

UNIVERSITY OF GHANA SCHOOL OF MEDICINE AND DENTISTRY
COLLEGE OF HEALTH SCIENCES



21/07/2017

GEMP 325
INTERIM ASSESSMENT: 2

TIME ALLOWED 1 HOUR

1. Select the parasite pair whose auto infection can occur without your patient's physical or mechanical involvement.

a.	<i>Balantidium coli</i>	and	<i>Ancylostoma duodenale</i>
b.	<i>Giardia lamblia</i>	and	<i>Trichuris trichiura</i>
c.	<i>Entamoeba histolytica</i>	and	<i>Necator americanus</i>
d.	<i>Cryptosporidium parvum</i>	and	<i>Strongyloides stercoralis</i>
e.	<i>Achantamoeba species</i>	and	<i>Ascaris lumbricoides</i>

2. *Cryptosporidium parvum* and *Giardia lamblia* BOTH share which of the following Clinical manifestation?

a.	Blood in stool
b.	Flatulence
c.	Villous blunting ans
d.	Foul smelling stool
e.	Bloating stomach

3. Which of the following parasites are **WRONGLY** matched with the corresponding clinical presentation?

a.	Dysentery	-----	<i>T. trichiura</i> and <i>S. stercoralis</i>
b.	Pruritus ani	-----	<i>S. stercoralis</i> and <i>Taenia spp</i>
c.	Rectal tenesmus	-----	<i>E. histolytica</i> and <i>B. coli</i>
d.	Vit. B12 anaemia	-----	<i>D. latum</i> and <i>A. duodenale</i> ans
e.	Urticaria	-----	<i>S. stercoralis</i> and <i>A. lumbricoides</i>

4. What diagnostic test would you recommend for a patient that you feel has Oxyuriasis?

a.	Temperature check and full blood
b.	Thick and thin blood examination and urinalysis
c.	Analysis of sample taken with the Scotch tape and Graham swap ans
d.	Z-N staining of stool and routine stool examination
e.	Urinalysis with sediment examination and cholesterol check

5. Choose the parasitic life form that is **NOT** the cause of the matched clinical presentation.
- | | | | |
|----|-----------------------------|-------|--|
| a. | Rectal prolapse | ----- | <i>Trichuris trichiura</i> Adult |
| b. | Loefflers like presentation | ----- | <i>Strongyloides Stercoralis</i> Larvae |
| c. | Pruritus ani | ----- | <i>Enterobius vermicularis</i> Eggs |
| d. | Intestinal obstruction | ----- | <i>Ascaris lumbricoides</i> Adult |
| e. | Iron deficiency Anaemia | ----- | <i>Ancylostoma duodenale</i> Larvae ans |
6. Select the **FALSE** statement about the following parasites.
- S. Stercoralis* shares Pruritus ani with *E. vermicularis* and Urticaria with *A. lumbricoides*
 - Life cycles of *Strongyloides stercoralis* can be described as Direct, Indirect, Retro infection, Autoinfection and Free-living.
 - The rhabditiform larvae of *S. stercoralis* have a short buccal capsule and large genital primordium
 - Whip worm adult looks like a "whip" and shares Dysentery with *S. stercoralis*
 - Finger nails and inhalation are important in the transmission of *Enterobius vermicularis* but not *Necator americanus*
7. Pick the **WRONGLY** matched statement with the corresponding parasite
- Trichuris trichiura* --- Ingestion of egg containing the L1 larvae
 - Pinworm --- Swube Tube for sample collection
 - Heavy infection of *Trichuris trichiura* --- mucus and bloody diarrhoea
 - Fertile egg of *Ascaris lumbricoides* --- less granular albuminous covering
 - Strongyloides Stercoralis* --- Auto-infection can be controlled by footwear **ans**
8. Select the **WRONGLY** matched statement about the parasite.
- Hook worm infection --- Diarrhoea with black or red stool
 - Strongyloides Stercoralis* --- Diarrhoea and constipation alternate
 - Seat worm infection --- More in tropical than temperate regions **ans**
 - Developed hookworm egg --- Contains fused segments or blastomeres
 - Strongyloides fülleborni* --- Chimpanzees and baboons
9. Choose the **WRONG** statement about *Strongyloides stercoralis* infection.
- Malabsorption syndrome in serious clinical presentation
 - Flattened and atrophied mucosal layer occur
 - Disseminated infection occur mainly in the immunocompetent **ans**
 - Heavy, chronic infections result in anaemia
 - Weight loss and chronic dysentery can occur in severe infection

10. The following life forms will be of diagnosis importance for the matched parasites **EXCEPT**?
- a. *Trichuris trichiura* ----- Eggs but sometimes the Adult
 - ☒ b. *Strongyloides Stercoralis* ----- Larvae but sometimes the Eggs **ans**
 - c. *Enterobius vermicularis* ----- Eggs but sometimes the Adult females
 - d. *Ascaris lumbricoides* ----- Eggs but sometimes the Adult
 - e. *Ancylostoma duodenale* ----- Eggs but sometimes the Larvae
11. Which of the following is **NOT** likely to be the way your patient would have acquired the matched intestinal parasite?
- a. Skin penetration of the filariform larvae *Strongyloides stercoralis*
 - ☒ b. Ingestion of cow dung contaminated vegetables *Taenia saginata* **ans**
 - c. Ingestion of ova containing L2 in food or water *Ascaris lumbricoides*
 - d. Water contact (Wading in infected water) *Schistosoma mansoni*
 - e. Ingestion of parasite in raw or uncooked fish *Diphyllobothrium latum*
12. Which of the following does **NOT** describe the causative agent of your patient who presents with bloody/dysenteric stool?
- a. Barreled shape dormant form, with two muco-polar plugs
 - b. Oval shape motile vegetative form, with a kidney shaped macro-nucleus
 - c. An oval shaped dormant form that is asymmetrically flattened at one side **ans**
 - d. Irregular shape vegetative form, having a nucleus with a central karyosome
 - e. Transparent elliptical dormant form with 2 or 4 segments or blastomeres
13. What diagnostic test would you recommend for a patient that you feel has both Cryptosporidiosis and Beavers fever?
- a. Temperature check and full blood
 - b. Thick and thin blood examination and urinalysis
 - c. Analysis of sample taken with the Scotch tape and Graham swap
 - ☒ d. Z-N staining of stool and routine stool examination **ans**
 - e. Urinalysis with sediment examination and cholesterol check
14. Which of the following descriptions about the aspirate, will be of diagnosis importance for your patient having amoebic liver abscess?
- a. chocolate looking, foul smelling with lots of cysts
 - ☒ b. anchovy sauce looking, no smell with more trophozoites **ans**
 - c. chocolate looking, spoilt fish smell with cyst predominating
 - d. anchovy sauce looking, chocolate smell with no trophozoites
 - e. chocolate looking, milky smell with more cyst

15. There could be either direct or indirect life cycle in parasites. For the following, select the wrongly matched parasite and life cycle.

- a. *Balantidium coli* – Direct
- b. *Strongyloides stecoralis* – Indirect **ans**
- c. *Entamoeba histolytica* – Direct
- d. *Schistosoma haematobium* – Indirect
- e. *Ascaris lumbricoides* – Direct

16. The apicomplexa group includes...

- a. *Plasmodium* spp. and *Entamoeba* spp.
- b. *Plasmodium* spp. and *Toxoplasma gondii* **ans**
- c. *Entamoeba* spp. and *Balantidium coli*
- d. *Toxoplasma gondii* and *Trypanosoma* spp.
- e. *Giardia lamblia* and *Trichomonas vaginalis*

17. Provision of toilet facilities will prevent the transmission of...

- a. *Schistosoma* species **ans**
- b. *Toxoplasma gondii*
- c. *Trichomonas* species
- d. *Wuchereria bancrofti*
- e. *Loa loa*

18. The pathology due to *Loa loa* is due mainly to the...

- a. Macrofilariae
- b. L1 microfilariae
- c. L2 microfilariae
- d. L3 microfilariae **ans**
- e. L4 microfilariae

19. Which of the following is not an oriental parasite?

- a. *Plasmodium knowlesi*
- b. *Brugia malayi*
- c. *Schistosoma japonicum*
- d. *Metagonimus yokogawai*
- e. *Mansonella ozzardi* **ans**

20. Which of the following is an anti-*Wolbachia* drug?

- a. Doxycycline **ans**
- b. Ivermectin
- c. Suramin
- d. Diethylcarbamazine
- e. Metrifonate

21. Relapse malaria is triggered by...

- a. sporozoites

- b. merozoites
- c. schizonts
- d. gametocytes
- ☒ e. hypnozoites **ans**

22. Which of these parasites is strictly anthroponotic?

- a. *Taenia* species
- ☒ b. *Onchocerca volvulus* **ans**
- c. *Paragonimus* species
- d. *Schistosoma intercalatum*
- e. *Balantidium coli*

23. Which of the following features do schistosomes share with other trematodes?

- a. They have operculated eggs
- b. They lack anus
- ☒ c. They are dioecious **ans**
- d. They have cercariae as their infective stage **ans**
- e. They have only one intermediate host

24. In *Taenia Saginata* infections, the infective stage of the worm when one ingest undercooked meat is the

- a. Proglottids
- b. Coracedia
- ☒ c. Cysticercus **ans**
- d. Onchosphere
- e. Ova

25. For *Diphyllobothrium latum* the second intermediate host is a

- ☒ a. small fish **ans**
- b. big fish
- c. crustacean
- d. coracedia
- e. cyclops

26. For this worm, infection occurs directly into the respiratory tract from eggs blown in dust by wind.

- ☒ a. *Echinococcus granulosus* **ans**
- b. *Diphyllobothrium latum*
- c. *Hymenolepis nana*
- d. *Hymenolepis diminuta*
- e. *Trichinella spiralis*

27. This is the only tapeworm known that does not require an intermediate host

- a. *Echinococcus granulosus*
- b. *Diphyllobothrium latum*

- c. *Hymenolepis nana* ans
- d. *Hymenolepis diminuta*
- e. *Trichinella spiralis*

28. Infection with *Dracunculus medinensis* is through

- a. Eating meat that is not well cooked which will harbour the *Cysticercus*
- b. Eating fish that is not well cooked which will have the *Cysticercus*
- c. Drinking water that has infected cyclops ans
- d. Wading through water that has high concentration of infected cyclops as happens during dry seasons.
- e. Can be mechanically transmitted by arthropod vectors

29. Very close association of dogs and children ensures that children are exposed to the eggs of this worm:

- a. *Echinococcus granulosus* ans
- b. *Diphyllobothrium latum*
- c. *Hymenolepis nana*
- d. *Hymenolepis diminuta*
- e. *Trichinella spiralis*

30. For this worm the rat/mice is the most important reservoir

- a. *Echinococcus granulosus*
- b. *Diphyllobothrium latum*
- c. *Trichinella spiralis*
- d. *Hymenolepis diminuta* ans
- e. *Trichinella spiralis*

31. Viruses are unique infectious agents with the following characteristics...

- a. have a cell wall which is the limiting membrane of the virus particle.
- b. replication is retarded by antibodies.
- c. grow only in living cells. ans
- d. have energy synthesizing organelles which help in viral protein synthesis.
- e. have complex structures when compared to bacteria.

32. The capsid of the virus has the following functions:

- a. forms the antigenic component for all viruses.
- b. protects the nucleic acid from degeneration by host cells nucleases ans
- c. provides special enzymes for virus attachment to susceptible host cells.
- d. the number of polypeptides forming the capsid is similar in all viruses.
- e. is coded by the host organs infected.

33. Virus infectivity is affected by....

- a. temperatures above normal body temperature.

- b. pH above 7.5.
- c. lyophilization into the dry state.
- d. 50-70% ethyl alcohol **ans**
- e. absolute isopropanol.

34. Basis for classification of viruses into families include...

- a. thermal stability.
- b. pathology produced after infection.
- c. mode and site of the infected host cell where replication takes place **ans**
- d. symptoms of the disease produced.
- e. PH stability.

35. Basis for identification of viruses into genera include...

- a. Type and nature of the genome.
- b. Morphology and size of the virus particle
- c. Solvent stability **ans**
- d. Type of polymerase into the virion.
- e. Symmetry of the nucleocapsid

36. Flaviviruses...

- a. Contains a negative sense RNA.
- b. are usually transmitted via vectors such as arthropods **ans**
- c. many cause chronic infection of the kidneys.
- d. are icosahedral naked viruses.
- e. have segmented genome.

37. Human Immunodeficiency viruses belong to the under listed virus family:

- a. Coronavirus
- b. Arenavirus
- c. Retrovirus **ans**
- d. Bunyavirus
- e. Astrovirus

38. The under listed virus families are all DNA viruses **EXCEPT;**

- a. Parvoviruses
- b. Rhabdoviruses **ans**
- c. Herpesviruses
- d. Papovaviruses
- e. Poxviruses

39. Paramyxoviruses...

- a. are antigenically unstable **ans**
- b. are naked icosahedral RNA viruses
- c. have four sub-families
- d. members have single serotype
- e. include the swine fever viruses

40. Route of inoculation of the embryonated egg for yellow fever virus isolation from clinical specimen is...

- a. chorioallantoic membrane
- b. amniotic cavity
- c. embryonic cavity
- d. yolk sac **ans**
- e. chorioallantoic cavity

41. Determination of virus growth in the laboratory animals inoculated with clinical specimen may manifest as follows **EXCEPT**...

- a. inoculation bodies **ans**
- b. paralysis
- c. tremor
- d. skin coloration
- e. skin lesion

42. The following are titres of paired acute and convalescent sera for serologic diagnosis of virus infection. Which of the pair shows significant diagnosis of the current infection.

- a. 1 in 8 and 1 in 16
- b. 1 in 8 and 1 in 8
- c. 1 in 16 and 1 in 64
- d. 1 in 32 and 1 in 64
- e. 1 in 32 and 1 in 16 **ans**

43. The most common intrauterine viral infection associated with congenital disease is

- a. rubella **ans**
- b. cytomegalovirus
- c. Zika virus
- d. hepatitis B virus
- e. HIV

44. The following statements are all true about Lassa virus infection **except**
- infection causes fetal death in more than 50% of pregnant women
 - mouth ulcers and deafness are associated with infection
 - carrier state in the rodent vectors is transient **ans**
 - management of cases can benefit from administration of ribavirin
 - hyper immune sera can help in recovery
45. The Dengue Haemorrhagic Fever Virus is transmitted by
- person to person
 - mosquito vector **ans**
 - ticks
 - sexual contact
 - contact with infected animal
46. A man on antiviral therapy for infection with a particular virus had a minor mutation at a specific position in the gene that determines resistance. He was put on suboptimal therapy due to the negligence of health personnel on the ward. Which of the following statements best describes what would happen to the virus infecting him if he continues on the suboptimal therapy?
- the mutant strain will revert to a non-mutant
 - the mutation will change positions
 - the minor species will still maintain the mutation
 - the species that has the mutation will emerge to become the major strain **ans**
 - the mutant strain will revert to a non-mutant and become the major species
47. Drugs used in antiviral therapy have different modes of actions. Which of the following statements is **NOT TRUE** of nucleoside analogues?
- need to be phosphorylated to become active
 - can be used to terminate transcription
 - have a similar mode of action to nucleotide analogues
 - some may be used for treatment of more than one viral agent
 - viruses cannot become resistant to them **ans**
48. Interferon is fairly effective in treating some viral infections. Which of the following best describes its primary mode of action?
- Inhibits transcription
 - Inhibits translation
 - Prevents re-infection of already infected cells
 - Prevents cell-to-cell passage of viruses **ans**
 - Prevents translation to proteins

Case (Questions 49 & 50)

A team going on a mop-up exercise and vaccinating against measles virus disease were trapped in a village for a few days during which the ice packs on the vaccines came to room temperature. It was not until they moved to another town that they introduced new ice-packs and thereafter continued with their vaccinations. Several months later, a 3 year old girl who received one of these vaccines came to a district hospital with what looked like a maculopapular rash so the doctors queried measles virus disease.

49. What is the most likely thing to have happened to the child after receiving the vaccination?
- a. Her immune system was weakened by the introduction of the vaccine
 - ☒ b. The vaccine had reverted to the wild-type measles virus causing measles **ans**
 - c. The stabilizer caused an irritation which activated the measles virus to cause disease
 - d. The vaccine was a mixture of wild-type and vaccine strain resulting in the rash.
 - e. The number of infectious particles may have reduced in the vaccine and so did not have the needed impact on her immune system.
50. At which stage in the pathogenesis of measles virus was she when she was brought to the hospital?
- a. seeding of virus into lymph nodes
 - b. primary viremia
 - c. replication of virus in internal organs
 - ☒ d. secondary viremia **ans**
 - e. neutralization of virus in capillaries
51. Which of the following types of vaccines contains the region of the virus needed for productive infection?
- a. Live-attenuated
 - b. Killed
 - ☒ c. Sub-unit **ans**
 - d. Whole genome recombinant DNA
 - e. Mixed recombinant
52. A 9-month old baby girl was brought to the emergency room last week with a 2-day history of vomiting, watery diarrhea, abdominal colic and fever. The patient had been well until 24 hours before her presentation when she had experienced an acute onset of vomiting followed by multiple episodes of diarrhea. She refused to eat and her parents were concerned about her dehydration. Which of the following viruses is likely to be the cause of the gastroenteritis?
- a. Poliovirus
 - b. Hepatitis A virus
 - ☒ c. Rotavirus **ans**
 - d. Hepatitis E virus
 - e. Enterovirus 70

53. A two year old child who had completed the entire childhood vaccination schedule for the expanded programme for immunization in Ghana had infantile diarrhea. Which of the following viruses will be your **LEAST** suspicion?

- a. Rotaviruses **ans**
- b. Noroviruses
- c. Sapoviruses
- d. Adenoviruses
- e. Astroviruses

54. In the pathogenesis of viral gastroenteritis, which of the following is likely to occur?

- a. systemic dissemination
- b. seeding of virus into lymph nodes
- c. sub-epithelial infections of gastrointestinal tract **ans**
- d. replication of the virus in the liver
- e. destruction of enterocytes

55. The mode of dissemination for virus to the target organ after it has been inhaled depends on where the organ is situated. In which of the following viruses are you **NOT LIKELY** to have an intense viremic phase?

- a. Human metapneumovirus **ans**
- b. Variola
- c. Measles virus
- d. Mumps virus
- e. Varicella Zoster

56. During the pathogenesis of viruses that are inhaled, some of the steps may be similar. Which of the following activities listed below **IS NOT** likely to be common to all viruses that are inhaled and have distant target organs?

- a. Primary replication in the upper respiratory tract
- b. Seeding of virus into the regional lymph nodes
- c. Dissemination through blood
- d. Cell-associated dissemination in blood
- e. Shedding through the respiratory tract **ans**

57. Which of the following viruses **DO NOT HAVE** the ability to cause pathological changes within the respiratory tract?

- a. Adenoviruses
- b. Measles virus
- c. Influenza virus
- d. Parainfluenza virus
- e. Rubella virus

58. Which one of the following activities occurs during the eclipse phase of viral replication?

- a. Attachment of virion
- b. Release of viruses from an infected cell
- c. The formation of replication intermediates **ans**
- d. Splicing of viral precursor proteins after release
- e. Budding of virus from nuclear membrane

Which of the following steps is the primary determinant for viral infection of a cell to occur?

- the binding of cell surface receptors to the viral surface molecules **ans**
- mode of entry of viral nucleocapsid into the cell
- time of uncoating of capsid within the cell
- early translational activities
- production of early viral proteins

Which of the following are properties of diploid cell-lines EXCEPT;

- Derived from secondary cultures
- Contain selective cells
- Ability to undergo many serial subcultures (50 generations)
- Same characteristics as parent cells
- Derived from malignant cells **ans**



16/062017

**GEMP 325
INTERIM ASSESSMENT: 1**

TIME ALLOWED 2HOURS

ANSWER ALL QUESTIONS

**SECTION A
CHOOSE THE BEST ANSWER**

1. The single best defining description of the classical pathway of complement activation is:
 - a) It acts as a cascade
 - b) It produces a C5 convertase
 - c) It generates the membrane attack complex (MAC)
 - d) It results in the splitting of C3 into C3a and C3b
 - e) It utilizes complement component C1 **ans**
2. The single best defining feature of a lymphocyte is that it is:
 - a) A type of leukocyte
 - b) A cell that is specialized to produce cytokines
 - c) Present in the circulation
 - d) Antigen-specific **ans**
 - e) Able to undergo cell proliferation
3. All of the following are true with respect to IgM antibodies EXCEPT
 - a) they fix complement
 - b) they occur on the surface of lymphocytes
 - c) they predominate in the primary response to antigen
 - d) they are glycoproteins
 - e) they warm agglutinin **ans**
4. One principal function of complement is to
 - a) inactivate perforins
 - b) mediate the release of histamine
 - c) Bind antibodies attached to cell surfaces and to lyse these cells **ans**
 - d) phagocytize antigens
 - e) cross link allergens

5. All of the following are true of antigen EXCEPT ?
- a) They contain epitopes.
 - b) They will react with antibodies.
 - c) They contain antigenic determinants.
 - d) They can elicit an immune response.
 - e) They contain paratopes **ans**
6. Which of the following immunoglobulins is present normally in plasma at the highest concentration?
- a) IgG **ans**
 - b) IgM
 - c) IgA
 - d) IgD
 - e) IgE
7. All of the following are true EXCEPT ?
- a) An epitope is a small portion of a macromolecule
 - b) The variable region domains contain the antigen recognition site
 - c) an antigenic determinant is a paratope **ans**
 - d) The class of an immunoglobulin is determined by its heavy chain
 - e) An IgG antibody is bivalent
8. Individuals unable to make the J protein found in certain immunoglobulins would be expected to have frequent infections of the
- a) brain.
 - b) blood.
 - c) liver.
 - d) pancreas.
 - e) intestinal tract **ans**
9. When a B-cell undergoes immunoglobulin class switching
- a) the variable region of the light chain changes, but its constant region remains the same
 - b) the variable region of the light chain remains the same, but its constant region changes
 - c) the variable region of the heavy chain remains the same but its constant region changes **ans**
 - d) the variable region of the heavy chain changes but its constant region remains the same
 - e) both the variable and constant regions change

10. Effector functions of immunoglobulins are
- a) The property of the constant region domains of L-chains
 - b) The property of the constant region domains of J-chains
 - c) The property of the variable region domains of H-chains
 - d) The property of the constant region domains of H-chains **ans**
 - e) The property of the constant region domains of H-chains and the Light chain
11. Fc receptors
- a) Occur on the cell surface of cells of the immune system
 - b) recognize the variable region domains of the immunoglobulin heavy chain
 - c) recognize the constant region domains of the immunoglobulin heavy chain **ans**
 - d) recognize the constant region domains of the immunoglobulin light chain
 - e) recognize the constant region domains of the immunoglobulin light and heavy chain
12. Killer T-cells effect their killing
- a) by antibodies with specific recognition capabilities
 - b) by Inserting the complement components, C5 and C9, into the target cell membrane
 - c) by the T- cell antigen receptor and Class II MHC proteins
 - d) by cell to cell contact **ans**
 - e) by C3d
13. The primary role of IgD antibody is:
- a) to function as an antigen receptor on T-lymphocytes.
 - b) to mediate ADCC.
 - c) to mediate NK activity.
 - d) to activate the complement cascade.
 - e) none of the above **ans**
14. Affinity is primarily a function of:
- a) complement activation .
 - b) polymeric antigen binding sites **ans**
 - c) Fc receptors on eosinophils.
 - d) the concentration of antigen needed to keep a monovalent antigen in the antigen binding site.
 - e) recognizing the constant region domains of the immunoglobulin light chain

15. B cells are not usually stimulated by antigen alone because:
- a) they usually require T cell help to be stimulated by antigen [ans](#)
 - b) most B cells in the circulation need thymic hormones secreted by the antigen presenting cell to mature to a plasma cell.
 - c) Phagocytosis by B cells must be stimulated by antigen presenting cells.
 - d) They may be polyclonally activated
 - e) Isotype switching may occur
16. B cells recognize antigen using:
- a) Fc receptors.
 - b) CD 19
 - c) complement receptors.
 - d) homing mechanism.
 - e) paratope [ans](#)
17. Recognition of intracellular particles in innate immune cells involves
- a) Toll-like receptors
 - b) Antibody
 - c) NOD-like receptors [ans](#)
 - d) NKT cells
 - e) IL 2 receptor
18. The germinal centres found in the cortical region of lymph nodes and the peripheral of the splenic periarteriolar lymphatic tissue
- a) Support the development of immature B and T cells
 - b) Remove damaged erythrocytes from circulation
 - c) Act as major source of stem cells and these maintain haematopoiesis
 - d) Provide an infrastructure that on antigenic stimulation contains large populations of B lymphocytes and plasma cells [ans](#)
 - e) Are the sites of NKT cells differentiation

19. Infection with vaccinia virus results in the priming of virus-specific CD8⁺ T cells. If these vaccinia virus-specific CD8⁺ T cells are subsequently removed from the individuals, they will Kill the following cells in vitro

- a) Vaccinia-infected cells expressing MHC class II molecules from any individual
- b) Influenza-infected cells expressing the same MHC class I molecules as the individual
- c) Uninfected cells expressing the same MHC class I molecules as the individual
- d) Vaccinia infected cells expressing the same MHC Class I as the individual **ans**

20. May differentiate into memory cells

- a) Th1 cells
- b) Th2 cells
- c) Both Th1 and Th2 cells
- d) CD 8 T-cells
- e) All of the above **ans**

21. Your patient became ill 10 days ago with a viral disease. Laboratory examination reveals that the patient's antibodies against this virus have a high ratio of IgM to IgG. What is your conclusion?

- a) It is unlikely that the patient has encountered this organism previously **ans**
- b) The patient is predisposed to IgE-mediated hypersensitivity reactions.
- c) It is likely that the patient has co infection.
- d) It is likely that the patient has an autoimmune disease.
- e) It is likely that the patient cannot produce IgG.

22. Allotypes

- a) are found only on heavy chains.
- b) are determined by class I MHC genes.
- c) are confined to the variable regions.
- d) are due to genetic polymorphism within a species **ans**
- e) are confined to the hypervariable regions.

23. Chronic granulomatous disease (CGD) is

- a) an inherited immunodeficiency disorder
- b) Clinically manifests as severe recurrent bacterial and fungal infections.
- c) is characterized biochemically by the absence of a respiratory burst and associated production of reactive oxygen intermediates.
- d) It is a defect in the innate immune component
- e) It is a defect in the cellular components of the adaptive immune system

24. The best way to provide immunologic protection against tetanus neonatorum is to

- a) Inject the infant with human tetanus antitoxin.
- b) Inject the newborn with tetanus toxoid
- c) Inject the mother with tetanus toxoid within 72 hours of the birth of her child
- d) Immunize the mother with tetanus toxoid before or early in pregnancy^{ans}
- e) Give the child antitoxin and toxoid for both passive and active immunization

25. Superantigens

- a) bind in the antigen-binding cleft of MHC Class I.
- b) bind in the antigen-binding cleft of MHC Class II.
- c) bind to non-antigen-specific regions of MHC and TCR^{ans}
- d) trigger clonal anergy.
- e) activate Th1 cells that recognize the cognate antigen present on the superantigen.

26. One principal function of complement is to

- a) Inactivate perforins
- b) Mediate the release of histamine
- c) Bind antibodies attached to cell surfaces and to lyse these cells^{ans}
- d) Phagocytize antigens
- e) Cross link allergens

27. Which of the following best describe passive immunity
- a) transfer of immune cells from one individual to another.
 - b) immunization with a vaccine.
 - c) a bone marrow transplant.
 - d) transfer of preformed soluble immune components (immunoglobulins) **ans**
 - e) transplant of spleen
28. Two antibodies that have the same antigenic recognition sequence are called
- a) isotypes.
 - b) allotypes.
 - c) haptens.
 - d) idiotypes **ans**
 - e) autotypes.
29. A given macrophage producing IL-1 can induce cells in the brain to reset the body thermostat to a higher temperature. This represents _____ action of a cytokine.
- a) Autocrine
 - b) endocrine **ans**
 - c) exocrine
 - d) paracrine
 - e) Orthocrine
30. Innate host defense mechanisms are critical to the protection of the body because:
- a) they utilize pre-committed T cells that have already been induced by other immune responses.
 - b) they are the last line of defense of the body after the immune system fails.
 - c) they are highly specific for the invading pathogens.
 - d) they provide immediate, continuous protection without the need for a specific immune response **ans**
 - e) they have memory cells
31. The protection against small pox afforded by prior infection with cowpox represents
- a) antigenic specificity
 - b) antigenic crossreactivity **ans**
 - c) enhanced antigen uptake by antigen presenting cells
 - d) passive immunity
 - e) none of the above

32. C3b is involved in all of the following EXCEPT

- a) altering vascular permeability **ans**
- b) promoting phagocytosis.
- c) forming alternative-pathway C3 convertase.
- d) forming C5 convertase.
- e) Forming the membrane

33. Which one of the following is NOT true regarding the alternative complement pathway?

- a) It can be triggered by infectious agents in absence of antibody.
- b) It does not require C1, C2, or C4.
- c) It cannot be initiated unless C3b fragments are already present **ans**
- d) It has the same terminal sequence of events as the classic pathway.
- e) Properdin is required.

34. Cytotoxic T cells induced by infection with virus A will kill target cells

- a) from the same host infected with any virus.
- b) infected by virus A and identical at class I MHC loci of the cytotoxic T cells. **ans**
- c) infected by virus A and identical at class II MHC loci of the cytotoxic T cells.
- d) infected with a different virus and identical at class I MHC loci of the cytotoxic cells.
- e) infected with a different virus and identical at class II MHC loci of the cytotoxic cells.

35. Antigen-antibody reactions can result in the following EXCEPT

- a) Agglutination
- b) complement fixation
- c) neutralization
- d) Cell to cell contact for distraction of infected cells **ans**
- e) Affinity maturation and isotype switching

36. A 25 year old lady presented with recurrent sinopulmonary pyogenic bacterial infections. The likely diagnoses will include

- a) x-linked hypogammaglobulinemia
- b) common variable hypogammaglobulinemia
- c) transient hypogammaglobulinemia of infancy
- d) selective IgA deficiency
- e) hyper IgM syndrome **ans**

37. Immature T cells that have a TCR (T cell receptor) which recognize self-antigens are eliminated in the thymus through
- a) cytotoxic T cell killing
 - b) negative selection **ans**
 - c) positive selection
 - d) apoptosis
 - e) absence of co stimulatory molecules
38. The lactoferrine in the lysosomal granules play a role in host immunity as follows:
- a) It binds iron within the cell **ans**
 - b) it destroys muramic acid in bacterial cell walls
 - c) It permeabilize bacterial and fungal membranes
 - d) It activate complement
 - e) It recruit inflammatory cells
39. Which of the following statements about virus is true.
- a) Live virus can elicit humoral immunity
 - b) Killed virus can elicit humoral immunity
 - c) Live virus can elicit both humoral and cell mediated immunity **ans**
 - d) Killed virus can activate both humoral and cell mediated immunity
 - e) Both live and killed Virus elicit cell mediated immunity only
40. Affinity maturation results in
- a) more mature macrophage populations
 - b) antibodies with a capacity to bind more tightly to the foreign antigen **ans**
 - c) slower immune complex formation
 - d) rapid immunoglobulin gene rearrangements
 - e) all of the above
41. Avidity is primarily a function of:
- a) the interaction between a single epitope and a single Fab fragment.
 - b) the strength of binding to Fc receptors.
 - c) the interactions between the cell adherence molecules and neutrophils.
 - d) multiple simultaneous interactions between antibodies and epitopes **ans**
 - e) none of the above.

42. Antigens in immunologically privileged sites:
- a) are immunogenic but not antigenic
 - b) are immunogenic and antigenic.
 - c) tend to be processed more efficiently by NK cells.
 - d) do not generally trigger immune responsesans
 - e) Do not express MHC.
43. which of the following immunity is best use as a therapy in needle stick injury
- a) natural passive
 - b) artificial active
 - c) artificial passiveans
 - d) natural active
 - e) innate
44. A young girl has documented Neisseria meningitis. No family history is available (the girl was adopted) but review of her medical record from a forwarding hospital reveals an otherwise previously well child with three episodes of Neisseria over 2 years. Which is not an explanation of these finding?
- a) Low C3
 - b) Low C6-C8
 - c) Absent factor D
 - d) Absent properdin
 - e) C1 INH deficiencyans
45. When C3b is deposited onto a bacterial surface, the alternative pathway of complement is activated and a C3 convertase is assembled on the microbial surface. Complement components directly/indirectly required for formation/stabilization of this C3 convertase include all the following EXCEPT
- a) Properdin
 - b) Factor B
 - c) Factor D
 - d) Factor Hans
 - e) C3b

46. Typical features of botulism food poisoning include:
- a. Bulbar paralysis^{ans}
 - b. Vomitting
 - c. Diarrhoea
 - d. fever
 - e. Opisthotonos
47. Which of the following is **NOT TRUE** about tetanus?
- a. Diagnosis is mainly clinical
 - b. It is primarily associated with deep wounds
 - c. It can be prevented by vaccination
 - d. It is mediated by tetanospasmin which binds reversibly to the central nervous system^{ans}
 - e. The incubation period could take several weeks
48. Resistance in *Neisseria gonorrhoeae* to penicillin is due to
- a. Efflux mechanisms
 - b. Penicillin binding proteins^{ans}
 - c. Type III secretion system
 - d. Antigenic variations in pili
 - e. Type IV secretion system
49. Anaerobic Gram negative rods include
- a. Veillonella
 - b. Enterobacter
 - c. Neisseria
 - d. Bacteroides^{ans}
 - e. Helicobacter
50. This is used only for disinfection
- a. Glutaraldehyde
 - b. Isopropyl alcohol
 - c. Ethylene oxide
 - d. Hypochlorite^{ans}
 - e. Heat
51. These may be found as normal flora of the skin **EXCEPT**
- a. Staphylococcus epidermidis
 - b. Neisseria meningitidis
 - c. Staphylococcus saprophyticus^{ans}
 - d. Corynebacterium acne
 - e. Candida albicans

52. Which of the following is **NOT** a target for antibiotics in the bacterial cell?
- a. Cell wall
 - b. Protein synthesis
 - c. Cell membrane
 - d. DNA
 - e. Endospores **ans**
53. Which of the following bacterium has the least infective dose?
- a. *Escherichia coli*
 - b. *Salmonella Typhi*
 - c. *Shigella flexneri* **ans**
 - d. *Campylobacter jejuni*
 - e. *Mycobacterium leprae*
54. The numerous diversity and serotypes of salmonella is due to variations in
- a. the Vi antigen **ans**
 - b. Core component of the cell wall
 - c. terminal repeat of the cell wall
 - d. endoplasmic reticulum
 - e. Lipid A component of the cell wall
55. Corneal ulcers caused by a fungus can **BEST** be described as
- a. Systemic mycosis
 - b. Superficial mycosis **ans**
 - c. Cutaneous mycosis
 - d. Subcutaneous mycosis
 - e. Mucocutaneous mycosis
56. Bacteria spores
- a. Develop under optimal growth conditions of bacteria
 - b. Are found only in anaerobic bacteria
 - c. Are metabolically inert **ans**
 - d. Are found only in aerobic bacteria
 - e. Are found in bacteria that grow only under microaerophilic environment.
57. Which of the following best describe endotoxins?
- a. They are toxins found on Gram negative cell walls **ans**
 - b. They are toxins that are released by Gram positive cells
 - c. They are toxins produced by both Gram positive and Gram negative microbes
 - d. They are toxins found on Gram positive cell walls
 - e. They can be neutralized by antibiotic

58. A bacterium that preferentially grows in the presence of 5% to 10% Carbon dioxide is
- Aerotolerant
 - A strict aerobe
 - Microaerophilic **ans**
 - A facultative anaerobe
 - A strict anaerobe
59. Exfoliative toxin of *Staphylococcus aureus* is associated with which type of skin condition?
- Furuncles
 - Pyoderma
 - Carbuncles
 - Scalded Skin Syndrome **ans**
 - Cellulitis
60. Immunity to *Streptococcus pyogenes* is associated with which component of the organism
- Capsule
 - Pili
 - M Protein **ans**
 - Streptodornase
 - Peptidoglycan
61. *Streptococcus agalactiae* is usually associated with neonatal infections because
- It is a nosocomial pathogens
 - It is a normal flora of the female genital tract **ans**
 - It is a common contaminant of breast milk
 - It is highly adapted to cause disease in neonates
 - It can easily cross the placenta
62. Which of the following pairing is **NOT CORRECT** regarding *Streptococcus* species and the anatomical site where they occur as normal flora
- S. pneumoniae*: Skin **ans**
 - S. agalactiae*: Female Genital Tract
 - S. mutans*: Oral Cavity
 - S. pyogenes*: Throat
 - S. mitis*: Oral Cavity
63. Which method of antibiotic susceptibility testing involves measuring diameters of zones of inhibition and interpreting them via standardized tables?
- Broth microdilution
 - E-test
 - Agar microdilution
 - Kirby Bauer test **ans**
 - Beta lactamase test

64. Which of the categories of antimicrobial drugs exhibits the highest degree of selective toxicity?
- a. Those that disrupt cell membrane function
 - b. Those that affect the cell wall **ans**
 - c. Those that inhibit nucleic acid function
 - d. Those that inhibit protein synthesis
 - e. Those that inhibit nucleic acid synthesis
65. Which of the following is not a normal flora
- a. *Escherichia coli*
 - b. *Staphylococcus aureus*
 - c. *Neisseria meningitidis*
 - d. *Neisseria gonorrhoeae* **ans**
 - e. *Streptococcus pyogenes*
66. These are true about fungi, **EXCEPT**
- a. they have a cell wall made up of chitin or cellulose
 - b. some are thermally dimorphic
 - c. they are susceptible to antibiotics **ans**
 - d. they can grow on chocolate agar medium
 - e. they have ergosterol in their cell membrane
67. Meningitis caused by *Cryptococcus neoformans* is **BEST** treated with
- a. Ketoconazole
 - b. Amphotericin **Bans**
 - c. Cotrimoxazole
 - d. Nystatin
 - e. Terbinafin
68. Which of the following is the most appropriate antibiotic for treatment of syphilis during pregnancy?
- a. Erythromycin **ans**
 - b. Levofloxacin
 - c. Metronidazole
 - d. Penicillin
 - e. Tetracycline

69. Which one of the following is characteristic of chlamydiae?

- a. Reticulate bodies are infectious, extracellular form of the organism.
- b. Most genital tract infections are asymptomatic and are undiagnosed and untreated **ans**
- c. Sensitive to β -lactam antibiotics.
- d. Stain gram positive.
- e. Inclusion bodies are formed from division of elementary bodies.

70. Rickettsiae:

- a. Grow only extracellularly.
- b. Have eukaryotic-type cell organisation.
- c. Cause contagious infections because they are disseminated by respiratory droplets.
- d. Are clinically sensitive to penicillin.
- e. Generally invade the endothelia lining of capillaries causing small haemorrhages **ans**

71. Lyme disease is caused by

- a. *Borrelia burgdorferi* **ans**
- b. *Leptospira interrogans*
- c. *Staphylococcus aureus*
- d. *Treponema pallidum*
- e. *Neisseria gonorrhoeae*

72. Which of the following is a Gram negative anaerobic organism

- a. *Escherichia*
- b. *Salmonella*
- c. *Enterobacteria*
- d. *Bifidobacterium*
- e. *Fusobacterium* **ans**

73. Select the set of biochemical test required for identification of Enterobacteria

- a. Oxidase only
- b. Oxidase, serology
- c. Sugar assimilation test
- d. Oxidase test, sugar assimilation, TSI
- e. Carbohydrate utilization, TSI, motility, serology **ans**

74. Mycobacteria

- a. Gram positive anaerobic rods
- b. Gram positive rods which are easy to stain
- c. Spore containing Gram positive rods
- d. Non-sporing, strictly aerobic rods **ans**
- e. Can only be stained by Gram stain

75. Tuberculosis

- a. Is the most important mycobacteria disease **ans**
- b. Affects 5% of the world population
- c. Affects up to 50% of the world population
- d. Is caused by all species of mycobacteria
- e. Is not an important disease in Ghana?

The following table is to be used in answering questions 76 to 79 Pick the letter with the appropriate differential white cell count for the answer. A letter could be used more than once.

DIFFERENTIAL WHITE CELL COUNT.

COUNT IN X10 ⁹ /L	TOTAL	NEUT	LYMPH	EOSI	MONO	BASO
A	3.0	1	1.6	0.2	0.2	0
B	12	10	1.5	0.3	0.7	0
C	10	2	7	0.4	0.6	0
D	15	4	9	0.3	1.7	0

76. A 22 year old male with repeated upper respiratory tract infections in the last six weeks.

Which of the differentials fit this case? **b**

77. A three months old baby with fever and bronchopneumonia. Which of the differentials will the baby have? **a**

78. A 15 year old lady with fever of 5 days duration and enlarged lymph nodes on both sides of the neck. She is otherwise well. Leukaemia is NOT suspected. What is the differential count? **d**

79. A 55 year old female trader with sharp acute left chest pain a few hours back. A cardiac infarct is strongly suspected. Which of the differentials will confirm this case? **b**

80. Which of the following statements is true of the spleen?

- a. The stomach is posterior to it.
- b. It lies in front of the 10th rib **ans**
- c. It weighs between 250 to 350 grams
- d. It contains myofibrils.

81. The spleen does NOT store

- a. Iron
- b. Platelets
- c. Lymphocytes
- d. Normoblasts **ans**

82. Which of the following is NOT seen in the peripheral blood after splenectomy?
- a. Howell Jolly bodies
 - b. Basophilic stippling
 - c. Reticulocytopenia **ans**
 - d. Normoblasts
83. Auto splenectomy is seen in which of the following haematological conditions?
- a. Sickle cell anaemia **ans**
 - b. Thalassemia intermedia.
 - c. Hereditary spherocytosis
 - d. Alpha thalassemia
84. In which of the following is massive splenomegaly not a feature?
- a. Hyperimmune malaria splenomegaly
 - b. Acute malaria **ans**
 - c. Chronic myeloid leukaemia
 - d. Chronic lymphocytic leukaemia.
85. Inter leukin 3 is secreted by which of the following cells.
- a. Basophil **ans**
 - b. Memory cell
 - c. Cytotoxic T cell
 - d. Activated T lymphocyte
86. A cell with a diameter of 12um, scanty pale blue cytoplasm and a round nucleus is most likely to be
- a. Natural killer cell
 - b. Lymphocyte **ans**
 - c. Monocyte
 - d. Macrophage
87. In the maturation of the granulocyte differentiation and proliferation do not occur in
- a. Stab cell **ans**
 - b. Myeloblast
 - c. Myelocyte
 - d. Promyelocyte
 - e.

88. Which of the following cells does NOT contain secondary granules?

- a. Neutrophil
- b. Stab cell
- c. Myelocyte
- d. Pro myelocyte **ans**

89. Which of these counts could be described as lymphopenia?

- a. $2.0 \times 10^9/L$
- b. $2.5 \times 10^9/l$
- c. $1.5 \times 10^9/L$
- d. $1.0 \times 10^9/L$ **ans**

90. Which of the following is not a function of neutrophils?

- a. Chemotaxis
- b. Antigen processing **ans**
- c. Phagocytosis
- d. Motility

SECTION B

ALL ANSWERS SHOULD BE WITHIN THE SPACE PROVIDED. ANY ANSWER OUTSIDE THE SPACE PROVIDED WILL NOT BE MARKED.

Maria is a 25 year old lady who suddenly became ill with a fever, general muscle ache and dizziness. Her heart rate and respiration rate were markedly elevated and her blood pressure was depressed. While on the way to the hospital, she briefly lost consciousness and also developed a red rash which rapidly spread to most parts of her body. Questioning revealed that Maria is in her menstrual period and had used a sanitary towel throughout the day and had not changed it because she was very busy at school that day. (10marks)

1). Briefly explain the pathophysiology of Maria's condition.

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