid
4. Copulation between mature proglottid and immature proglottid

340.Shell around the zygote and yolk cell is secreted by
1. Mehli's glands 2. Vitelline cell
3. Ootype 4. Uterus

341.Capsule in tape worm is
1. Shelled zygote 2. Unshelled zygote
3. Shelled ovum 4. Shelled embryo

342.Secretion of which glands acts as a lubricant making the passage of capsules into uterus easy
1. Penetration glands 2. Mehli's glands
3. Apical glands 4. Prostate glands

343.Lateral branches in the uterus of gravid proglottid of *Taenia solium* are
1. 15 to 18 pairs 2. 7 to 14 pairs
3. 10 to 20 pairs 4. 5 to 10 pairs

LEVEL - II

344. S): Tapeworm is protandrous
R): In tapeworms reproductive system of male worms matures earlier than the reproductive system of female worms

345. S): Tapeworm is hermaphrodite
R): Both male and female reproductive organs are well developed in all proglottides of tapeworm

346. S): Fertilization is internal in tapeworms
R): In tapeworms both self fertilization and cross fertilization occur

347. Study the following statements regarding fertilization in tapeworm
I. In tapeworm fertilization occurs in the ootheca
II Both self fertilization and cross fertilization occur in tapeworm
III In self fertilization, sperms produced in a proglottid fertilize the ova produced in the same proglottid.
IV. In cross fertilization sperms produced in a proglottid fertilize the ova produced in another mature proglottid of the same worm
Identify the correct statements
1) I, II and III 2) I, II and IV
3) II, III, and IV 4) I, II, III, IV

LIFE CYCLE IN MAN

LEVEL -I

348.Number of onchospheres likely to be stored in the uterus of gravid proglottid in Taenia solium
1. 30,000 to 40,000 2. 5,000
3. 5,00,000 4. 3,000

349.Cleavage in tape worm is
1. Holoblastic unequal 2. Holoblastic equal
3. Meroblastic equal 4. Meroblastic unequal

350.The first two cells formed in the development of tape worm are
1. Megamere and embryonic cell
2. Mesomere and mircromere
3. Megamere and micromere
4. Mesomere and embryonic cell

351.In the evelopment of Taenia solium morula is formed by
1. Micromeres 2. Mesomere
3. Megameres 4. Onchoblasts

352.Embroyophore and outer embryonic membrane around hexacanth are formed by
1. Yolk cells and megameres
2. Mesomeres and megameres
3. Yolk cells and mesomeres
4. Micromeres and mesomeres

353.Basement membrane around hexacanth is secreted by
1. Hexacanth 2. Embryophore
3. Uterus 4. Megamere

354.Six chitinous hooks of the embryo of tape worm are secreted by
1. Onchoblasts 2. Neoblasts
3. Mesoblasts 4. Myoblasts

355.Onchosphere is
1. Hexacanth with shell
2. Hexacanth with two embryonic membranes and a shell

3. Hexacanth with embryophore and shell
4. Hexacanth with two embryonic membranes

LEVEL -II

356.Study the following statements regarding the embryonic development of tapeworm
I. Morula is produced from micromeres
II. Mesomeres form outer embryonic envelope
III. Megamere divides and these cells form the inner embryonic envelope
IV. Hooks of proscolex are formed by the onchoblasts of morula
Identify the correct statements
1) I, II, III, IV 2)Only I
3)I,. II and III 4)I and IV

357.Arrange the following cells of embryonic develop ment of tapeworm in a correct sequence as per order of their appearance
A) Onchoblasts B)Zygote C) Micromeres D)Embryonic cell
1)B-D-C-A 2)B-C-D-A
3)B-C-D-A 4)B-A-D-C

358.Arrange the following parts of onchospheres of tapeworm in a correct sequence from outer to inner
A) Hexacanth B) Shell
C)Embryophore D)Outer embryonic envelop
1)D-B-C-A 2)B-D-C-A
3)B-C-D-A 4)B-A-D-C

LIFE CYCLE IN PIG

LEVEL -I

359. Infective stage of tapeworm to pig
1. Gravid proglottid 2. Onchosphere
3. Cysticercus 4. Scolex

360.The place where hexacanth is set free in the body of the pig
1) Stomach 2) Colon
3) Rectum 4) Duodenum

361.Hexacanth bores through the mucosa of intestine with the help of substance secreted by
1. 1 pair penetration glands
2. 2 pairs penetration glands
3. 2 salivary glands
4. 3 penetration glands

362.The larva which settles in the striated muscles of pig
1. Sporocyst 2. Hexacanth
3. Cercaria 4. Miracidium

363.Normally hooks of hexacanth are lost in
1. Voluntary muscles of pig
2. Voluntary muscles of man
3. Intestine of pig
4. Intestine of man

364.Dormant larva of tape worm that develops in pig
1. Cysticercus cellulosae 2. Cysticercus bovis
3. Hexacanth 4. Miracidium

365.The process of formation of proscolex in cysticercus is
1. Strobilization 2. Delamination
3. Invagination 4. Involution

366.The inverted scolex is called
1. Retroscolex 2. Proscolex
3. Mature scolex 4. immature scolex

367.Measly pork contains
1.Hexacanth 2. Onchospheres
3. Cysticerci 4. Capsules

368.The wall of bladder worm is formed by
1. Outer cuticle and inner mesenchymal layer
2. Inner cutlcle and outer mesenchymal layer
3. Inner lipid layer and outer albumen layer
4. Inner chitinous layer and outer protein layer

369.Time needed for the transformation of hexacanth into cysticercus larva in voluntary muscle of pig
1. 10 Days 2. 10 weeks
3. 15 minutes 4. 15 days

LEVEL - II

370.The hexacanth larva of Taenia reaches the striated muscles of pig passing through
a) Post caval vein b) Heart c) Liver
d) Hepatic portal vein e) Voluntary muscles
f) Intestine
Arrange the above in correct sequence
1)f-d-c-a-b-e 2)f-d-c-e-a-b
3)f-d-a-c-b-e 4)c-d-f-a-b-e

371. The following are the various parts in the body of pig traveled by the hexacanth larva
A) Voluntary muscles B) Hepatic vein
C) Heart D) Stomach
E) Hepatic portal vein F) Intestine
G) Post caval vein H) Liver
Arrange these parts in a correct path1
1)D-F-E-H-B-G-C- 2)D-F-E-B-H-G-C-A
3)F-D-E-H-B-G-C-A 4)D-F-B-E-H-G-C-A

372.S): The mature bladder worms surrounded by fibrous capsule are called cysticercus cellulosae
R): The bladder worms appear to cover by cellulosae cysts

INFECTION

LEVEL -I

373. Waiting time for cysticercus to enter man
1.5-6 years 2. 5-6. days
3. 5-6 hours 4. 5-6 months

374.Normal mode of infection of *Taenia solium* to man
1. Contamination of food
2. Polluted drinking water
3. Eating under cooked measly pork
4. By catching pigs

375.In man the bladder of bladder worm is dissolved in
1. Stomach 2. Colon
3. Duodenum 4. Small intestine

376.Time required for the formation of adult tape worm in man
1. 2 or 3 months 2. 2 to 3 days
3. 2 or 3 weeks 4. 2 to 3 years

LEVEL -II

377.S): Cysticercus larva doesnot undergo further development in the muscles of the pig
R): Cysticercus larva enter into primary host for further development

378. S): The evaginated scolex of cysticecus is called proscolex
R): Proscolex is helpful in the attachment of bladder to the voluntary muscles of pig

PARASITIC ADAPTATIONS

LEVEL -I

379.Which one compensate the absence of digestive system in tapeworm
1. Mesenchyme 2. Tegument
3. Muscles 4. Acoelonne

380.Adaptation for survival of *Taenia solium*
1. Presence of enzyme resistant tegument
2. Occurence of suckers
3. Complex reproductive system
4. Presence of tegument, suckers and complex reproductive system

LEVEL - II

381. S): Reproductive system of parasites very well developed
R): Well developed reproductive system ensures perpetuation of the species

382.The following are the parasitic adaptations
I. Digestive system is absent
II. Tegument is enzyme resistant
III Hooks and suckers are present for attaching to the host
IV Complex reproductive organs
Which of the above is/are not adaptation for perpetuation of species
1) IV 2) I and IV
3) II, III and IV 4) I, II and III

PATHOGENICITY

LEVEL -I

383.Entry of gravid proglottids from intestine to stomach of the same primary host is known as
1. Digital infection 2. Retroinfection
3. Heteroinfection 4. Reverse peristalsis

384.Reverse peristalysis is triggered by
1. Constipation
2. In man injury to intestinal wall
3. Indigestion
4. Allergy

385.Cysticercosis is more dangerous than taeniasis because
1. It causes necrosis in brain
2. It causes necrosis in muscles
3. tt causes necrosis in kidney
4. It causes necrosis in lung

386.Abdominal pain, vomitings, indigestion, eosinophilia, anaemia are the symptoms of
1. Cysticercosis 2. Trypanosomiasis
3. Taeniasis 4. Filariasis

387. Onchospheres may infect non pork eaters through
1. Digital infection 2. Retroinfection
3. Autoinfection 4. Heteroinfection

388.The stages of tapeworm which enter into human being through contaminated food
1. Adults 2. Cysticercus
3. Bladder worm 4. Onchosphere

389.Epilepsy because of
1. Formation of cysts in eyes
2. Formation of cysts in heart
3. Brain cell necrosis
4. Formation of cysts in liver

390 If gravid proglottids are pushed back into stomach of human being due to reverse peristalsis, this process is called
1. Premunition 2. Autolysis
3. Autoinfection 4. Inoculation

LEVEL -II

391. Study the following statements regarding tapeworm
I. When the scolex of tapeworm causes injury to the intestinal wall, it triggers reverse peristalsis
II. Due to reverse peristalsis autoinfection occurs
III. In autoinfection cysticercus larvae are the infective stages
IV. Cysticercosis is more dangerous than taeniasis and is seen mostly in children
Identify the correct statements
1)I, II and IV
2)I, III and IV
3)I, II and III
4)I, II, III and IV

392. Study the following statements regarding pathogenicity of tapeworm
I. Adult tapeworm causes taeniasis
II. Cysticercus larvae cause cysticercosis
III. Infection of cysticercus larvae to man cause cysticercosis
IV. Autoinfection with onchospheres results in cysticercosis
Identify the correct statements
1)I, II, III and IV 2)I, II and IV
3)I, II and III 4)II, III and IV

Wuchereria bancrofti

Phylum :Nematoda(Nemathelminthes)
Class:Phasmidia

INTRODUCTION :

- Zoological Name - ***Wuchereria bancrofti***
- Commom Name - **Filarial worm**
- Wucherer found **- the larvae of this worm in chylorus urine.**
- Lewis found **- the larvae of this worm in human blood.**
- Demarquay **- first discovered the larval form of this worm.**
- Bancroft **- found the adult female.**
- ***Wuchereria bancroft*** is named after - Wuchrer and Bancroft
- ***Wuchereria bancroft*** is a pseudocoelomate round worm
- Sir Patric Manson discovered **- female *Culex* mosquito is the vector for the parasite.**
- This parasite is common to tropical and subtropical coutries
- Filaria worm is a **- heteroxenous parasite.**
- The definitive host **- Man.**
- Intermediate host **- female *Culex* mosquito.**

STRUCTURE:

- Normal habitat - **Adult forms live in Lymph vessels and Lymph nodes of man**
- Important habit - **Male and female worms always coil round each other.**
- Mouth **- present at the anterior end of both male and female.**
- Oral lips **- absent**
- Alimentary canal includes **- mouth, pharynx, oesophagus, intestine, anus/cloaca.**

- *Wuchereria* is **- unisexual and exhibits sexual dimorphosis.**

Character	Male worm	Female worm
Size	40 mm length	65-100 mm in length
	0.1 mm diameter	0.25 mm in diameter
Posterior end	curved	straight
Cloaca	Present in curved region	absent
Anus	absent	present near the posterior end
Penial setae	Present in cloacal region	Absent
Copulatory papillae	present at the posterior end	absent
Female genital pore	absent	present at one third length of the body

LIFE CYCLE

THE HUMAN PHASE

- Males and female worms copulate **- in the lymphatic system.**
- Fertilization is **- Internal**
- Females are ovoviviparous because **- they produce eggs that hatch within the females body without obtaining nourishment from it.**
- The young ones of filarial worm are called- **Microfilariae** (released into the lymph)
- The loose envelope in the microfilariae in which it moves freely is - **the egg membrane/modified shell.**
- The length of microfilaria at the time of birth - **200 - 300 microns (0.2-0.3 mm)**
- The spine like structure present at the blunt anterior end of the larva is - **Stylet**
- Future mouth develops **- at the oral stylet.**
- The excretory cell present in the larva is - **Renette cell**
- Nerve ring is present around **- Pharynx.**

- Number of large germinal cells arranged anterior to the anal region **- Four.**
- Rudimentary alimentary canal is represented by **- darkly stained inner cell mass.**
- Openings of microfilaria **- excretory pore and anus.**
- The larvae migrate into peripheral blood vessels during night, and retreat into deeper blood vessels during day time. This migration is called- **Nocturnal periodicity**
- Nocturnal periodicity suits **- feeding habit of mosquito.**
- Further development of microfilariae occurs in **- female *Culex* mosquito.**
- Life span of microfilariae in man **- 70 days**

LIFE CYCLE IN MOSQUITO:

- Sir Patric Manson discovered that female *Culex* mosquitoes are Intermediate hosts as well as vector of - **"Filaria Worm"**
- In the midgut of the female *Culex* mosquito- **the sheath of the larva will be digested**
- The larva penetate the gut wall with the help of **- stylet.**
- The microfilaria develop further in the- **thoracic muscles of female culex**
- In the thoracic muscles the microfilaria become flat sausage shaped and it is called - **sausage shaped larve or first stage larva**
- The sausage shaped larve perform two moults and grow into **-infective stages or third stage larvae**.
- The infective stages migrate into the proboscis and wait there to enter into the - **human host**
- The infective stages migrate into the blood circulation and finally pass into the **lymph glands and lymph nodes**
- The larva perform third and fourth moults in the - **lymph vessels of the primary host**
- The fifth stage larva- **become adult in about 9 months time**
- The adult worms obstruct free flow of lymph through- **lymph nodes**

PATHOGENECITY:

- The accumulated lymph at the terminal parts of organs cause excess growth of fibrous tissue. So the organs swell and loose their shape. The condition is called- **Elephentiasis**
- Inflammation in the lymph vessels is called- **Lymphangitis**
- Inflammation in the lymph glands is called - **Lymphadentis**
- Due to obstruction to free flow of Lymph, Lymph vessels and glands show swelling. It is called- **Lymphedema**
- The net result of Lymphedema is - **Elephantiasis (or) Filariasis**
- Lymphoedema occurs in heavy infection, where microfilariae density is more than **20,000 per ml of blood.**
- Other manifestations of filariasis.

  i) **Lymphangiovarix** - dialation of lymph vessels.

  ii) **Lymphorrhage** - rupture of lymph vessels.

  iii) **Hydrocele** - accumulation of fluid due to the obstruction of spermatic cord.

  iv) **Occult filariasis** - hypersensitivity reaction to

Question Bank

Wuchereria bancrofti

INTRODUCTION

LEVEL -I

393.Filarial worm belongs to the Phylum
1. Phasmidia 2. Aphasmidia
3. Nematoda 4. Filaroidea

394.*Wuchereria* belong to this class
1. Cestoda 2. Aphasmidia
3. Phasmidia 4. Trematoda

395.*Wuchereria bancrofti* is commonly called
1. The malarial worm 2. The hookworm
3. The filarial worm 4.The pin worm

396.Larvae of *Wuchereria bancrofti* in chylorus urine are found by
1. Wucherer 2. Manson
3. Hawking 4. Bourne

397.Larvae of *Wuchereria bancrofti* in human blood are found by
1. Wucherer 2. Manson
3. Hawking 4.Lewis

398.Vector of *Wuchereria bancrofti* was discovered by
1. Augustine 2. Manson
3. Hawking 4. Bourne

399.Adult female worm was first found by
1. Bancroft 2.Wucherer
3. Lewis 4. Demarquay

400. *Wuchereria* is widely distributed in this region
1. Polar 2. Tropical
3. Sub tropical 4. Tropical and sub tropical

401. *Wuchereria* is
1. Heteroxenous parasite
2. Monoxenous parasite
3. Facultative parasite
4. Aberrant parasite

402. Female *Culex* mosquito is the intermediate host of
1. *Wuchereria bancrofti* 2. *Plasmodium vivax*
3. *Leishmania donovani* 4. *Fasciola hepatica*

403. Definitive host of filarial worm
1. Female *Culex* mosquito
2. Female *Anopheles* mosquito
3. Human being
4. *Sus scrofa*

LEVEL -II

404. The following are the statements about *Wuchereria bancrofti*
I. This parasite is common in tropical and subtropical countries
II. Manson discovered that female *Culex* mosquito is the vector for this parasite
III. It is a pseudocoelomate tapeworm
IV. It requires a blood sucking intermediate host for its transmission
Identify the correct statements
1)I, II and III 2)II, III and IV
3)I, II and IV 4)I,II and IV.

STRUCTURE

LEVEL - I

405. Male and female filarial worms live together in coiled conditon in
1. Lymph vessels of man 2. Blood of man
3. Intestine of man
4. Intestine of mosquito

406. Colour of filarial worm
1. Creamy white 2. Brown
3. Grey 4. Yellow

407. Female filarial worm can be recognised from the male worm by the absence of
1. Curved posterior end
2. Cloaca and copulator spicules
3. Copulatory papillae
4. Curved posterior end, cloaca, copulatory spicules and copulatory papillae

408. In male filarial worm cloaca is a common outlet for
1. Digestive system and excretory system
2. Reproductive system and excretory system
3. Digestive, reproductive and excretory system
4. Digestive and reproductive system

409. Number of copulatory spicules in Wuchereria is
1. 1 2. 2
3. 4 4. 3

410. Genital pore in female filarial worm was located
1. Before pharynx
2. Behind muscular pharynx
3. At the posterior end
4. Near the posterior end

411. Posterior end of the female worm is
1. Blunt 2. Curved
3. Straight 4. Blunt and curved

412. The aperture near the posterior end of male filarial worm is
1. Anus 2. Gonopore
3. Cloaca 4. Mouth

LEVEL - II

413. S): *Wuchereria bancrofti* is unisexual and exhib its sexual dimorphism
R): In *Wuchereria bancrofti* male and female reproductive organs are present in seperate individuals and male are smaller and thinner than female with curved posterior end

414. Study the following statements regarding filarial worm
I. The anterior end of the body is blunt and the posterior end is pointed
II. Mouth is present at the anterior end and is with 3 oral lips
III. The anterior part of the pharynx is glandular and the posterior part is muscular
IV. It is unisexual and exhibits sexual dimorphism
In the above
1)I and II are correct
2)I and III are correct
3)I and IV are correct
4)II, III and IV are correct

415. The following are the various parts of alimentary canal of female *Wuchereria.*
Arrange them in a correct sequence in the direction of movement of food
A).Anus B).Mouth C).Glandular part of pharynx D).Intestine E).Muscular part of pharynx
1)B-D-E-C-A 2)B-C-E-D-A
3)B-D-C-E-A 4)B-E-C-D-A

416. Match the following of *Wuchereria bancrofti* and select the correct option

Aperture	Location
I) Anus	A)In the curved region of male

II)Cloaca B)At the anterior 1/3rd of female
III)Gonophore C)Near the posterior end of female
IV) Mouth D)At the anterior end
E) At the anterior 1/3rd of male

1)I-C, II-A, III-E, IV-D
2)I-C, II-A, III-B, IV-D
3)I-A, II-E, III-B, IV-D
4)I-A, II-E, III-B, IV-D

417.The following are various apertures in *Wuchereria bancrofti*

A.Mouth B.Cloaca
C.Anus D.Gonophore

Arrange these apertures in a correct sequence from anterior end to posterior end in female

1A-D-C-B 2.B-A-D-C
3.A-D-C 4.A-D-B

LIFE CYCLE IN MAN

LEVEL - I

418.Infective larva of filarial worm to man is
1. 3 stage microfilaria
2. Second stage microfilaria
3. 4th stage microfilaria
4. First stage microfilaria

419.*Wuchereria* is known as ovo-viviparous because -
1. It prdouce eggs that hatch within the female body without obtaining nourishment from it.
2. It releases embryos
3. It delivers advanced larval stages
4. It releases unsegmented shelled zygotes

420.The loose cuticular sheath enclosing the microfilaria
1. Elongated foetal membrane
2. Transparent cuticle
3. Elongated egg shell
4. Flattened epidermal cells

421.Microfilaria has
1. Multinucleatred cytoplasm
2. Stylet at the anterior end
3. Four large cells and a renette cells
4.Stylet at anterior end, four large cells, a renette cell and multinucleated cytoplasm

422.The appearance of microfilaria in the peripheral blood between 10 pm and 4am is known as
1. Nocturnal periodicity 2. Lunar periodicity
3. Photokinesis 4. Diurnal periodicity

423.Nocturnal periodicity is performed by
1. Mocrofilaria 2. Rhabditiform larva
3. Strongyliform larva 4. Cercaria

424. Pores present in microfilaria
1) Anal and genital pores
2) Anal and excretory pores
3) Genital and excretory pores
4) Mouth and anus

425. The structure present in microfilaria where future mouth develops
1) Renette cell 2) Stylet
3) Germinal cells 4) Somatic cell mass

426.The micro filariae normally circulate at night in
1. Arteries 2. Renal veins
3. Peripheral blood vessels 4. Deep in the lymph

427.Microfilaria larvae are seen in
1. Blood of man
2. Midgut of female *Culex* mosquito
3. Labium of culex 4.Blood of man & mid gut of *Culex* mosquito

LEVEL - II

428. S) :*Wuchereria* parasite is ovovivipa rous nature
R): The microfilaria larva neither it is a completely developed young one nor it is a egg

429 S): Larval forms that shows nocturnal periodicity is microfilaria larva
R): Microfilaria larva during night time between 10 pm to 4 am it comes to peripheral blood vessels

430 Study the following statements regarding the microfi lariae of *Wuchereria*
I. The microfilariae are formed with the covering of egg membranes in the female animal and do not depend on the mother for nourishment
II. The larval surface is covered by a syncytial epi dermis
III. The microfilaria contains a column of cytoplasm with a number of nuclei in syncytial condition
IV. The microfilariae exhibit nocturnal periodicity
Identify the correct statements from the above
1)I, III and IV 2)I, II and IV
3)II, III and IV 4)I, II and III

431. Study the following statements regarding the mos quito phase of *Wuchereria bancrofti*
I. The sheath of microfilaria is dissolved in the mid gut of mosquito within two to six hours of infec tion
II. In the thoracic muscles of mosquito the larva first transforms into flat sausage shaped form
III. Sausage stage undergoes moulting and grows into a long infective third stage larva
IV. The infective microfilariae move to the labium of the female *Culex* mosquito

Identify the correct statements

1)I, II and III 2)I, II and IV

3)II, III and IV 4)I, II, III, IV

432. The following are the various stages in microfilaria larva of *Wuchereria*

I. Sheathed microfilaria

II. Sausage shaped form

III. Second stage larva

IV. Infective third stage larva

V. Fourth stage larva

Which of the above are not seen in human being

1)II, II and V 2)I, II and III

3)II, III and IV 4)II and III

433. Match the following regarding microfilaria

List I	List II
A. Oral stylet	I Rudimentary alimentary canal
B. Nerve ring	II Around the pharynx
C. Renette cell	III At the anterior end
D. Inner cell mass	IV Excretory
	V. Form reproductive system

	A	B	C	D
1)	III	II	IV	I
2)	II	III	IV	I
3)	III	II	V	I
4)	III	II	IV	V

LIFE CYCLE IN MOSQUITO

LEVEL -I

434. Exsheathing of microfilaria takes place in

1. Midgut of culex mosquito
2. Thoracic muscles of culex
3. Salivary glands of cufex
4. Blood of man

435.First and second moults of microfilaria take place in this part of mosquito

1. Alimentary canal 2. Head
3. Salivary glands 4. Thoracic muscles

436.3rd and 4th moults of microfiiaria take place in

1. Stomach of mosquito 2. Head of mosquito
3. Lymph vessels of man
4. Thorasic muscles of mosquito

437. Microfilariae reaching proboscis of *Culex* and waiting for a chance to enter man are

1. III stage larvae 2. IV stage larvae
3. II stage larvae 4. V stage larvae

438.Sausage shaped stages of filarial worm are formed in

1. Salivary glands of *Culex*
2. Thoracic muscles of *Culex*
3. Stomach of *Culex* 4. Blood of *Culex*

439.Time taken by the sausages to undergo two moults in thoracic muscles of *Culex*

1. 10-20 days 2. 10-20 hrs
3. 10 -20 weeks 4. 10-20 min

440.Sausage larva by undergoing 2 moults and develops into

1. Infective III stage microfilaria
2. Adult *Wuchereria* 3. Young *Wucheraria*
4. Rhabditiform larva

LEVEL -II

441.Arange the following parts travelled by microfilaria larvae in correct sequence

A) Thoracic muscles B) Midgut

C) Labium D) Haemocoel

1)B-D-A-C 2) B-C-D-A

3)B-C-D-A 4) C-B-D-A

442.S): *Wuchereria bancrofti* requires a blood sucking intermediate host for its transmission

R): In human being the microfilaria larvae of *Wuchereria* are present moving in the blood capillaries

PATHOGENICITY

LEVEL - I

443.Inflamation of lymph vessels is called

1) Lymphoedema 2) Lymphadenitis

3) Lymphangitis 4) Lymphangiovarix

444.Adult fiiaria worms cause obstruction to flow of lymph in lymph vessels and lymph glands, leads to

1. Lymphangitis 2. Lymphadenitis
3. Lymphodema 4. Lymphangiovarix

445.If the extremeties of limbs, scrota! sacs, mammary glands, are abnormally swollen become, rough loosing cutaneous glands, the condition is called

1. Elephentiasis. . 2. Fibrosis
3. Cutaneosis 4. Hypertrophy

446.Dialation of lymph vessels is called

1) Lymphangiovarix 2) Lymphadenitis

3) Lymphangitis 4) Lymphoedema

447.Sweat glands disintegrates and skin becomes dry due to

1) *Taenia* *2) Ascaris*

3) *Wuchereria* 4) *Plasmodium*

LEVEL -II

448. The following are the statements about the pathogenicity of *Wuchereria*
I. Light infection causes filarial fever, mental depression and headache
II. Swelling of extremities of the limbs, scrotum of male and mammary glands of female is called lymphoedema
III. The inflammation in lymph vessels is called lymphadenitis
IV. The inflammation in lymph glands is called lymphangitis
Identify the correct statements
1)I and II 2)II and III
3)III and IV 4)I, II, III, IV

449. The following are the statements regarding elephantiasis
I. Fibroblasts accumulate in the oedematous tissue causing fibrosis
II. Fibrous tissue is formed in the affected regions
III. In severe cases. the sweat glands of the skin in the affects parts degenerate and the skin becomes rough and dry
Identify the correct statements
1)Only I and II 2)Only II and III
3)Only I and III 4)I, II, III

450. The following are the various steps in the development of elephantiasis
A) Skin becomes rough and dry
B) Increased permeability of the wall in lymph vessels
C) Sweat glands in the affected parts disintegrate
D) Fibrosis E) Accumulation of lymph in tissues
F) Fibroblasts accumulate in the oedematous tissues
Arrange thee in the correct sequence
1)B-E-D-F-A-C 2)B-E-F-D-C-A
3)B-F-E-A-E-C 4)F-D-B-E-A-C

451. S): Elephentiatic organs are dried in nature
R): In elephentiatic organs sweat glands are absent

LEVEL - III

452. Study the following statements regarding symbiosis.
I. Symbiosis means living together in close prolonged association of two or more organisms of smae species with or without mutual benefit or harm, interms of nutrition and shelter.
II. Mutualism is a close association between two living organisms of different species, which is benificial to both partners.
III. Commensalism is a close association between two organisms of different species in which only one partner is benefited and the other partner is not harmed.
IV. Parasitism is a close association between two organisms of different species, of which the host obtains nourishment from the parasite.
In the above
1)I, II, III, & IV are correct
2) I, II, III, & IV are wrong
3) II and III are wrong 4) I and IV are wrong

453. Study the following statements
I. In their association *Zootermopsis* secretes cellulase for *Trichomonas termopsidis.*
II. In darkness *Chlorohydra* can live chaemotrophiczlly.
III. When *Chlorohydra* is starved it can utilize the products of photosynthesis provided by *Chlorella.*
IV. *Hydractinia echinata* and *Pagurus bernhardus* can live independently because they are not metabolically dependent on each other.
Identify the correct statements.
1) I and II 2) II and III
3) III and IV 4) I and IV

454. Study the following
A. Enterozoic parasite B. Digenetic parasite
C. Obligate parasite D. Pathogenic parasite
E. Facultative parasite
Which of the above are applicable to *Taenia solium*
1) A,C and D 2) A,B,C and D
3) A,D and E 4) A,B,D and E

455. Study the following
A. Invertebrate host B. Definitive host
C. Vector host D. Intermediate host
E. Paratenic host F. Intermittent parasite
Which of the above are applicable to female A*nopheles* mosquito?
1) All except E 2) All except D
3) All except F 4) All except D and E

456. Study the following statements
I. *Leishmania* is adapted to live in the blood sucking vector which inoculates the infective stages of parasite into a fresh human host.
II. The reproductive system of tapeworms shows greatest adaptation for survival of the parasites and their species.
III. In digenetic parasites producation of multiple embryos from the same zygote occurs with no intervening gamete production.

IV. Multiplication generally occurs in the larval stages by parthenogenesis.
In the above
1) I, II, III, IV are correct
2) All except I are correct
3) All except III are correct
4)All except IV are correct

457. Study the following
I. Schizont II. Sporozoite
III. Trophozoite IV. Sporoblast
V. Reduction division
Which of the above are applicable to the sporogony of *Plasmodium.*
1) I,II,IV and V 2) I,II and IV
3) II, IV and V 4) II, III, IV and V

458. Study the following statements regarding fertilization in tapeworm.
I. In tapeworm fertillization occurs in the ootheca.
II. Both self fertilization and cross - fertilization oc cur in tapeworm.
III. In self - fertilization, spems produced in a pro glottid
IV. In cross - fertilization, sperms produced in a pro glottid fertilize the ova produced in another ma ture proglottid of the same worm.
Identify the correct statements.
1) I, II and III 2) I,II and IV
3) II, III and IV 4) I, II, III, IV

459. Study the following statements
I. The trophozoite of *Entamoeba histolytica* dis solves the walls of the blood vessels by releasing proteolytic enzymes called histolysins.
II. The secretory organelles of sporozoites of *Plasmodium* secrete a cytolytic enzyme which helps in the penetration of sporozoites in to the liver cells of human being.
III. The hexacanth of *Taenia solium* penetrates the intestinal wall of pig with the help of the substances secreted by the penetration glands.
IV. The micro filaria of *Wuchereria* penetrates the gut wall of human beings with the help of stylet.
In the above
1) I, II, III, IV are correct
2) Al except II are correct
3) All except IV are correct
4) All except I are correct

460. Study the following statements regarding the merozoites of *Plasmodium*
I. The first generation merozoites may enter into RBC or liver cells.
II. The Smaller second generation merozoites always enter into RBC
III. The bigger second generation merozoites cannot enter into RBC
IV. The erythrocytic merozoites always enter into RBC.
Identify the correct statements
1) I,II and III only 2) II, III and IV only
3) III, IV and I only 4) I, II, III, IV

461. Study the following statements regarding the embryonic development of tapeworm.
I. Morula is produced from micromeres.
II. Mesomeres form outer embryonic envelop
III. Megamere devides and these cells form the inner embryonic envelope
IV. Hooks of proscolex are formed by the onchoblasts of morula.
Identify the correct statements
1) I, II, III, IV 2) Only I
3) I, II and III 4) I and IV

462. Study the following regarding the life cycle of *Entamoeba histolytica* and arrange them in a correct sequence.
A) Metacystic form B) Infection
C) Trophozoite D) Encystment
E) Precystic form F) Excystment
G) Tetranucleate cyst
1) C - E - G - F - A - B - D
2) C - E - D - G - B - F - A
3) B - G - F - A - D - E - C
4) C - E - F - G - B - D - A

463. The following are the various persons involved in discovering various events in the life cycle of *Plasmodium vivax*
A) Ronald Ross B) Laveran
C) Grassi D) Golgi
E) Garnham
Arrange these persons in a correct chronologi cal sequence in the order of their discoveries.
1) B - D - A - C - E 2) D - B - A - C - E
3) A - B - D - C - E 4) B - D - C - A - E

464. The following are the various stages in the schizogony of *Plasmodium vivax.*
Arrange these in a correct sequence.
A) Gametocytes B) Sporozoites
C) Merozoites D) Cryptozoites
E) Metacryptozoites
1) D - E - B - C - A 2) B - D - E - C - A
3) A - D - E - C - B 4) B - E - D - C - A

465. The following are the various stages in the asexual life cycle of *Plasmodium vivax*
A) Gametocyte B) Merozoite
C) Trophozoite D) Cryptozoite
E) Signet ring stage
F) Micrometa cryptozoite

G) Amoeboid stage H) Schizont
I) Sporozoite
Arrange the stages of Golgi cycle in a correct sequence
1) I - D - F - C - E - G - H - B - A
2) I - D - F - B - A
3) F - C - G - E - H- B - A
4) D -C - E - G - H - B

466. The following are the various stages in the Ross cycle of *Plasmodium vivax*
A) Sporozoites B) Gametocytes
C) Sporoblasts D) Oocyst
E) Gametes F) Zygote
G) Ookinete
Arrange these stages in correct sequence
1) B - E - G - F - D - C - A
2) E - B - F - G - D - C - A
3) B - E - F - G - D - C - A
4) B - E - F - G - C - D - A

467. The following are the various events in the life cycle of *Plasmodium vivax*
A) Sporogony B) Gametogony
C) Pre erythrocytic generation
D) Formation of gametes
E) Exoerythrocytic generation
F) Fertilization
G) Erythrocytic schizogony
Arrange these in a correct sequence from asexual cycle to sexual cycle.
1) D - F - A - C - E - G - B
2) C - E - G - B - D - F - A
3) C - E - G - D - B - F - A
4) E - C - G - B - D - F - A

468. Arrange the following of malarial parasite in a correct sequence.
A) Cold Stage B) Incubation Period
C) Sweating stage D) Prepatent period
E) Hot stage
1) D - B - A - E - C 2) B - D - A - E - C
3) D - B - E - A - C 4) B - D - E - A - C

469. Arrange the following of tapeworm from anterior end to posterior end.
A) Proglottides with branched uterus
B) Hold fast organ
C) Proglottides with blind sac like uterus
D) Zone of Proliferation
E) Proglottides without uterus
1) B - D - C - A -E 2) B - D - A - C - E
3) B - E - C - A - D 4) B - D - E - C - A

470. Arrange the following of tapeworm in a correct sequence from anterior end to posterior end.
A) Scolex
B) Wider than longer proglottides
C) Unsegmented part
D) Squarish proglottides
E) Longer than wide proglottides
1) A - C - D - B - E 2) A - C - E - B - D
3) A - C - B - D - E 4) A - C - E - D - B

471. The following are the various steps in he development of elephantiasis
A) Skin becomes rough and dry
B) Increased permeability of the wall in lymph vessels
C) Sweat glands in the affected parts disinte grate
D) Fibrosis
E) Accumulation of lymph in the tissues
F) Fibroblasts accumulate in the oedomatous tissues
Arrange these in the correct sequence
1) B - E - D - F - A - C
2) B - E - F - D - C - A
3) B - F - D - A - E - C
4) F - D - B - E - A - C

472. The following are various apertures in *Wuchereria bancrofti*
A) Mouth B) Cloaca
C) Anus D) Gonopore
Arrange these apertures in a correct sequence from anterior end to posterior end in female.
1) A - D - C - B 2) A - D - B - C
3) A - D - C 3) A - D - B

473. Arrange the following parts of mosquito travelled by microfilaria larvae in a correct sequence
A) Thoracic muscles B) Midgut
C) Labium D) Haemocoel
1) B - D - A - C 2) B - A - D - C
3) B - C - D - A 4) C - B - D - A

474. Study the following and choose the correct combination

Type of symbiotic association	Feature	Example
1. Commensalism	Commensal is benifited	*Chlorohydra* and *Phagurus bernhardus*
2. Predation	Prey is benifited	Cat and rat
3. Parasitism	Host is the loser	*Ascaris* and *Homo sapiens*
4. Mutualishm	Both are benefitted	*Zootermopsis Trichomonas termopsidis*

Which of the above are correct?

1) I and II 2) II and III
3) III and IV 4)I, II, III, IV

475. Study the following

Parasite	Group	Host
I. *Nosema notabilis*	Cnidospora	*Shpaerospora polymorpha*
II *Sphaerospora Polymorph*a	Cnidospora	Toad fish
III. *Fasciola hepatica*	Trematoda	Sheep
IV *Sacculina*	Crustacea	*Carcinus moneas*

Which of the above are correct?
1) IV only 2). III and IV only
3) II, III and IV only 4) I, II, III, IV

476.. Study the following

Type of parasite	Feature	Example
I. Intermittent	Capable of living independently if host is not available	*Cimex*
II. Ectoparasitic	Lives on the surface of the body of the host	*Sacroptes*
III. Factultative	Not constantly associated with host	*Mycobacterium leprae*
IV. Obligate	Lives only as parasite	*Taenia solium*

Which two of the above are correct?
1) II and IV 2) III and IV
3) I and III 4) I and II

477. Study the following

Type of host	Feature	Example
I. Definitive	Parasite attains sexual maturity and reproduces sexually	Female *Anopheles*
II Intermediate	Larval stages of parasite live	*Sus scrofa* to *Taenia solium*
III. Paratenic	Parasite is viable without any development	*Musca* to *Entameoba histolytica*
IV. Reservoir	Instrumental in the transmission of parasite from one man to the other	Monkey to *Wuchereria*

Which of the above are correct
1) Only I 2) Only I and II
3) Only I, II and III 4) I, II, III, IV

478. Study the following

Parasite	Effect on host	Host effected
I. *Fasciola hepatica*	Hypertrophy	Sheep
II. *Plasmodium vivax*	Hyperplasia	Human being
III. *Trematode larva*e	Gigantism	Snail
IV. *Carcinus moenas*	Sterility	*Sacculina*

Which of the above are correct?
1) I and II 2) I, II and III
3) II and IV 4) III and IV

479. Study the following

I. Increase in the size of cells	Hypertrophy	*Plasmodium*
II. Abnormal increase of the size of body	Hyperplasia	Trematode larvae
III Rapid increase of the rate of multiplication of cells	Gigantism	*Fasciola*
IV. Degeneration of gonads	Sterility	*Sacculina*

Whichof the above are correct?
1) I and IV 2) I and III
3) I and II 4) III and IV

480. Study the following.

Parasite	Infective stage to definitive host	Disease caused
I. *Entamoeba histolytica*	Tetranucleate cyst	Amoebiasis
II. *Taenia solium*	Cysticercus	Taeniasis
III. *Wuchereria bancrofti*	3rd stage microfilaria	Elephantiasis
IV *Plasmodium vivax*	sporozoite	Benign tertian malaria

Which of the above are correct
1) I, II, III, IV 2) I, II and III
3) I, II, IV 4) II, III and IV

481. Study the following regarding the life cycle of Plasmodium vivax

Stage	Cycle conducted	Products
I. Sporozoite	Preerythrocytic generation	Cryptozoites
II Cryptozoites	Exoerythrocytic generation	Metacryptozoites
III. Merozoites	Erythrocytic cycle	Merozoites
IV.Gametocyte	Gametogony	Gametes

Which of the above are correct
1) I and II only 2) II and III only
3) I, II and III only 4) I, II, III and IV

482. Study the following regarding the infective stages of different parasites

Stage	Infective to	Transform into
I. Sheathed microfilaria	Female *Anopheles* mosquito	Sausage shaped form
II. Onchosphere	*Sus scorfa*	Bladder worm
III. 3rd stage microfilaria	Intermediate host	Adult *Wuchereria*
IV. Cysticercus cellulosae	*Homo sapiens*	Adu*lt Taenia*

Which of the above are correct

1) I, II and III 2) II and IV
3) I, III and IV 4) I, II and IV

483. Match the following

List I	List II
A. *Zootermopsis*	I *Hydractinia*
B. *Chlorohydra*	II Trichomonas
C.*Pagurus bernhardus*	III *Escherichia coli*
D. *Homo sapiens*	IV *Fasciola hepatica*
	V *Chlorella*

	A	B	C	D
1	II	V	I	III
2	II	I	III	IV
3	II	V	IV	III
4	III	V	I	IV

484 Match the following

Life cycle	Product
A. Golgi cycle	I Cryptozoites
B. Ross cycle	II Sporozoites
C. Exoerythrocytic	III Merozoites
D. Preerythrocytic	IV Metacryptozoites
	V. Gametes

	A	B	C	D
1)	III	II	IV	I
2)	V	II	IV	I
3)	III	V	IV	I
4)	III	II	V	I

485. Match the following regarding Plasmodium

Process	Stages formed
A. Schizogony	I. Gametes
B. Gametogony	II. Gametocytes
C. Exflagellation	III Sporozoites
D. Maturation	IV. Microgametes
E. Sporogony	V. Femae gametes

	A	B	C	D	E
1)	IV	I	VI	V	III
2)	IV	II	VI	V	III
3)	III	II	V	VI	I
4)	IV	II	V	VI	III

486. Match the following

List I	List II
A. Megameres	I. Form embryophore
B. Onchoblasts	II Form outer embryonic envelope
C. Micromeres	III Provides nourishment to embryo
D. Mesomeres	IV Secrete hooks
E. Vitelline cell	V. Forms morula

	A	B	C	D	E
1)	II	IV	V	I	III
2)	I	IV	V	II	III
3)	III	IV	V	I	II
4)	II	IV	I	V	III

487. Match the following

List I	List II
A. Sporozoite	I. Dissolves the walls of blood vessels by releasing histolysins
B. Hexacanth	II Penetrates into the Liver cells with the help of cytolytic enzyme
C. Microfilaria	III. Penetrates the gut wall of mosquito with the help of stylet
D. Trophozoite of *Entamoeba*	IV. Penetrates the intestinal wall of pig with the help of substance secreted by penetration glands

	A	B	C	D
1)	I	IV	III	II
2)	II	IV	III	I
3)	II	III	IV	I
4)	III	IV	I	II

488. Match the following and select the correct com bination

List I	List II
A. Exflagellation	I. Formation of male gametes in *Plasmodium*
B. Encystment	II. Coming out of cyst in *Entamoeba*
C. Apolysis	III Formation of cyst wall in *Entamoeba*
D. Strobilation	IV Formation of new proglottids in *Taenia*
	V. Formation of new segments in *Pheretima*
	VI. Shedding of gravid proglottides in *Taenia*

	A	B	C	D
1)	I	III	VI	V
2)	II	III	IV	V
3)	I	II	VI	IV
4)	I	III	VI	IV

KEY

SYMBIOSIS

1) 4 2) 1 3) 4 4) 2 5) 3

MUTUALISM

6) 1 7) 2 8) 2 9) 3 10) 4 11) 2 12) 3
13) 4 14) 4 15) 2 16) 4 17) 2 18) 4 19) 4
20) 1 21) 3 22) 1 23) 1 24) 1

COMMENSALISM

25) 2 26) 3 27) 4 28) 2 29) 4 30) 3 31) 2

PARASITISM

32) 1 33) 1 34) 3 35) 3 36) 2 37) 2 38) 1
39) 2 40) 3 41) 2 42) 4 43) 1 44) 1 45) 4
46) 3 47) 1 48) 1 49) 3 50) 1 51) 3 52) 1
53) 1 54) 2 55) 2 56) 1 57) 1 58) 4 59) 2
60) 1 61) 2 62) 3 63) 2 64) 3

TYPES OF HOSTS

65) 1 66) 3 67) 3 68) 4 69) 1 70) 3 71) 1
72) 3 73) 1

VECTOR

74) 1 75) 1 76) 1 77) 4

EFFECTS OF PARASITES ON THEIR HOSTS

78) 1 79) 1 80) 2 81) 1 82) 1 83) 3 84) 3
85) 1

PARASITIC ADAPTATIONS FOR SURVIVAL IN THE HOST

86) 4 87) 2 88) 4 89) 4 90) 4 91) 4 92) 1
93) 1 94) 1 95) 1 96) 2

Entamoeba histolytica

INTRODUCTION

97) 1 98) 1 99) 2 100) 1 101) 2 102) 1 103) 1
104) 3 105) 4

STRUCTURE

106) 3 107) 3 108) 1 109) 2 110) 2 111) 3 112) 1
113) 2 114) 3 115) 2 116) 2 117) 3 118) 1 119) 1
120) 1

LIFE CYCLE PRECYSTIC

121) 2 122) 1 123) 1 124) 3 125) 3 126) 2

CYSTIC STAGE

127) 2 128) 3 129) 1 130) 2 131) 2 132) 3 133) 4

INFECTION

134) 3 135) 4 136) 4

EXCYSTMENT

137) 2 138) 1 139) 3 140) 3 141) 1 142) 3 143) 1
144) 4

PATHOGENICITY

145) 2 146) 3 147) 2 148) 1 149) 3 150) 2 151) 4
152) 4 153) 3 154) 4 155) 2

Plasmodium vivax

INTRODUCTION

156) 3 157) 1 158) 3 159) 1 160) 4 161) 2 162) 3
163) 2 164) 4 165) 2 166) 4 167) 1 168) 3 169) 2
170) 3

STRUCTURE OF A SPOROZOITE

171) 1 172) 2 173) 2 174) 1 175) 2 176) 1 177) 3
178) 1 179) 2 180) 2 181) 1 182) 1 183) 1

EXOERYTHROCYTIC GENERATION

184) 1 185) 2 186) 2 187) 1 188) 4 189) 2 190) 1
191) 3 192) 3 193) 4 194) 3 195) 2 196) 2 197) 2
198) 1 199) 1 200) 2 201) 1 202) 3 203) 3 204) 3
205) 2 206) 4 207) 2 208) 2 209) 3 210) 4 211) 2
212) 1 213) 1 214) 2 215) 1

GAMETOGONY

216) 4 217) 4 218) 1 219) 1 220) 1 221) 3 222) 1
223) 1

MOSQUITO PHASE

224) 1 225) 2 226) 2 227) 2 228) 2 229) 4 230) 1
231) 1 232) 2 223) 4 234) 3 235) 1

SPOROGONY

236) 4 237) 1 238) 2 239) 4 240) 3 241) 4 242) 2
243) 3 244) 1 245) 3 246) 3 247) 1

PATHOGENICITY

248) 2 249) 1 250) 3 251) 3 252) 3 253) 1 254) 4
255) 1 256) 1 257) 1 258) 2

PREVENTION

259) 3 260) 3 261) 2

Taenia solium

INTRODUCTION

262) 1 263) 1 264) 2 265) 2 266) 2 267)1 268) 1
269) 1 270) 2 271) 1 272) 3 273) 4 274)1 275) 2
276) 1 277) 2 278) 4 279) 2 280) 2 281) 2 282) 3
283) 1 284) 2 285) 3 286) 1 287) 2 288) 3 289) 1
290) 1 291) 3 292) 2 293) 2 294) 1 295) 4 296) 1
297) 4 298) 3 299) 3 300) 1 301) 1 302) 1 303) 1
304) 1

BODY WALL

305) 2 306) 1 307) 4 308) 4 309) 1 310) 2
311) 2 312) 2 313) 2 314) 1 315) 4 316) 1
317) 1 318) 1 319) 1 320) 2 321) 3

ORGANS IN THE MATURE PROGLOTTID

322) 3 323) 1 324) 1 325) 3 326) 1 327) 4
328) 2 329) 1 330) 3 331) 4 332) 2 333) 1
334) 2 335) 1 336) 3 337) 1 338) 2

FERTILIZATION

339) 1 340) 2 341) 1 342) 2 343) 2 344) 1
345) 3 346) 2 347) 3

LIFE CYCLE IN MAN

348) 1 349) 1 350) 1 351) 2 352) 2 353) 2
354) 1 355) 2 356) 2 357) 1 358) 2

LIFE CYCLE IN PIG

359) 2 360) 4 361) 1 362) 2 363) 1 364) 1 365) 3
366) 2 367) 3 368) 1 369) 2 370) 1 371) 1 372) 1

INFECTION

373) 1 374) 3 375) 1 376) 1 377) 2 378) 4

PARASITIC ADAPTATIONS

379) 1 380) 4 381) 1 382) 4 383) 2 384) 2 385) 1
386) 3 387) 4 388) 4 389) 3 390) 3 391) 1 392) 2

Wuchereria bancrofti

INTRODUCTION

393) 3 394) 3 395) 3 396) 1 397) 4 398) 2 399) 1
400) 4 401) 1 402) 1 403) 3 404) 4

STRUCTURE

405) 1 406) 1 407) 4 408) 4 409) 2 410) 2 411) 3
412) 3 413) 1 414) 3 415) 4 416) 2 417) 3

LIFE CYCLE IN MAN

418) 1 419) 1 420) 3 421) 4 422) 1 423) 1 424) 2
425) 2 426) 3 427) 4 428) 1 429) 1 430) 1 431) 2
432) 4 433) 1

LIFE CYCLE IN MOSQUITO

434) 1 435) 4 436) 3 437) 1 438) 2 439) 1 440) 1
441) 1 442) 1

PATHOGENICITY

443) 3 444) 3 445) 1 446) 1 447) 3 448) 1 449) 4
450) 2 451) 1

LEVEL - III

452) 4 453) 3 454) 1 455) 4 456) 4 457) 3 458) 3
459) 3 460) 4 461) 2 462) 2 463) 1 464) 2 465) 4
466) 3 467) 2 468) 1 469) 4 470) 3 471) 2 472) 3
473) 1 474) 3 475) 4 476) 1 477) 3 478) 4 479) 4
480) 1 481) 2 482)3 483) 2 484) 1 485) 4 486) 2
487) 1 488) 2 489) 4