

Examination for Third Year Malaysian Students

Course Title: Medical Parasitology

Date: 12-9-2015

Term: Final Examination

Time Allowed: 3 hours

Total Assessment Marks: 75 MARKS

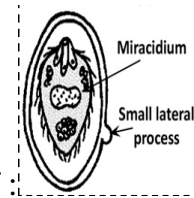


**Tanta University
Faculty of Medicine
Department of Parasitology**

MODEL ANSWER

I- **Write short notes on:**

1- **Direct laboratory diagnosis of schistosomiasis *japonicum*.**



- 1) Detection of the characteristic eggs by repeated examination of
 - Stool (*S. mansoni* and *S. japonicum*). Concentration procedures as formolether technique are needed. Egg count can be done using Kato method to assess the intensity of the infection .
 - Urine (*S. haematobium*). Concentration procedures are used as membrane filtration technique .
- 2) Hatching test may be performed on fresh stool and/or urine to distinguish active from previous infection because dead eggs may be shed for up to 1 year after treatment.

Viable eggs	Non viable eggs
Translucent	Opaque
Clear miracidium	Disintegrated miracidium
Surrounded by RBCs	No RBCs
Hatch by adding water	Do not hatch

N.B. Closed schistosomiasis: means active schistosomal infection despite absence of eggs in the excreta due to dense fibrosis of the tissues of the bladder or bowel wall. The diagnosis at this stage is aided by tissue biopsy (for detection of eggs) and/or

immunological tests.

3) Endoscopy and tissue biopsy:

- In *S. mansoni* and *S. japonicum*: **sigmoidoscopy** is used to take rectal snips or biopsy for diagnosis, and detection of intestinal complications.
- In *S. haematobium*: **cystoscopy** is used to take bladder snips or biopsy for diagnosis, and detection of urinary complications.

2) Clinical aspects of ascariasis.

(I) Migration stage:

The migrating larvae may produce host sensitization that result in allergic manifestations such as asthmatic attacks. They may cause serious haemorrhagic pneumonitis called verminous pneumonia (**Loeffler's syndrome**) manifested by:

- Fever.
- Coughing, expectoration and haemoptysis.
- Dyspnoea and wheeze.
- Eosinophilia up to 20%.

(II) Intestinal stage:

1) **Asymptomatic**: mild infection, consisting of 5 to 10 worms often goes unnoticed and discovered only by routine stool examination.

2) **Symptomatic**: the most frequent complaints of patients are abdominal pain, colic, dyspepsia, diarrhoea or constipation.

Complications:

a) Traumatic damage:

- Intestinal obstruction.
- Penetration of the intestinal wall causing peritonitis.
- Occlusion of the bile duct (obstructive jaundice), pancreatic duct (acute haemorrhagic pancreatitis), or appendix (appendicitis).
- Migration to the stomach and may be vomited.
- Migration out of the anus or come out through the mouth or nose or enter the

pharynx or Eustachian tube and trachea causing suffocation.

Worm migration may occur as a result of stimuli such as:

- Anthelmintic therapy of mixed infections. So, in such cases, *Ascaris* should be treated first.
- Ineffective treatment.
- Fever and anaesthesia.

b) Severe nutritional impairment: *Ascaris* worms feed on pre-digested food and their by-products interfere with digestion of protein, fat and fat-soluble vitamins. These may produce loss of weight, mental and physical weakness especially in children.

Toxic effect: by products of living or dead worms may produce allergic manifestations, nervous irritability, or anorexia especially in children.

3) Complications of amoebiasis:

1) Intestinal:

- i. Appendicitis.
- ii. Haemorrhage.
- iii. Intestinal perforation leading to peritonitis.
- iv. Amoeboma: It is an inflammatory thickening of the intestinal wall around the ulcer which can be confused with a tumor.
- v. Strictures and fistulae in intestinal wall.

2) **Extra-intestinal lesions:** in different organs.

II- Complete the following statements:

1- *Bithyniasnail*.

2- *Parafossarulus* snail.

3- Promastigote

4- Short stumpy form

5- Plague, epidemic typhus, trench epidemic relapsing fever, vagabond's disease.

6- *Leishmania* spp., Sand fly fever, Oroya fever

7- &8- *H. heterophyes*, *Metagonimus yokogawii*, *Paragonimus westermani*,
Colonorchissinensis, *Opisthorchis felinus*, *Diphyllbothrium latum*,
Capillaria philippinensis.

9&10 *Ancylostoma braziliense* and *Ancylostoma caninum*, *Strongyloides stercoralis* and
Cutaneous myiasis due to larvae of *Gasterophilus* and *Hypoderma*.

III) Give the reason(s) of:

10marks

1) Repeated treatment after two weeks is recommended in hymenolepiasis: to kill worms that emerge from cysticercoids in submucosa.

2) IgG avidity test may be an essential for the diagnosis toxoplasmosis: as it is a useful marker for discrimination between old and recently acquired toxoplasmosis. The avidity of specific IgG denotes the net antigen-binding force of antibodies. Following primary infection, the initially produced antibodies have low avidity that increases progressively over weeks or months to be of high avidity. So low avidity IgG denotes recent infection and high avidity IgG denotes past infection.

3) Chyluria in *Wuchereria bancrofti* infection: due to lymphatic obstruction results from:

- 1) Fibrosis following the cellular reaction occurring due to the repeated acute inflammatory attacks.
- 2) The coiled worms or the proliferative granulation tissue after its death.
- 3) Repeated long-term secondary bacterial infections.

Extensive lymph varices, which may rupture in the renal pelvis or urinary bladder resulting in passage of milky white urine (**chyluria**)

IV) Name only two parasites that:

5 marks

- 1) **Can be treated by ivermectin:** *Strongyloidesstercoralis*, filariasis, cutaneous larva migrans, scabies
- 2) **Can be demonstrated by muscle biopsy:** *Trichinellaspiralis* infection, other parasites that could be found in muscles: *Cysticercuscellulosae*, hydatid cyst, sparganum, *Toxoplasma gondii*, *T. cruzi*. *Sarcosyst* spp.
- 3) **Can be detected in urine sample:** *Schistosomahaematobium* eggs & occasionally *S. Mansoni* eggs, *E. vermicularis* eggs (in females only), Microfilariae of *Wuchereriabancrofti* (in case of chyluria), Scolices of hydatid cyst, *Trichomonasvaginalis*, Larvae of dipterous flies (urogenital myiasis), *Sarcoptescabiei*, *Phthirus pubis*.
- 4) **Can cause malabsorption syndrome: Helminths:** *Strongyloidesstercoralis*, *Capillariaphilippinesis*. **Protozoa:** *Giardia lamblia*, *Cryptosporidium*
- 5) **May cause megaloblasticanaemia:** *D. latum*, *Giardia lamblia*, *T. trichiura*.

V) Mention one of the parasitological uses of the following:

5 marks

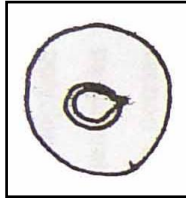

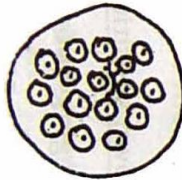


- 1) **Mercurial ointment for** treatment of enterobiasis.
- 2) **Nitazoxinide for** treatment of cryptosporidiosis.
- 3) **Baermann's technique for** for isolation and the detection of hookworm, *Strongyloides* and *Trichostrongylus* larvae in stool or soil.

- 4) **Animal inoculation:** for diagnosis of visceral Leishmaniasis, Babesiosis, Toxoplasmosis & Trichinosis: Feeding laboratory-bred mice with the suspected tissue biopsy (muscle).
- 5) **Crotamiton 10%** for treatment of scabies.

VI- Draw labeled diagrams for the following:

15 marks

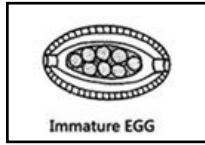
2. The erythrocytic cycle of *Plasmodium vivax*.

<p>Red cell: enlarged.</p> <p>Stippling: Schuffner's dots.</p>	
<p>Early trophozoite (Ring form) : Ring form with a single chromatin dot, a thin rim of cytoplasm and a vacuole. Size: 1/3 of RBC.</p>	
<p>Late trophozoite: Irregular amoeboid in shape with vacuolated cytoplasm.</p>	
<p>Mature schizont: With 16 merozoites in average, clumped malarial pigments. Size: fills RBC.</p>	
<p>Male (micro) gametocyte : Rounded with diffuse chromatin. Size: fills RBC.</p>	
<p>Female (macro) gametocyte : Rounded with compact chromatin. Size: fill RBC.</p>	

2- The diagnostic stage (s) of :-

a) *Capillariaphilippinensis*

Egg:



a) **Size:** 45 × 20 μm.

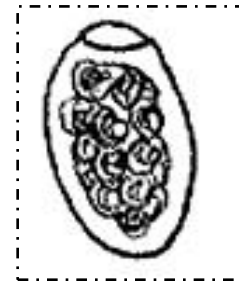
b) **Shape:** peanut-shaped, with inconspicuous bipolar plugs and a striated shell.

c) **Colour:** yellow.

d) **Content:** typically unembryonated when passed in stool.

b) *Fasciolopsisbuski*:Egg:

- **Size:** 140 × 70 μm.
- **Shape:** oval, operculated and thin shelled.
- **Colour:** yellowish.
- **Content:** immature ovum.



1) The infective stage (s) of:-

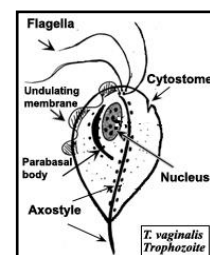
a) *Strongyloidesstercoralis*:filariform larva unsheathed, cylindrical, 1/2 body length and



notched

b) *Trichomonasvaginalis*:trophozoite

– Oval or pear-shaped, about 15 × 8 μ with a great variation



in

size.

- Has one large oval vesicular nucleus and a very small anterolateral cytostome.
- Has 3-4 free anterior flagella plus a recurrent flagellum that arises anteriorly and parallels the body posteriorly to form the outer margin of the undulating membrane that never extends beyond the middle of the body.
- Has numerous granules along its slender axostyle. The axostyle extends beyond the posterior end.
 - o Has a thick parabasal body

VII- Case(1)

7.5 marks

a) What are the suspected parasitic disease and the causative parasite?

A case of neurocysticercosis disease. the causative parasite is *taeniasolium*

b) Discuss the different modes of infection?

1- Ingestion of food or water contaminated by the eggs of *Taeniasolium*.

2- Auto-infection either.

a-External autoinfection: The patient harbouring the adult parasite contaminates his fingers by his own stool.

b- Internal autoinfection: In the presence of antiperistaltic movements of the intestine (in case of vomiting or taking emetic drugs), the gravid segments and ova may regurgitate to the stomach. The gravid segments become broken up and liberate the eggs. On returning to the intestine, the eggs hatch.

c) What are other organs that may be involved

1) Subcutaneous and muscular cysticercosis: this could be asymptomatic or manifested by presence of subcutaneous nodules, muscle pain and tenderness.

2- Ocular cysticercosis: the hatched onchosphere reach the eye via the posterior ciliary branches of the ophthalmic artery. Cysticercan develop in the eye leading to

retinal detachment ending in blindness and atrophy of the eye. Occasionally, cysts could develop in extraocular muscles causing squint.

d) Enumerate other three parasites that may affect the brain?

- **Trematodes:** *Heterophyes heterophyes*, *Schistosoma* spp.
- **Cestodes:** cysticercosis, hydatid cyst, sparganosis, *Coenurosis*.
- **Nematodes:** *Strongyloides stercoralis*, *Toxocara* spp., *Trichinella spiralis*
- **Protozoa:** *Entamoeba histolytica*, free-living amoebae, *Toxoplasma gondii*, *Plasmodium falciparum* (cerebral malaria), African trypanosomes, *T. cruzi*.

VIII- Case (2)

7.5 marks

a) What are the suspected parasitic disease and the causative parasite?

Oriental sore and causative parasite is *leishmaniatropica*.

b) Discuss the different modes of infection?

- Biological transmission: by blocked female *Phlebotomuspapatasi* and *Phlebotomussergenti*.
- Direct contact: contamination of the abraded skin with the infected material.
- Autoinfection: by scratching the discharge from the active sore into normal skin.

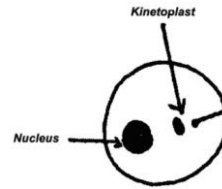
b) How can you confirm the diagnosis by a direct laboratory method?

c) Direct:

1- Detection of the parasite in superficial scraping, needle aspiration, or a biopsy taken from the active edge of the lesion.

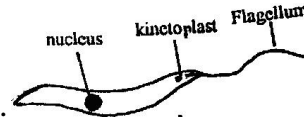
The collected material can be:

1- Smear on microscopic slides and stained with Giemsa or Leishman or fixed for



pathological examination for detection of **amastigotes**.

2-Cultured on the classical solid blood agar Novy-McNeal-Nicol (N.N.N.) medium or



Schneider's liquid medium → **promastigotes**.

3- Inoculated in experimental animals. **Amastigotes** are detected in smears from the ulcers or nodules of the animal's skin. It is a confirmatory test and is not used for routine diagnosis.

d) Enumerate other three parasites that may cause skin nodule?

Cysticercus cellulose in the skin, sparganum in the skin, *O. volvulus*, *Loa loa*, *African trypanosomes*. *T. cruzi*, *Tungapenetrans* (chigger's disease)

IX- Choose the correct answer:

10 Marks

1-	C	6-	C
2-	D	7-	D
3-	C	8-	B
4-	D	9-	B
5-	D	10-	A