



KENYATTA UNIVERSITY
UNIVERSITY EXAMINATIONS 2011/2012

UNIVERSITY EXAMINATIONS 2011/2012 ACADEMIC YEAR

**SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE
(NURSING)**

HPA 220: PATHOLOGY II

DATE: Monday 2nd April 2012

TIME: 8.00a.m – 10.00a.m

INSTRUCTIONS: Answer ALL questions in the three sections.

SECTION A

1. Which of the following is a common routine cytologic fixative?
 - a. Formalin
 - b. Xylene
 - c. Absolute alcohol
 - d. 95% ethanol

2. Which of the following is a mountant?
 - a. Ethyl alcohol
 - b. Xylene
 - c. DPX
 - d. Picric acid

3. Fixation stabilizes tissue components so that they become:
 - a. Resistant to subsequent histological processing
 - b. Immortal and water resistant
 - c. Preserved as close to 'life-like' as possible
 - d. Unreactive to staining procedures

4. Hopwood's classification of fixatives includes all of the following except?
- Aldehydes
 - Oxidizing agents
 - Xylene
 - Protein-denaturing agents
5. The following are protein-denaturing fixatives except?
- Methyl alcohol (methanol)
 - Formalin (formaldehyde)
 - Ethyl alcohol (ethanol)
 - Acetic acid
6. The standard solution of formalin used routinely in histology laboratories is?
- 10% neutral buffered formalin
 - 4% formalin
 - 95% formalin
 - 10% formalin
7. The best fixative for electron microscopy is?
- Microwave
 - Formaldehyde
 - 95% alcohol
 - Glutaldehyde
8. On March 15, a patient developed an illness suggestive of influenza, which lasted 1 week. On April 20, she had a similar illness. She had no influenza immunization during this period. Her haemagglutination inhibition titre to influenza A virus was 10 on March 18, 40 on March 30, and 320 on April 20. Which of the following is the most appropriate interpretation?
- The patient was ill with influenza A on March 15
 - The patient was ill with influenza A on April 20
 - The patient was not infected with influenza virus
 - The patient has an autoimmune disease

9. Which of the following is the main advantage of passive immunization over active immunization
- It can be administered orally
 - It contains primarily IgM
 - It provides antibody more rapidly
 - Antibody persists for a longer period
10. Intracellular bacteria can evade immune destruction through all of the following mechanisms except?
- Production of reactive oxygen intermediate and hydrogen peroxidase catalytic enzymes
 - Secretion of anti-immunoglobulin proteases
 - Production of anti-lysosomal fusion and/or phagosomal killing proteins
 - Reversal of the acidification of the phagosome
11. Which of the following is not true about IFN- γ mediated elimination of exo-erythrocytic forms of the malaria parasites?
- Activation of Kupffer cells leading to inhibition of the parasite growth
 - IgG-dependent cellular inhibition
 - Up-regulation of HLA expression promoting CD4⁺ and CD8⁺ T cell activation
 - Liver stage antigen-1 stimulate IFN- γ production from CD8⁺ T cells
12. *Giardia lamblia* undergoes which of the following processes that cause variable and/or persistent infection
- Activation of CD8⁺ T cells leading to small intestine malabsorption and maldigestion
 - Release of factors that activate hyper-secretion of chloride leading to diarrhoea
 - Antigenic variation of variant specific surface proteins
 - Molecular mimicry through uptake of gut proteins
13. IgE binding to which of the following receptors mediates destruction of helminth worms by eosinophilic granular molecules
- FC α R
 - FC γ R
 - FC ϵ R
 - FC μ R

14. Which of the following is not an immunoglobulin evasion mechanism of viruses

- a. Antigenic drift and shift
- b. Expression of viral FcRs that block immunoglobulin effector functions
- c. Blockage of B cell signaling
- d. Production of viral hydrolases

15. The following is true about type 1 diabetes mellitus?

- a. Patients present during middle age (40-60 years)
- b. Hyperosmolar coma is more common
- c. Insulin levels are reduced or absent
- d. Has no genetic basis

16. A 41-year-old man has been drinking large quantities of water up to 20 litres per day for the past week. On physical examination he has diminished skin turgor and dry mucous membranes.

Laboratory studies show:

Sodium	162 mmol/L	(Normal 135-145)
Potassium	4.1 mmol/L	(Normal 3 to 5.5)
Chloride	121 mmol/L	(Normal 90-110)
Bicarbonate	27 mmol/L	(Normal 22-27)
Serum glucose	4.1 mmol/L	(Normal 4-10.9)
Creatinine	100 umol/L	(Normal 60-120)
Serum osmolality	343 mOsm/kg	(Normal 285-300)

A deficiency of which of the following hormones is most likely present in this man?

- a. Antidiuretic hormone
- b. Oxytocin
- c. Insulin
- d. Growth hormone

17. A 35-year-old type I insulin-dependent diabetic has had flu for the past week. He now presents with hypotension, dry mucous membranes and poor skin turgor. The patient is tachypneic and his breath has a fruity odour.

He has the following pertinent laboratory findings:

Serum urea	12 mmol/l	(normal 3-8 mmol/L)
Serum creatinine	200 umol/l	(normal 60 – 120 umol/l)
Serum glucose	28mmol/l	(normal 4-11 mmol/L)
Serum sodium	132 mmol/L	(normal 135-147 mmol/L)
Serum chloride	92 mmol/L	(normal 95-105 mmol/L)
Serum bicarbonate	17 mmol/L	(normal 22-28 mmol/L)

The following statement is true regarding the above results

- a. The patient has respiratory acidosis
- b. The patient has normal anion gap metabolic acidosis
- c. The patient has increased anion gap metabolic acidosis
- d. The patient has metabolic alkalosis

18. Fluoride is the anticoagulant used in testing blood for?

- a. Blood sugar
- b. Coagulation
- c. Electrolyte
- d. CBC

19. Which of the following statements is not true of acromegaly?

- a. Often associated with hyperglycaemia
- b. Growth hormone levels may be within reference range
- c. Thyroid hormone levels may be increased
- d. Lipid profile is often abnormal

20. The following laboratory tests are indicated in the diagnosis of Cushing's disease except?

- a. Dexamethasone suppression test
- b. Serum cortisol
- c. Serum ACTH
- d. Short synacthen test

SECTION B

1. (a) List qualities of a good fixative (5 marks)
(b) List 3 advantages and 2 disadvantages of using formalin as a fixative (5 marks)
(c) List different types of cytology specimen (5 marks)
2. (a) State the immunopathogenic mechanisms leading to development of anaemia in *Trypanosoma brucei* and *Trypanosoma brucei gambiense* infections (5 marks)
(b) Briefly, describe the erythrocytic genetic mutations that mediate innate immunity to human malaria (5 marks)
(c) Briefly, describe the mechanisms of granuloma formation in human *Mycobacterium tuberculosis* patients (5 marks)
3. Carefully examine the following laboratory results of patient.

Plasma	Patients values	Reference values
Na ⁺	139 mmol/L	132 - 144
K ⁺	4.8 mmol/L	3.2 - 4.8
Cl ⁻	98 mmol/L	98 - 108
HCO ₃ ⁻	6 mmol/L	23 - 33
pH	7.13	-
pCO ₂	22 mmHg	35 - 45

- (a) (i) Using the laboratory data above, what is the acid base disorder? Explain your answer (2 marks)
(ii) List 3 likely causes of this acid base disorder (3 marks)
- (b) Briefly, describe the laboratory investigations of an adult patient presenting with hypercalcaemia (5 marks)

SECTION C

1. List and briefly explain the different steps and processes that tissues go through before histology slides are presented to the pathologist for interpretation (15 Marks)
2. Discuss the immunopathogenesis of human HIV-1 infections (15 marks)
3. Write an account of Cushing's syndrome under the following headings (10 marks)
 - (a) Definition
 - (b) Clinical signs and symptoms
 - (c) Laboratory investigations