



KENYATTA UNIVERSITY
UNIVERSITY EXAMINATIONS 2019/2020
SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF
PHARMACY
HPA 220: PATHOLOGY II

DATE: Monday, 7th December 2020

TIME: 11.00 a.m. - 1.00 p.m.

INSTRUCTIONS:

This paper consists of three sections: A, B and C

Answer all questions in the booklets provided

SECTION A

1. A blood collection tube containing ONE of the following may not be used in collecting blood for testing serum calcium
 - a. Sodium Citrate
 - b. Lithium Heparin
 - c. Serum separator
 - d. Sodium fluoride
2. A 41-year-old man has been drinking up to 20 liters per day--for the past week. On physical examination he has signs of dehydration. Laboratory studies show the following:
Sodium 162 mmol/L (Normal 135-145)
Potassium 4.1 mmol/L (Normal 3 to 5.5)
Chloride 121 mmol/L (Normal 90-110)
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
3. The following are causes of respiratory alkalosis EXCEPT
 - a. salicylate poisoning
 - b. hysterical over breathing
 - c. Chronic lung disease
 - d. protracted vomiting
4. All the following are causes of hypokalemia EXCEPT
 - a. Acute renal failure
 - b. Laxative abuse

- c. Adrenal tumor
 - d. Diuretic abuse
5. ONE of the following conditions causes hypercalcemia
- a. Ricketts
 - b. Parathyroid gland failure
 - c. Bone tumors
 - d. Diabetes mellitus
6. The modification of diet in renal disease (MDRD) formula for calculating eGFR requires which four parameters
- a. Urine creatinine, serum creatinine, height, weight
 - b. Serum creatinine, age, gender, race
 - c. Serum creatinine, height, weight, age
 - d. Urine creatinine, gender, weight, age
7. ONE of the following laboratory results is diagnostic of diabetes mellitus in a patient being tested for the first time
- a. Fasting plasma glucose of 6.1 mmol/L
 - b. Two-hour postprandial plasma glucose of 8.0 mmol/L
 - c. Two-hour plasma glucose of 10 mmol/L following a 75 g oral glucose challenge
 - d. Random plasma glucose of 18 mmol/L and presence of symptoms
8. ONE of the following tests is not useful in laboratory diagnosis and monitoring of diabetes mellitus
- a. Glycated hemoglobin
 - b. Fructosamine
 - c. Random blood sugar
 - d. Serum insulin levels
9. ONE of the following serum protein electrophoresis results suggests an acute inflammatory process

	Albumin	α 1	α 2	β	Γ
a.	Reduced	Increased	Reduced	Normal	Normal
b.	Normal	Increased	Normal	Increased	Increased
c.	Reduced	Increased	Increased	Normal	Normal
d.	Increased	Increased	Increased	Increased	Increased

10. A 27-year-old medical student complains of excessive fatigue and a poor appetite over the last few months. He has some vague right upper quadrant pain on deep palpation; however, the liver is not enlarged on physical examination. A biochemical profile reveals a serum ALT of 125 U/L (normal, 8-20 U/L) and a normal serum aspartate aminotransferase (AST; SGOT), total bilirubin, ALP, and GGT. ONE of the following statements is TRUE regarding elevated transaminases
- a. The normal AST rules out liver disease
 - b. The elevated ALT is diagnostic of acute liver failure
 - c. ALT elevation is more specific for liver disease
 - d. Both AST and ALT must be elevated in liver damage.
11. ONE of the following is a compound fixative
- a. Acetone.
 - b. Neutral formalin

- c. Glutaldehyde
 - d. Ethanol
12. End point of decalcification cannot be determined by chemical method when one of the following is agent is used in decalcifying the tissue
- a. Nitric acid
 - b. Ion exchange resins
 - c. Chelating agents
 - d. Formic acid
13. The nuclear stain in cytology is
- a. Haematoxylin.
 - b. Eosin Azur
 - c. Orange g-6
 - d. Gram stain
14. The second step in tissue processing is
- a. Impregnation
 - b. Clearing
 - c. Dehydration
 - d. Blocking
15. ONE of the following is a mountant
- a. Xylene
 - b. DPX
 - c. Paraffin wax
 - d. 95% ethanol
16. In regard to exfoliative cytology, ONE of the following statements is TRUE
- a. The cells are well preserved
 - b. The sub epithelial are usually sampled
 - c. The cell sample consists of spontaneously shed cells
 - d. The aims in sampling to enrich the cell sample
17. ONE of the following is NOT the aim of tissue fixation:
- a. Preventing autolysis and putrefaction
 - b. Fortify tissue against harsh effects of solution used in tissue processing
 - c. Preventing loss of cellular components
 - d. Stain the tissue for examination
18. The special stain in cytology is
- a. Haematoxylin.
 - b. Eosin Azur
 - c. Orange g-6
 - d. Gram stain
19. Papanicolaou's earliest work in human cancer concentrated on study of which organ system
- a. Respiratory
 - b. Gastrointestinal
 - c. Female reproductive
 - d. Urinary
20. Artefacts is likely to be introduced by one of the following method used to determine the end point of decalcification

- a. Feeling and bending
- b. X-ray
- c. Chemical method
- d. Probing with needle

21. The antibody isotype associated with type three hypersensitivity reaction is:

- a. IgA
- b. IgG
- c. IgE
- d. IgD

22. The signature cytokine for the regulatory T helper cell subset is:

- a. Transforming Growth Factor-beta
- b. Tumour Necrosis Factor-alpha
- c. Interleukin 17
- d. Interferon gamma

23. For an immune cell to destroy pathogens through the process of Antibody- Dependent cellular cytotoxicity (ADCC) it must have:

- a. A Fab-receptor
- b. A Toll-like receptor
- c. An Fc-III gamma receptor
- d. A gamma-delta B-cell receptor

24. In the oxygen-independent killing stage of phagocytosis by performed antimicrobial agents, lactoferrin:

- a. Digests killed micro-organisms.
- b. Splits mucopeptides in bacterial cell wall.
- c. Damages non-specifically microbial membranes.
- d. Complexes with iron.

25. The name given to specialized epidermal cells found in the human skin that act as antigen presenting cells and also secrete cytokines functional in the inflammatory response is:

- a. Langerhans cells
- b. Intraepidermal thymocytes
- c. Keratinocytes
- d. Interdigitating dendritic cells

26. The followings are pathogen-associated molecular patterns linked to extracellular infections EXCEPT:

- a. Yeast cell wall mannans
- b. Gram-positive bacterial lipoteichoic acid
- c. Gram-negative lipopolysaccharide
- d. Double-stranded RNA

27. The protein molecule which together with messenger RNA and ribosomes direct the manufacture of milk proteins rich in antibodies during cellular secretion of human milk is:

- a. Golgi apparatus
- b. Endosome
- c. Transfer RNA
- d. Endoplasmic reticulum

28. The following statement is FALSE with regards to the Major Histocompatibility Complex (MHC):
- Haplotypes are identical in families.
 - Linkage disequilibrium occurs all the times.
 - Haplotypes are inherited together.
 - It is highly polymorphic.
29. The immune response induced by endoparasitic protozoa and helminths resulting in a balance between a level of persistent infection and resistance to reinfection is known as:
- Concomitant immunity
 - Premunition
 - Sterile immunity
 - Herd immunity
30. Polyclonal activation of B lymphocytes by *Trypanosoma brucei* may lead to:
- IgG – mediated hypersensitivity
 - IgM – Hyperglobulinaemia
 - Depletion of CD8 – positive T cells.
 - Depletion of plasma cells

SECTION B: SHORT ANSWER QUESTIONS (SAQ) (50MKS)

- State 5 biochemical disturbances which are characteristically seen in chronic renal insufficiency.(5 mks)
- Outline 5 laboratory tests one would request for a patient presenting to a medical facility with hyponatraemia. (5 mks)
- The following electrolyte panel was obtained in a healthy ambulatory patient coming to hospital for a routine pre-employment check. State FIVE likely causes for the hyperkalemia (5 mks)

Plasma		Reference value
Na	141 mmol/L	132-144
K	10.3 mmol/L	3.2-4.8
Cl	99 mmol/L	98-108
HCO ₃	28 mmol/L	23-33
Urea	5.5 mmol/L	3.0-8.0
Creatinine	90 umol/L	60 – 120

- A 65 year old presented with visible jaundice which he had noticed was deepening in colour. He had no pain, but noticed some weight loss and his stools were pale. Laboratory values were as follows. Reference ranges are given in brackets ():

Total bilirubin 250 µmol/l (<17), ALT 92 U/l (1-41), AST 87 U/l (1-38), ALP 850 U/l (39-117)

 - State 2 differential diagnosis (2 mks)
 - State 3 other investigations that would be helpful in making the diagnosis and the expected result.(3 mks)

5. State the purpose and important consideration during the process of fixation of tissues (5mks)
6. Outline in order the steps in preparation biopsy specimen for microscopy (5mks)
7. Briefly state the principles of abrasive cytology (5mks)
8. Outline the characteristics of a good fixative (5mks)
9. (a) State any **FOUR** examples of protozoan parasites which occupy intracellular habitats in the host to avoid anti-parasite immune responses. (2 mks)
 (b) Explain **THREE** host immune evasion strategies developed by fungi (3 mks)
10. (a) Explain how the human skin is equipped to mount effective immune responses against arthropod vectors of human disease. (3 mks)
 (b) State any **TWO** reasons why insect vectors of human diseases must immunosuppress host defences despite their short feeding period. (2 mks)

SECTION C: LONG ANSWER QUESTIONS

1. Using specific examples, describe the factors that may cause laboratory values to vary in the same person on different occasions (intra-individual variation) as well as in different individuals (inter individual variation) (10 mks)
2. Based on respiratory cytology, briefly describe:
 - a) Sampling and preparation of sputum specimens (5marks)
 - b) Fine Needle Aspiration sampling, complications and precautions (5marks)
3. (a) State the law of Major Histocompatibility Complex (MHC) restriction. (2 mks)
 (b) Illustrate the concept that killing of a virus-infected target by cytotoxic T cells is MHC-restricted. (10 mks)
 (c) Use a diagram or a flow chart to demonstrate the influence of MHC genes on skin grafting. (8 mks)
