Medical Microbiology Exam—Parasitology Block  
May 13, 2003

CIRCLE THE BEST NUMBERED ANSWER THAT FOLLOWS EACH QUESTION.

QUESTION 1: The most significant and definitive diagnoses for malaria. 1pt  
A. Blood count  
B. Blood Chemistry  
C. Blood serology (antibody detection)  
D. CT Scan for abscesses  
E. Blood smear analysis  

1. A and E are correct  
2. B and D are correct  
3. C and E are correct  
4. D and E are correct  
5. All are correct

QUESTION 2: Plasmodium falciparum can be fatal by many mechanisms. What are the most common causes of death in non-immune individuals? 1pt  
A. Cerebral involvement  
B. Kidney dysfunction  
C. Liver disease  
D. Gamete invasion of red cells  
E. Pseudocyst formation in the brain and in deep tissues

1. A and B are correct  
2. A and C are correct  
3. A and E are correct  
4. B and C are correct  
5. None of the above are correct

QUESTION 3: Malaria transmission can occur via; 1pt  
A. Tick bites which also transmit babesia  
B. Blood transfusion/bone marrow transfer  
C. Fecal-oral transmission similar to Cryptosporidial which is also an Apicomplexan  
D. Organ transplant  
E. Acquisition of infection from animals (Zoonotic transmission)

1. B and E are correct  
2. A and B are correct  
3. B and D are correct  
4. B and C are correct  
5. All of the above are correct
QUESTION 4: 1pt
A. GAMETES are the form of Plasmodia infectious to humans which enter the liver
B. MEROZOITES are produced both in the liver and in RBCs
C. SCHIZONTS are immature blood forms only associated with P. vivax
D. RING TROPHozoITES are characteristic of P. vivax and P. falciparum only
E. GAMETES are produced by all plasmodial species

1. A and B are correct
2. B and C are correct
3. C and E are correct
4. B and E are correct
5. None of the above are correct

QUESTION 5: 1pt
A. P. FALCIPARUM is one of the two major forms of Plasmodial infections typically seen clinically
B. P. OVALE is only a minor Plasmodial infections and is seldom seen clinically
C. P. MALARIAE produces gametes that are seldom seen clinically
D. P. VIVAX is one of the two major forms of Plasmodial infections typically seen clinically
E. Drug resistant malaria is often treated with Quinine sulfate and tetracycline (Doxycycline)

1. A and B are correct
2. B and C are correct
3. C and E are correct
4. B and E are correct
5. All of the above are correct

QUESTION 6: 1pt
A. Only P. FALCIPARUM produces gametes in the host
B. P. OVALE is one of the two major forms of Plasmodial infections typically seen clinically
C. P. MALARIAE is one of the two major forms of Plasmodial infections typically seen clinically
D. P. VIVAX is one of the two major forms of Plasmodial infections typically seen clinically
E. GAMETES are produced by all plasmodial species

1. A and B are correct
2. B and C are correct
3. C and D are correct
4. D and E are correct
5. All of the above are correct

QUESTION 7: 1pt
The following parasites are known to recrudescence or undergo latency
A. Plasmodia falciparum
B. Plasmodia malariae
C. Plasmodia ovale
D. Plasmodia vivax

1. A and B are correct
2. A and D are correct
3. B and C are correct
4. B and D are correct
5. All are correct
QUESTION 8: 1pt
*Plasmodia vivax* is not the most serious of all malarial because of its
-✓ A. Inability to invade all cells of the reticuloendothelial system
-✓ B. Inability to recrudesce
-✓ C. Exclusive survival in the spleen and liver and inability to access the brain
- B. Low gamete production
- E. Because it targets only Duffy antigen negative individuals

1. A is correct
2. A and C are correct
3. B is correct
4. A and D are correct
5. all are correct

QUESTION 9: 1pt
Merozoite yield by plasmodial species ranges from highest to lowest as follows
A. *Plasmodia falciparum*, *Plasmodia malariae*, *Plasmodia ovale*, *Plasmodia vivax*
B. *Plasmodia malariae*, *Plasmodia falciparum*, *Plasmodia ovale*, *Plasmodia vivax*
C. *Plasmodia falciparum*, *Plasmodia ovale*, *Plasmodia vivax*, *Plasmodia malariae*
D. *Plasmodia falciparum*, *Plasmodia vivax*, *Plasmodia ovale*, *Plasmodia malariae*

1. A is correct
2. B is correct
3. C is correct
4. D is correct

QUESTION 10: 1pt
Specific protection against *P. vivax* mediated disease but not other Plasmodial disease in some individuals is due to
A. Glucose 6-Phosphate deficiencies
B. β-Thalassemia deficiencies
C. Sickle Cell Anemia
D. Duffy Blood Group absence

1. A is correct
2. B is correct
3. C is correct
4. D is correct
5. None of the above is correct, No such differences exist among plasmodial species

QUESTION 11: 1pt
Host resistance to malarial disease can be conferred by all of the following except
A. Glucose 6-Phosphate deficiencies
B. β-Thalassemia deficiencies
C. Sickle Cell Anemia
D. Duffy Blood Group absence
✓ E. High Density Lipoprotein Deficiency

1. A is the correct choice
2. B is the correct choice
3. C is the correct choice
4. D is the correct choice
5. E is the correct choice
QUESTION 12 : 1pt
All of the following are true of malaria except

☑ Transmitted by Ticks which also transmit babesia
☐ Clinical features can include blackwater fever, renal failure, fever and coma
☒ Can be diagnosed by thick and thin blood film
☐ Doxycycline, a tetracycline analog, should be used in people unable to tolerate Mefloquine
☒ There is always a blood stage in active infections

1. A is the correct choice
2. B is the correct choice
3. C is the correct choice
4. D is the correct choice
5. E is the correct choice

QUESTION 13 : 1pt
All of the following are true of malaria except

☐ P. falciparum is the most common cause of cerebral malaria
☒ ‘Knobs’ enhance binding to vessel endothelium, placenta, lungs and brain
☐ Infected red cells bind thrombospondin, ICAM and proteoglycans (PGs)
☐ Plasmodial species are differentiated on thin film
☒ There is never non-sterilizing immunity

1. A is the correct choice
2. B is the correct choice
3. C is the correct choice
4. D is the correct choice
5. E is the correct choice

QUESTION 14 : 1pt
All of the following associations are true except

☒ P. falciparum / multiple ring trophozoites / visible gametes
☐ P. vivax / Daisey heads / Ring trophozoites visible
☐ P. falciparum / extracellular merozoites / visible gametes
☐ P. vivax / Schuffner dots / Ring trophozoites visible
☐ P. ovale / Schuffner dots / Ring trophozoites visible

1. A is the correct choice
2. B is the correct choice
3. C is the correct choice
4. D is the correct choice
5. E is the correct choice
QUESTION 15: 1pt
All of the following are true of the antimalarials given except:
A. Chloroquine: use prophylactically/Same target as Trimethoprim/blocks food vacuole function
B. Mefloquine: Targets gametes/formation/blocks food vacuole function/targets blood stage
C. Doxycycline: classic antibacterial/antimalarial/protein synthesis inhibitor
D. Primaquine: administration mimics anemic conditions/Targets liver stage/use in radical curing
E. Fansidar: A cocktail of Mefloquine + pyrimethamine/Targets liver stage/Targets blood stage

1. A and B are the correct choices
2. B and C are the correct choices
3. C and D are the correct choices
4. D and E are the correct choices
5. None of the above. All of the answers give are correct for antimalarials

QUESTION 16: 1pt
The following are stages in the malaria life cycle
A. Tachyzoites, Pseudocysts, Merozoites and Bradyzoites (depending on the species)
B. Cysts, microfilarial forms and adult organisms (only in the insect).
C. Merozoites and schizonts (depending on the species).
D. Sporozoites and Oocysts

1. A and B are correct
2. B and C are correct
3. C and D are correct
4. A and D are correct
5. All are correct

QUESTION 17: 1pt
Plasmodial erythrocytic stage disease can present like Babesia. In the simplest way, how would you distinguish the erythrocytic stage of Plasmodia and babesia?

I would do a thin smear stained with blood spicer [cross]
and look for merozoites infected RBCs and bisama like ring [series]
only falciparum [ring]
three for all plasmodia

QUESTION 18: 1pt
The pathology typically associated with active Schistosomal infections is
A. Due to worms multiplying in the host
B. Due to worms migrating to the Mesenteric of the host
C. Due to dying worms eliciting host immune responses
D. Is due to immune attack against the relatively stationary adult worms in venules
E. Is due primarily to egg deposition/granuloma formation

1. A and B are correct
2. C is correct
3. A and C are correct
4. E is correct
5. A, C and E correct.
QUESTION 19: 1pt
Schistosomal infections can result in the following
A. Eggs in urine
B. Antibodies to larval forms
C. Eggs in the stool
D. Hepatosplenomegaly
E. Activated T-cells specific for eggs

1. A and C are correct
2. B and C are correct
3. C and D are correct
4. A, C and D are correct
5. All are correct

QUESTION 20: 1pt
Schistosomal dermatitis
A. Is often called swimmers itch
B. Is a maculopapular rash caused by non-human Schistosomes
C. Is not caused by a Schistosomal parasite at all
D. Can spread by direct skin contact between an infected and an uninfected individual

1. A and B are correct
2. B and C are correct
3. C and D are correct
4. A, C and D are correct
5. All are correct

QUESTION 21: 3pts total
A. The important human schistosomal species are
   i. *S. mansoni*
   ii. *S. japonicum*
   iii. *S. hematobium*

B. Overt clinical features of chronic schistosomiasis are
   i. 
   ii. Katayama fever
   iii. Hepatosplenomegaly
   ascites of dilated mesenteric veins
   chronic schisto can cause brain abscess

C. i. Name one drug that is effective against all schistosome species
   proguanil

   ii. Name a drug that targets only one of the three schistosomal species
   metrifonate

Also name the schist species
*S. mansoni* - 0.3
QUESTION 22 : 1pt
The following stages represent parts of the schistosomal life cycle
A. Cercariae / Merozoites / snail trophozoite
B. Egg / Miracidia / Lung schizont / female adult worm
C. Schistosomula / Adult worms / swimming miracidia
D. Oocysts / Meront / Intestinal Pseudocyst
E. Ova / Ookinetes / Sporozoites

1. A is correct
2. B is correct
3. C is correct
4. D is correct
5. None are correct

QUESTION 23 : 1pt
Freshwater snails
A. Are infected by Schistosomula and then release infectious miracidia.
B. Are not the hosts for schistosomes
C. Are the non-human host for human schistosomes
D. Release schistosomes intermediates that are either male or female.

1. A and C are correct
2. B and C are correct
3. C and D are correct
4. A and D are correct
5. All are correct

QUESTION 24 : 1pt
What is a physical characteristic feature of eggs deposited into the intestines by schistosomes parasites?

They have either a lateral spine (mehson) or no spine (japonicum)

QUESTION 25 : 1pt
What is a physical characteristic feature of eggs deposited into the intestines by schistosomes parasites?

They have a terminal spine.

HOOKWORMS

QUESTION 26 : 1pt
What are the full names of the two major forms of human hookworms

parasites americana
- 0.25 ()
-

QUESTION 27 : 1pt
Dog or cat hookworm causes a disease in humans known as:

creeping itch
QUESTION 28: 1pt
Hookworm infections in humans are important infections. What do these infections actually do? (What harm do the worms do to the host)
- May release antigens, suck blood, cause anemia

QUESTION 29: 1pt
Name two drugs that are useful in treating hookworm infections
- praziquantel
-  

QUESTION 30: 2pt
Describe the likely path of a hookworm larvae on its course to taking up permanent residence in the 'donut'. List major landmarks on its way to adulthood.
Example of idea answer format: Larvae → lymphatics → brain → toes (permanent home of adults)
- Foot (filariform) → lung → up trachea → swallowed to gut → mature and make → eggs → stool → new foot → stomach / intestine → permanent home

QUESTION 31: 2
Systemic mycoses caused by Candida Albicans is a common occurrence. a. What is the main line of host defense (specific cell/s), b and two factors that pre-disposes an individual to such infections
a. T cell (cell mediated immunity) 
-  

b. Immune suppression (e.g. AIDS)
- Pregnancy
PARASITOLOGY EXAM 2002
Professor Andrew G. Campbell

Please read the questions very carefully. There are 30 questions to be answered. ALL CORRECT ANSWERS MUST BE COMPLETELY CIRCLED. NO WRITTEN TEXT IS REQUIRED AND ANY MARKS OTHER THAN CIRCLED ANSWERS WILL NOT BE GRADED. EACH QUESTION IS WORTH 1 POINT

MALARIA
Circle the NUMBERED choice (s) (i.e. 1,2,3 etc) following each question which corresponds to the correct answer(s)

QUESTION I. The following parasites typically produce hypnozoites in the liver.
A. Plasmodium falciparum
B. Plasmodium malariae
C. Plasmodium ovale
D. Plasmodium vivax

Circle the correct choice
1. A is correct
2. B is correct
3. C is correct
4. D is correct
5. All are correct

QUESTION II. The following is typically used in radical curing of plasmodial infections.
A. Chloroquine
B. Fansidar (Pyrimethamine plus Sulfadoxine)
C. Primaquine
D. Doxycycline

Circle the correct choice
1. A is correct
2. B is correct
3. C is correct
4. D is correct
5. All are correct

QUESTION III. The term radical curing refers to.
A. Superficial treatment of the overt clinical symptoms of malaria
B. Elimination of parasites from the liver which can give rise to parasites elsewhere in the host
C. Clearance of plasmodium from the brain
D. Elimination of bolus parasite masses from the Bowman’s capsule of the kidney

1. A is correct
2. B is correct
3. C is correct
4. D is correct
5. All are correct
**QUESTION IV**

The organism shown in the center of the adjacent image corresponds to

A. The cyst form of a parasite  
B. An intestinal parasite form typically associated with overt disease  
C. Is seldom seen during active infection  
D. Is Giardia and is associated with intestinal dysfunction  
E. Is Giardia and is rarely associated with extra-intestinal disease/infection

1. A, B and C are correct
2. B, D and E are correct
3. D and E are correct
4. A and D are correct
5. All are correct

**QUESTION V**

The microscopic image shown below corresponds to

A. The cyst form of a parasite  
B. The gamete structure form of a parasite  
C. Is seldom present during active infection  
D. Is characteristic of all Plasmodia but typically seen in falciparum infection  
E. Is always extracellular and sometimes detected in blood smears

1. A, B and C are correct
2. B, D and E are correct
3. C, D and E are correct
4. A, C and D are correct
5. All are correct

**QUESTION VI**

The microscopic image shown below corresponds to

A. A field of stained RBC showing a single infected RBC  
B. A P. vivax infection and most likely not a P. falciparum infection  
C. A P. falciparum infection  
D. An RBC infected with both Plasmodium and Babesa  
E. RBCs from an individual who has either Sickle cell anemia, β-Thalassemia or G6PD deficiency

1. A and C are correct
2. A and B are correct
3. B and C are correct
4. A and D are correct
5. All are correct

**QUESTION VII**

The microscopic image shown below corresponds to

A. A field of stained RBC showing a single infected RBC  
B. A P. vivax infection and most likely not a P. falciparum infection  
C. A P. falciparum infection  
D. An RBC infected with both Plasmodium and Babesa  
E. RBCs from an individual who has either Sickle cell anemia, β-Thalassemia or G6PD deficiency

1. A and C are correct
2. A and B are correct
3. B and C are correct
4. A and D are correct
5. All are correct

*-EDITED*-
QUESTION VIII. Among some of the typical features associated with *P. falciparum* infections are:
A. The identification of extracellular gametocytes in thin blood smears
B. The identification of intracellular gametocytes in thin blood smears
C. The formation/appearance of ring trophozoites in red blood cells
D. The appearance of ring trophozoites in neurons which defines cerebral malaria

1. A and C are correct
2. A and B are correct
3. B and C are correct
4. A and D are correct
5. All are correct

QUESTION IX. In duodenal aspirates, the structures shown in the photographs can be isolated in certain diseases states. Their presence confirms:
A. Plasmodial infection and most likely disease in patients
B. Schistosomal infection but no overt disease
C. Giardial infection and most likely disease in patients
D. The presence of protozoal infection which can accompany diarrhea

1. A and B are correct
2. B and D are correct
3. A and D are correct
4. C and D are correct
5. A and C are correct

QUESTION X. The adjacent image shown corresponds to
A. The egg of *Schistosoma mansoni* with its characteristic lateral spine
B. The egg of *Schistosoma japonicum* which has no lateral spine
C. The egg of *Schistosoma haematobium* with its characteristic terminal spine
D. The tetranucleated cyst of Giardia

1. A is correct
2. B is correct
3. C is correct
4. D is correct
5. None are correct, this is actually, the gamete of plasmodia

QUESTION XI. The adjacent image shown corresponds to
A. The egg of *Schistosoma mansoni* with its characteristic lateral spine
B. The egg of *Schistosoma japonicum* which has no lateral spine
C. The egg of *Schistosoma haematobium* with its characteristic terminal spine
D. A tetraneucleated cyst of Giardia

1. A is correct
2. B is correct
3. C is correct
4. D is correct
5. None are correct, this is actually, the gamete of plasmodia vivax
QUESTION XII. For individuals returning from the tropics and/or Asia complaining of general malaise and presenting with anemia, it is reasonable to ask the following questions:

A. Have you or are you taking anti-malarials?
B. Have you experienced insect/mosquito bites on your recent trips?
C. Have you consumed undercooked meats?
D. Do you or have you engaged in anal/oral sex?

1. A and B are correct
2. B and C are correct
3. C and D are correct
4. A, B and D are correct
5. All are correct

QUESTION XIV. The following is true for malaria:

A. Infections/disease can be transmitted by blood transfusions and can present in individuals who have never traveled to endemic areas.
B. It typically requires the use of blood analyses (smears) for reliable diagnoses of active disease.
C. Is never found in individuals who strictly adhere to their anti-malarial regimens.
D. It does not typically require blood analyses (smears); malaria is a helminth and these types of parasites are readily visible to the naked eye.

1. A and B are correct
2. B and C are correct
3. C and D are correct
4. A, and D are correct
5. All are correct

QUESTION XV. The following is (are) true for malaria:

A. Malarial infections never persist in the absence of clinical disease.
B. Of the two most important forms, P. falciparum does not relapse.
C. Persistent non-sterilizing immunity in young adults can cause learning disabilities.
D. Can be transmitted by liver transplants.

1. A, B and C are correct
2. B, C and D are correct
3. A, C and D are correct
4. A, B and D are correct
5. All are correct

QUESTION XVI. The field shown at the left contains:

A. A Giardia trophozoite
B. A Plasmodial schizont
C. A Schistosoma ovum or egg
D. A Giardia cyst

1. A and C are correct
2. B and D are correct
3. B and C are correct
4. A, B and D are correct
5. None are correct
QUESTION XVII. Regarding *P. falciparum*
A. It never shows resistance to drugs. Only *P. vivax* develops resistance
B. It is second only to the more deadly *P. vivax* in prevalence
C. It undergoes recrudescence
D. It is seldom seen and therefore death is never an issue when diagnosing

1. A is correct
2. B is correct
3. C is correct
4. D is correct
5. All are correct

QUESTION XVIII. Some of the clinical manifestations of malarial infections include
A. Paroxysms
B. Anemia
C. Black Water Fever
D. Cerebral malaria

1. A and B are correct
2. B and C are correct
3. C and D are correct
4. A and D are correct
5. All are correct

QUESTION XIX. The following is (are) true
A. *P. falciparum* can yield 50% blood parasite levels
B. *P. falciparum* shows no liver latency
C. *P. falciparum* can recrudesce
D. *P. falciparum* can cause death

1. A is correct
2. B is correct
3. C is correct
4. D is correct
5. All are correct

QUESTION XX. Stages in the life cycle of parasites belonging to the plasmodial genus include
A. Miracidia, Eggs, Cercaria and ‘Adults’
B. Oocysts, Microfilaria, Hypnozoites and Gametes (Depending on the species)
C. Sporozoites, Schizonts, Gametes and Hypnozoites
D. Oocysis (or cyst or ovum), trophozoites and Tachyzoites

1. A is correct
2. B is correct
3. C is correct
4. D is correct
5. All are correct
QUESTION XXI. The simplest way to establish the presence of Schistosomal infections would be to
A. Perform needle aspirates of the lymphatic ducts
B. Establish the presence of microfilaria in the peripheral circulatory system by drawing blood at
night
C. Check for eggs in the stool
D. Check urine for eggs

1. A and B are correct
2. B and C are correct
3. C and D are correct
4. A, B and D are correct
5. All are correct

QUESTION XXII. The following are characteristic of the clinical picture of Schistosomal dermatitis
A. Swimmers itch
B. (Pruitic maculopapular) rash following exposure of skin to infectious forms of the parasite
C. A commonly self-limiting infection
D. The absence of eggs in the infected host

1. A and B are correct
2. B and C are correct
3. C and D are correct
4. A, B and D are correct
5. All are correct

NOTE CHANGE IN REQUIRED ANSWER FORMAT!

CIRCLE ALL LETTERED ANSWERS THAT ARE TRUE
MORE THAN ONE ANSWER IS POSSIBLE

Circle the LETTERED choice(s) following each question which correspond(s) to the correct answer(s)

QUESTION XXIII. Circle all that are true for Schistosomal Infection and/or disease
A. S. haematobium can cause bladder/urinary tract disease
B. S. mansoni usually causes disease associated with the intestines
C. Schistosomes can cause neurologic disease
D. Can cause/present as hepatosplenomegaly
E. Adult worms cause all of the disease
F. Eggs cause most of the disease

QUESTION XXIV. Circle all that are true for Schistosomal Infection and/or disease
A. Disease onset is always immediate
B. Is never associated with Eosinophilia
C. Western blotting or ELISA assays may be useful to detect microfilaria
D. Only eggs not adults are typically lodged in deep tissues
E. Transmitted by the Blackfly (Buffalo gnat)
F. Larval forms are typically ingested by consuming undercooked snails
QUESTION XXV. Diagnoses for Schistosoma Infection include:
A. Eggs in stool
B. Serology such as looking for IgE
C. Non-invasive tests such as immunoblotting for hemoglobinase
D. Finding migrating larvae in the eye
E. Liver biopsy
F. Rectal snips

QUESTION XXVI. Reasonable control measures to prevent against Schistosoma Infection/disease which a physician can suggest includes:
A. Minimizing contact with freshwater snails
B. Use of appropriate drugs as prophylactic
C. Avoid mosquito in endemic areas
D. Avoid eating raw fish
E. Surgically remove/treat infected tissues where possible and necessary to minimize disease
F. Avoid continuous drug use when in endemic areas for long periods of time

QUESTION XXVII. The following can be associated with Schistosoma Infection/disease (depending on the specie):
A. Granuloma formation in the intestines
B. Granuloma formation in the urinary tract and bladder
C. Migration of worms to the mesenteric blood vessels
D. The development of disease requires a mating pair of adult worms (Need more than one worm)
E. Larval periodicity where larval forms of the organism are found in blood only at nights
F. Granuloma formation in the liver and possibly egg deposition in the brain under rare circumstances

QUESTION XXVIII. Regarding Giardia infections.
A. Is typically transmitted via the oral/fecal route
B. Produces multinucleate cysts that are passed anally
C. All infections are symptomatic
D. The form responsible for much of the disease is never flagellated
E. Infections can become systemic — rarely

QUESTION XXIX. Regarding Giardia infections.
A. Lifestyle is not a risk factor
B. One risk factor for infection/disease is post-operative (gastric surgery) care
C. Is not a disease found in the United States
D. Institutionalized individuals are often at higher risk for disease
E. Respond to Metronidazole (flagyl)

QUESTION XXX. Regarding Giardia infections.
A. Never produces cysts in the hosts. Cysts are never seen
B. Like Schistosomes which reside in the intestines, Giardia will illicit eosinophilia
C. Are multicellular organisms and when passed from the host can be identified with the naked eye
D. A significant portion of the disease is due to eggs being lodged in deep tissues and their ability to illicit strong immune responses
E. Can multiply in the host
III. Some human resistance to clinical malarial disease can be conferred by
A. Glucose-6-Phosphate deficiency
B. Thalassemia deficiency
C. Sickle Cell Anemia carrier state
D. Duffy Blood Group absence

1. A and C are correct
2. A and B are correct
3. Band C are correct
4. All are correct
5. None of the above

II. Determining which Plasmodial species(s) produce hypnozoites is important to clinical understanding
A. Hypnozoites are the sole cause of cerebral malaria
B. The production of hypnozoites is the primary cause of relapsing malaria which can occur weeks to years after the initial infection has occurred
C. Hypnozoites are associated with the susceptibility of Duffy antigen negative individuals to disease
D. DEFINES RACIAL GROUPS predisposed to disease

1. A is correct
2. B is correct
3. C is correct
4. D is correct
5. All are correct

MALARIAN

To varying degrees, the following parasites produce hypnozoites in the liver.
A. Plasmodium falciparum
B. Plasmodium vivax
C. Plasmodium ovale
D. Plasmodium malariae

1. A and B are correct
2. A and C are correct
3. Band D are correct
4. C and D are correct
5. All are correct

Circle one NUMBERED choice (1, 2, 3, etc) following each question which corresponds to the correct answer. No written text is required and any marks other than circles will not be graded.
IV. Understanding 'allelic polymorphism' such as absence/presence of Duffy antigen is useful because
A. It helps us to categorize individuals by social behavior
B. It helps us in establishing predisposition/resistance to infection.
C. It helps in narrowing down which particular species an individual may be infected with.
D. Is really unimportant to physicians who will only treat the overt signs of disease.

1. A and C are correct
2. A and B are correct
3. B and C are correct
4. A and D are correct
5. All are correct

V. Among some of the typical features associated with P. falciparum infections are:
A. The identification of extracellular gametocytes in thin blood smears.
B. The identification of intracellular gametocytes in thin blood smears.
C. The formation/appearance of ring trophozoites in red blood cells.
D. The appearance of ring trophozoites in neurons which defines cerebral malaria.

1. A and C are correct
2. A and B are correct
3. B and C are correct
4. A and D are correct
5. All are correct

VI. For individuals returning from the tropics and/or Asia complaining of general malaise and presenting with anemia it is reasonable asked the following questions related to malaria:
A. Have you are you taking anti-malarials?
B. Have you experienced insect/mosquito bites on your recent trips?
C. Have you consumed undercooked meats?
D. Do you or have you engaged in anal/oral sex?

1. A and B are correct
2. B and C are correct
3. C and D are correct
4. A, B and D are correct
5. All are correct

VII. The following is true for malaria:
A. Infections/disease can be transmitted by blood transfusions and can present in individuals who have never traveled to endemic areas.
B. It typically requires the use of blood analyses (smears) for reliable diagnoses of active disease.
C. Is never found in individuals who strictly adhere to their anti-malarial regimens.
D. It does not typically require blood analyses (smears); malaria is a helminthes and these types of parasites are readily visible to the naked eye.

1. A and B are correct
2. B and C are correct
3. C and D are correct
4. A, and D are correct
5. All are correct
VIII. The following is (are) true for malaria
A. Malarial infections can persist in the absence of clinical disease ✓
B. Of the two most important forms, \textit{P. falciparum} does not relapse ✓
C. Persistent non-sterilizing immunity in young adults can cause learning disabilities ×
D. Can be transmitted by liver transplants ✓

1. A and C are correct
2. B and D are correct
3. B and C are correct
4. A, B and D are correct
5. All are correct

IX. Some of the overt clinical manifestations of \textit{P. falciparum} infections may include
A. Acute renal failure/Blackwater fever ✓
B. Cerebral malaria ✓
C. Eosinophilia ×
D. Anemia ✓

1. A and C are correct
2. B and D are correct
3. B and C are correct
4. A, B and D are correct
5. All are correct

X. Regarding \textit{P. falciparum}
A. It can show resistance to drugs ✓
B. It is second only to the more deadly \textit{P. ovale} in prevalence ×
C. Does not always present as the classic textbook picture of the disease ✓
D. It is seldom seen and therefore death is never an issue when diagnosing ×

1. A and B are correct ×
2. A and C are correct
3. B and C are correct ×
4. C and D are correct ×
5. All are correct ×

XI. \textit{Plasmodium vivax}
A. Does not typically cause deep tissue infections ✓
B. Will infect the bone marrow (young RBCs) ✓
C. Is associated with persistent liver disease ✓
D. When infecting red cells causes the appearance of Schuffner's dots ✓

1. A and B are correct
2. B and C are correct
3. C and D are correct
4. A and D are correct
5. All are correct
XII. *Plasmodium vivax*

A. Differs from other plasmodial species in that sporozoites never invade the liver. ✗
B. Is transmitted by Blackflies (Buffalo gnats) and Asian Tiger mosquitoes ✗
C. Does not produce immature parasites that might be found in the circulatory system ✓
D. Can produce ring trophozoites and Schuffner dots. ✓

1. A and B are correct ✓
2. B and C are correct ✗
3. C and D are correct ✓
4. A and D are correct ✓
5. All are correct ✗

XIII. Stages in the life cycle of parasites belonging to the plasmodial genus include

A. Tachyzoites, Hypnozoites, Gametes and Bradyzoites (depending on the species) ✗
B. Oocysts, Microfilaria, Hypnozoites and Gametes (Depending on the species). ✗
C. Sporozoites, Schizonts, Gametes and Hypnozoites (depending on the species) ✓
D. Merozoites, oocysts and trophozoites ✓

1. A and B are correct ✓
2. B and C are correct ✓
3. C and D are correct ✓
4. A and D are correct ✓
5. All are correct ✓

XIV. Patients presenting with periodic fever and anemia with recent history of extensive US summer travel and international travel, a history of insect bites during their travel and who fail to respond to chloroquine may have the following

A. Chloroquine drug resistant malaria which is often effectively treated with mefloquine ✓
B. Babesia which clinically presents like malaria ✓
C. Babesia based on the observation of cross-shaped structures and nothing else present in their RBCs ✓
D. A possible risk for Lyme disease if a Babesial infection is diagnosed. ✓

1. A and B are correct ✓
2. B and C are correct ✓
3. C and D are correct ✓
4. A and D are correct ✓
5. All are correct ✓

XV. The following are effective at some point or another in treating malarial infections

A. Chloroquine ✓
B. Fansidar ✓
C. The antibiotic Doxycycline (a tetracycline analog) ✓
D. Primaquine for radical curing of infections. ✓

1. A and B are correct ✓
2. B and C are correct ✓
3. C and D are correct ✓
4. A and D are correct ✓
5. All are correct ✓
SCHISTOSOMIASIS

Circle one NUMBERED choice following each question which corresponds to the correct answer(s)

XVI. The simplest way to establish the presence of Schistosomal infections would be to
A. Perform needle aspirates of the lymphatic ducts
B. Establish the presence of microfilaria in the peripheral circulatory system by drawing blood at night
C. Check for eggs in the stool ✓
D. Check urine for eggs ✓

1. A and B are correct
2. B and C are correct
3. C and D are correct
4. A, B and D are correct
5. All are correct

XVII. The following are characteristic of the clinical picture of Schistosomal dermatitis
A. Swimmers itch ✓
B. (Pruitic maculopapular) rash following exposure of skin to infectious forms of the parasite ✓
C. A commonly self-limiting infection ✓
D. The absence of eggs in the infected host ✓

1. A and B are correct
2. B and C are correct
3. C and D are correct
4. A, B and D are correct
5. All are correct

NOTE CHANGE IN REQUIRED ANSWER FORMAT!

CIRCLE ALL LETTERED ANSWERS THAT ARE TRUE
MORE THAN ONE ANSWER IS POSSIBLE

Circle the LETTERED choice(s) following each question which correspond(s) to the correct answer(s)

XVIII. Circle all that are true for Schistosomal Infection and/or disease
A. S. haematobium can cause bladder/urinary tract disease
B. S. mansoni usually causes disease associated with the intestines
C. Schistosomes can cause neurologic disease
D. Can cause/present as hepatosplenomegaly
E. Adult worms cause all of the disease
F. Eggs cause all of the disease

XIX. Circle all that are true for Schistosomal Infection and/or disease
A. Disease onset is always immediate ×
B. Is never associated with Eosinophilia ×
C. Western blotting or ELISA assays may be useful to detect microfilaria ×
D. Only eggs not adults are typically lodged in tissues
E. Transmitted by the Blackfly (Buffalo gnat) ×
F. Larval forms are typically ingested by consuming undercooked snails ×
XX. Diagnoses for Schistosomal Infection include:
A. Eggs in stool ✓
B. Serology such as looking for IgE
C. Non-invasive tests such as immunoblotting for hemoglobinase
D. Finding migrating larvae in the eye ×
E. Liver biopsy
F. Rectal snips

XXI. Reasonable control measures to prevent against Schistosomal Infection/disease which a physician can suggest includes:
A. Minimizing contact with freshwater snails ✓
B. Use of appropriate drugs as prophylactic ×
C. Minimizing contact with water sources suspected for transmitting the parasite
D. Avoid eating raw fish
E. Surgically remove/treat infected tissues where possible and necessary to minimize disease
F. Avoid continuous drug use when in endemic areas for long periods of time

XXII. The following can be associated with Schistosomal Infection/disease (depending on the specie):
A. Granuloma formation in the intestines
B. Granuloma formation in the urinary tract and bladder
C. Migration of worms to the mesenteric blood vessels
D. The development of disease requires a mating pair of adult worms (Need more than one worm)
E. Larval periodicity where larval forms of the organism are found in blood only at nights
F. Granuloma formation in the liver and possibly egg deposition in the brain under rare circumstances

XXIII. The following is true of Schistosomes:
A. Swimming Miracidia infect non-human hosts
B. Cercariae are the forms infectious to humans which penetrate the skin
C. Excluding cases of drug resistance, Praziquantel is generally effective against all species
D. Drug treatment is effective but parasite re-infection is very uncommon
E. On average, adult mating pairs can live 5-8 years
F. Other useful drugs include Metrifonate and Oxamnique

ENTAMOEBA/GIARDIA

Circle the LETTED choice(s) following each question which correspond(s) to the correct answer(s)

XXIV. Regarding both Entamoeba and Giardial infections.
A. Both are typically transmitted via the oral/fecal route
B. Both produce multinucleate cysts that are passed anally
C. 90% or greater of the infected individuals are typically asymptomatic for disease
D. The form responsible for much of the disease is the flagellated trophozoite - Entamoeba do not have flagella
E. Given the right circumstances both infections can become systemic

XXV. Regarding Entamoeba infections.
A. Trophozoites can contribute to slow smoldering and initially asymptomatic infections leading to the formation of Amoebomas; large space-filling voids that can be mis-diagnosed as tumors
B. Can cause extra-intestinal abscesses of the liver, brain and possible other major organs
C. Disease will present with greasy diarrhea, with pain and intestinal ulcerations
D. Disease will present as dysentry (bloody diarrhea with pain and intestinal ulcerations)
E. The clinical picture without laboratory diagnosis may resemble inflammatory bowel disease
XXVI. Regarding *Entamoeba* and *Giardia* infections.
(A) One risk factor for infection/disease is lifestyle (more prevalent in gay men)
(B) One risk factor for infection/disease is post-operative (gastric surgery) care
(C) Both can show a relapsing course of disease
(D) Institutionalized individuals are typically at higher risk for disease
(E) Respond to Metronidazole (Flagyl)

XXVII. Regarding either *Entamoeba* or *Giardia* infections.
(A) Once treated, re-infections in the US is uncommon
(B) Are uncommon causes of chronic diarrhea
(C) The conditions, Hypogammaglobulinemia, is a risk factor for disease
(D) Trophozoites are never passed in feces and duodenal aspirates are required to identify these forms
(E) For Giardia, Tinidazole, Furazolidone and Quinacrine as useful substitutes for Flagyl

XXVIII. Regarding either *Entamoeba* or *Giardia* infections.
(A) May cause secondary bacterial infections which, without proper identification of parasite trophozoites, can lead to mis-diagnosis and wrong or insufficient therapy
(B) Susceptibility is HLA independent
(C) More common among pregnant women than women in the general population
(D) Is common among individuals with IgA deficiency
(E) Much of the immunity associated with protection against disease is likely to be mucosal immunity

XXIX. Regarding either *Entamoeba* or *Giardia* infections.
(A) Each organism has the capacity to produce 300 - 3000 eggs per day
(B) Like many worms, which also reside preliminary in body cavities such as the intestines, *Entamoeba* and/or *Giardia* will illicit eosinophilia
(C) Relapsing disease in *Giardia* is due to their unusual capacity to change the antigenic properties of their surface antigen
(D) A significant portion of the disease due to both organisms is due to eggs being lodged in deep tissues and their ability to illicit strong immune responses
(E) The adult organisms do not multiply in their hosts but only produce offspring which do not mature in the host

XXX. Regarding either *Entamoeba* or *Giardia* infections.
(A) Are multicellular organisms and when passed from the host can be identified with the naked eye
(B) Are transmitted by copepods, small aquatic crustaceans
(C) Resistance to disease is directed towards the invading/infecting larval form
(D) Part of the differential diagnosis for *Entamoeba* and *Giardia* infections can be made by noting the numbers of nucleic in cysts (4 vs. 2)
(E) *Giardia* infections are zoonotic, can be transmitted to humans from animals
PART II, PARASITOLOGY

Select the correct answer by circling the NUMBER (i.e. i, ii, iii etc) which corresponds to the correct choice.

**Question 1.** Blood (red!) in the urine, urinary tract obstruction and eosinophilia with the absence of foreign matter in peripheral blood smears is suggestive of infection with which organism?

A. Schistosoma mansoni
B. Schistosoma haematobium
C. Schistosoma japonicum
D. Dracunculus medinensis
E. Cryptosporidium parvum

i. A is correct
ii. B is correct
iii. C is correct
iv. D is correct
v. E is correct
vi. All are correct

**Question 2.** The key points of schistosomal infections are:

A. They are transmitted by fresh water snails
B. They cause chronic infections because of the long life of the adult worms
C. They are associated with fibrotic liver or urinary bladder disease
D. The treatment for infections are good but re-infection is usually common
E. That infections can occur in all age groups, sexes and races

i. A is correct
ii. B is correct
iii. C is correct
iv. D is correct
v. E is correct
vi. All are correct

**Question 3.** The following diagnostic approaches are valid for some Schistosomal infections

A. Analysis of stool for eggs
B. Biopsy analysis (rectal snips and liver biopsy)
C. Skin snips for microfilaria
D. Sputum analysis for spores
E. Bronchoscopy for trophozoites

i. A and B are correct
ii. B and C are correct
iii. C and D are correct
iv. D and E are correct
v. A and C are correct
vi. All are correct
**Question 4. Acute Schistosomiasis (Katayama fever) can present with**

A. Fevers and chills  
B. Abdominal pain  
C. Hepatosplenomegaly  
D. Lymphadenopathy  
E. Eosinophilia and high IgE levels  

i. A and B are correct  
ii. B and C are correct  
iii. C. and D are correct  
iv. D and E are correct  
v. A and C are correct  
vi. All are correct  

**Question 5. Schistosomes are worms and worms in general**

A. Have complex life cycles  
B. Do not multiply (produce more worms) in the same host  
C. Ilicit very good immune responses in the host  
D. Have larval forms that do not illicit an immune response in their hosts  
E. Cause disease that is typically independent of worm burden in the host  

i. A and B are correct  
ii. B and C are correct  
iii. A and C. are correct  
iv. B and D are correct  
v. E is correct  
vi. All are correct  

**Question 6. Protozoal parasites in general**

A. Are multicellular pathogens  
B. Are obligate parasites that cause disease in their hosts  
C. Do not multiply their numbers in the same host  
D. Cause very high eosinophilia  
E. Are always extracellular and thus easy to detect  

i. A is correct  
ii. B is correct  
iii. A and B are correct  
iv. C is correct  
v. C and D are correct  
vi. D is correct  
vii. D and E are correct
Question 7. Toxoplasma infections in immune competent individuals ('normals')

A. Can present as mononucleosis in a small percentage of cases
B. Can cause congenital infections
C. Can cause ocular disease
D. Is a reportable disease in France
E. Is rare in the absence of immune suppression

i. A is correct
ii. B is correct
iii. C is correct
iv. D is correct
v. E is correct
vi. All are correct

Question 8. Some key points about Toxoplasmosis are

A. It is a major problem for pregnant women and AIDS patients
B. There are usually lots of infection (asymptomatic/latent) but little disease in healthy infected individuals
C. Confirming the parasite as the basis for disease is a problem since infection rates are high in the general (healthy) population.
D. Treatment is suboptimal
E. Serologic diagnosis in AIDS patient is difficult due to their inability to produce the diagnostic rise in anti-Toxoplasma antibodies

i. A is correct
ii. B is correct
iii. C is correct
iv. D is correct
v. E is correct
vi. All are correct

Question 9. Some key points regarding treatment of Toxoplasmosis are

A. Normal individuals infected with the parasite are usually not treated
B. Treatment (typically Pyrimethamine/Sulfadiazine) is given in congenital and persistent.
C. Surgical intervention is the only recourse for treating disease.
D. Treatment is usually 100% effective
E. Treatment is fairly effective since the parasites survive exclusively as an extracellular pathogen in the host and is thus easily targeted by drugs.

i. A and B are correct
ii. B and C are correct
iii. C and D are correct
iv. D and E are correct
v. A and E are correct
vi. All are correct
Question 10. Some key points regarding Plasmodium falciparum are

A. It can kill and is the most virulent of all Plasmodial species
B. Wrong therapy is often prescribed and parasite drug resistance is prevalent
C. There is high case fatality in the U.S.
D. Diagnosis is often missed
E. The spread of the disease is facilitated by thriving mosquito populations.

i. A and D are correct
ii. B and C are correct
iii. C. and E are correct
iv. A and E are correct
v. A and B are correct
vi. All are correct

Question 11. Some key points regarding Plasmodium falciparum (Pf.) diagnosis are

A. Infections clinically manifest themselves like Babesial infections in the absence of red cell analysis
B. Pf. clinical manifestations include chills and fevers which present like Babesia
C. Pf. Infection is often diagnosed by Giesma-stained smear of peripheral blood
D. Individuals lacking a spleen (which normally functions to remove RBCs that are often deformed as a result of parasite infection) are at grave risk for more severe infections and even death

i. A is correct
ii. B is correct
iii. C is correct
iv. D is correct
v. All are correct

Question 12. Some key points regarding Plasmodium infections are

A. They are transmitted by the bites of the Black fly
B. They never give rise to conditions of non-sterilizing (clinical) immunity
C. They never cause disease in black Americans
D. A periodicity of fever in infected individuals is related to parasite replication and lysis of red cells.

i. A is correct
ii. B is correct
iii. C is correct
iv. D is correct
v. All are correct
Question 13. Humans typically acquire Toxoplasma gondii by?

A. The venereal route
B. Ingestion of cysts from poorly cooked meats
C. Swimming in contaminated waters
D. Penetration of the skin by cercarial larval forms from water sources
E. From consumption of raw fish

i. A is correct
ii. B is correct
iii. C. is correct
iv. C and D are correct
v. D is correct
vi. E is correct

Question 14. A 32 year old woman with acquired immunodeficiency syndrome (AIDS) who has had 3 cats in her apartment for the past 3 years has episodes of confusion and seizures. A computer tomography (CT) scan of her brain indicates ring enhanced cavitory brain lesions. What is the most likely cause of these lesions?

A. Plasmodium ovale
B. Entamoeba coli or Entamoeba histolytica
C. Toxoplasma gondii
D. Cryptosporidium parvum
E. Schistosoma mansoni

i. A is correct
ii. B is correct
iii. C is correct
iv. D is correct
v. E is correct

Question 15. Natural resistance to P. vivax infection and disease has been demonstrated in populations who are

A. Duffy Blood Group antigen positive
B. Glucose –6- Phosphate dehydrogenase deficient
C. Duffy blood group antigen negative
D. already infected with P. falciparum
E. already infected with other non-plasmodial parasites

i. A and B are correct
ii. B and C are correct
iii. C and D are correct
iv. D and E are correct
v. All are correct
Question 16: Select the most appropriate 'lettered' answer from the list given below by filling in the blanks below. If none of the above, write 'N'.

A. Toxoplasma gondii  
B. Plasmodium falciparum  
C. Plasmodium vivax  
D. Plasmodium ovale  
E. Schistosoma mansoni  
F. Schistosoma haematobium  
G. Schistosoma japonicum  
H. Ancylostoma duodenalis

Ex: i. Intestinal obstruction, 'P.I.E.', rectal blood loss _____ answer: I
ii. Congenital blindness and central nervous system involvement _____ A

iii. Intestinal granuloma formation _____ F

iv. Urinary tract infection _____ G

v. Transmitted by Anopheles mosquitoes _____ B

vi. Transmitted by snails and causes intestinal/hepatic disease _____ F + H (SELECT TWO)

vii. Can be transmitted by domestic cats _____ A

Question 17: Select the most appropriate 'lettered' answer from the list given below by filling in the blanks below. If none are appropriate, write 'N'.

A. Toxoplasma gondii  
B. Plasmodium falciparum  
C. Plasmodium vivax  
D. Schistosoma mansoni  
E. Schistosoma haematobium  
F. Schistosoma japonicum  
G. Giardia lamblia

Examples: Duodenal aspirates answer: I

i. Swimming miracidia / bladder carcinoma _____ G

ii. Tachyzoites / Encephalitis _____ A

iii. Hemozoin production / gametes in peripheral blood _____ B

iv. Hemozoin production 1–2% RBCs infected / one ring per cell _____ C

v. Schistosomula / intestinal infections _____ F + H
Question 18.
Blackwater fever is a manifestation of hemoglobin accumulation in renal tubules resulting from excessive red cell lysis/hemoglobinuria. It is

A. Symptomatic of severe secondary malarial infections
B. Occurs only with drugs used to treat Toxoplasma infections
C. The common name given to S. japonicum infections transmitted through water contact
D. A consequence of urinary tract infection by S. japonicum and parasite egg deposition.

i. A and B are correct
ii. B and C are correct
iii. C and D are correct
iv. Only A is correct
v. All are correct

Question 19.
Toxoplasma infections are usually latent infections which can
A. Manifest themselves by causing disease in immunocompromised individuals
B. Cause hypersecretion and dehydration in humans
C. Be transmitted as pseudocysts in contaminated drinking water supplies
D. Can result in disease that cause Central Nervous System impairment

i. A and B are correct
ii. B and C correct
iii. C and D are correct
iv. A and D are correct
v. All are correct

Question 20.
The greatest risk that Toxoplasma gondii infections posed to developing fetuses occurs only in the last trimester of pregnancy when the mother is exposed

A. Only in the last trimester of pregnancy when the mother is exposed to Toxoplasma for the first time
B. Occurs only in the last trimester of pregnancy when the mother is exposed to Toxoplasma for the second time eliciting a more vibrant immune response
C. Is only of consequence if the mother is immune compromised
D. Occurs only in the first trimester of pregnancy when the mother is exposed to Toxoplasma for the first time

A. is correct
B. is correct
C. is correct
D. is correct
v. All are correct
Question 21. Toxoplasma gondii infections

A. Can cause encephalitis resulting from re-activation of previously latent brain cysts in AIDS patients
B. Never occurs outside of the brain and therefore diagnosis is often difficult
C. Can be identified by their characteristic appearance in infected cells
D. Is transmitted primarily by the bites of domestic cats

i. A and C is correct
ii. B and D is correct
iii. B and C is correct
iv. A and D is correct
v. All are correct

Question 22
Organ transplant recipients are at higher risk for Toxoplasma infection and disease because

A. They may already have latent Toxoplasma infections that may be re-activated as a consequence of immune suppressive drug treatment employed to minimize organ rejection
B. Can acquire infections from the donor organs carrying latent Pseudocysts
C. Of sexual practices which facilitate transmission
D. Of predisposition to Sickle Cell disease

i. A and C are correct
ii. B and D are correct
iii. C and D are correct
iv. A and B are correct
v. All are correct

Question 23. Toxoplasma gondii infections in humans

A. can be transmitted via close contact with the definitive animal, via blood transfusions or via organ transplants and can not be ruled out as the cause of encephalitis in AIDS patients
B. Only causes ocular disease when transmitted via organ transplant
C. Occurs only in gay men
D. Is completely independent of host immune (CD4) status and host IgM levels

i. A is correct
ii. B is correct
iii. C is correct
iv. D is correct
v. All are correct
Question 24. The recipient of a blood transfusion develops intermittent fever with one to two fever free days between fever attacks. The transfusion recipient has never had such episodes before and has never left the country. Thin blood smear analysis shows the following.

Based on your interpretation of the above image select the best answer.

A. The infection acquired by transfusion is likely to be caused by Plasmodia because of the ring-like appearance in red blood cell shown above.
B. The infection is most likely P. falciparum since P. falciparum tends to produce more than one 'ring structure' per infected cell.
C. Based on the characteristic structures shown above, the patient is infected with Babesia.
D. The above structures will ultimately give rise to Tachyzoite rosettes in the cell.

i. A and B are correct
ii. A and C are correct
iii. B and C are correct
iv. C and D are correct
v. All are correct

Question 25. Disease caused by S. mansoni infections is associated with the following
A. Egg deposition and subsequent granuloma formation in the intestines and liver of the host
B. Egg deposition and entrapment in venules
C. Worms attaching to the intestinal tract and causing blood loss by Parasite consumption of blood
D. Eosinophilia in the host.

i. A and B are correct
ii. B and C are correct
iii. C and D are correct
iv. A, B and C are correct
v. All are correct

Question 26. Plasmodia falciparum is the most serious and potentially fatal of all malarials because of its ability to
A. Invade all cells of the reticuloendothelial system
B. Because of its ability to cause severe relapses
C. Because it survives exclusively in the spleen and liver
D. Because it can never be eliminated once an infection has been acquired

i. A is correct
ii. A and B are correct
iii. B is correct
iv. A and D are correct
v. All are correct
Question 27. Given that Chloroquine is often used as an effective drug in treating malarial infections, the limitation in using this drug is
A. It must always be used in combination with Mefloquine
B. It is only effective in individuals with sickle cell anemia
C. The increasing incidence of drug resistance must be considered
D. There is no limitation. Chloroquine remains 100% effective

i. A is correct
ii. B is correct
iii. C is correct
iv. D is correct
v. All are correct

Question 28. Latent Toxoplasma gondii infections in HIV infected gay men is of potentially grave consequences because of
A. Diminished T-cell surveillance (CD4+) results in re-activation of latent infections and can cause encephalitis
B. The increased risk of anemia, Blackwater fever and high IgE titers
C. The high risk of sexual transmission between gay men
D. None of the above are true. T. gondii is not associated with AIDS

i. A is correct
ii. B is correct
iii. C is correct
iv. D is correct
v. All are correct

Question 29
The simplest way to establish the presence of Schistosomal infections would be to
A. Check urine for eggs
B. Use antibodies against hemoglobinase to detect circulating hemoglobinase in the blood of the patient
C. Check for eggs in the stool
D. Check for miracidial hatching/swimming in stool when egg burden is too low to confirm infection

i. A and B are correct
ii. B and C are correct
iii. C and D are correct
iv. A, B and D are correct
v. All are correct
Question 30
Cercarial dermatitis (also referred to as swimmers itch or clam diggers itch)
A. Can be fatal
B. Is caused by the avian species of Schistosoma
C. Is of little medical consequence since the causative agents quickly die off before causing serious disease
D. Only occurs with Schistosoma mansoni.

i.  A and B are correct
ii. B and C are correct
iii. C and D are correct
iv. A and D are correct
v. All are correct

Question 31. Miracidia infected freshwater snails
A. Release cercariae which infect their human hosts by penetrating the skin.
B. Release eggs which are consumed by humans thus transmitting the disease, schistosomiasis
C. Are susceptible to cercarial infections
D. Eventually release forms that transform into schistosomula which migrate through the human lungs and become fully mature worms in mesenteric venules.

i. A and B are correct
ii. B and C are correct
iii. C and D are correct
iv. A and D are correct
v. All are correct

Question 32. Plasmodium vivax
A. Will produce dormant sporozoites (hypnozoites) in the liver of infected individuals.
B. Is transmitted by the Blackfly (The Buffalo gnat)
C. Will take about 8 - 30 days to produce symptoms in infected individuals
D. Will only invade old (non-nucleated) RBCs.

i. A and B are correct
ii. B and C are correct
iii. C and D are correct
iv. A and C are correct
v. All are correct

Question 33. Stages in the life cycle of parasites belonging to the plasmodial genus include
A. Oocysts, Tachyzoites, Pseudocysts and Bradysotites
B. Cysts, microfilarial forms and adult organisms
C. Sporozoites, liver schizonts and oocysts
D. Merozoites and Ring-like trophozoites

i. A and B are correct
ii. B and C are correct
iii. C and D are correct
iv. A and D are correct
v. All are correct
Question 34. Stages in the life cycle of parasites belong to the plasmodial genus include
A. A latent pseudocyst stage in cardiac muscle and the brain
B. An exoerythrocytic stage in liver.
C. An asexual stage in erythrocytes.
D. Formation of inert cysts in human intestines

i. A and B are correct
ii. B and C are correct
iii. C and D are correct
iv. A and D are correct
v. All are correct

Question 35. Stages in the life cycle of Schistosoma mansoni include
A. Egg production and release into the host intestine
B. Release of swimming cercaria from infected snail hosts.
C. Release of infectious Miracidia from hatched eggs
D. Formation of mated adult worm pairs in host venules

i. A and B are correct
ii. B and C are correct
iii. C and D are correct
iv. A and D are correct
v. All are correct
**BONUS QUESTION** Important stages in the life cycle of Toxoplasma gondii in humans include

A. Oocyst production in the intestines and passage with stool
B. Pseudocyst formation in tissues including the brain and muscle.
C. The ability of Tachyzoite to invade virtually all nucleated cell
D. Formation of mated protozoal pairs in host tissues

i. A and B are correct
ii. B and C are correct
iii. C and D are correct
iv. A and D are correct
v. All are correct

**BONUS QUESTION** Identify the following structures and the specific organisms from which they are derived

A. [Image of a structure]
B. [Image of a structure]
C. [Image of a structure]
D. [Image of a structure]

A. *Manson* + 2
B. *Hematothium* + 2
C. *Toxoplasma Gondii* + 2
D. *P. Falciparum* + 1