The University of Zambia

School of Medicine

Department of Pathology and Microbiology

PATHOLOGY, (PTM 4210)

THEORY TEST 2

23rd April, 2019

(Year Four BSc. Human Biology)

08:00 -09:20 hrs

INSTRUCTIONS TO CANDIDATES

1. Do not turn this page until you are told to do so
2. This paper consists of two sections and all the questions in this paper are compulsory
3. Write your **computer number** on each page you use. Scripts without computer numbers will not be marked.
4. Use the same question paper to answer section A of this paper.
5. Each question of section B should be answered on separate answer scripts

Section A: Multiple Choice Questions (MCQs). Answer ALL the questions in this section by indicating TRUE (T) or FALSE (F) against each stem. A wrong answer will attract a negative mark (0.25 Mark). Answer this section using this question paper.

1. The globulin fraction of plasma proteins based on the electrophoretic mobility may be classified into alpha-1 globulin, alpha-2 globulin, beta-globulin, and gamma-globulin. Which of the following protein is present in the gamma-globulin fraction?
   A. Transthyretin
   B. Ceruloplasmin
   C. Haptoglobin
   D. Immunoglobulin
   E. All the above

2. A patient arrives to the ER and is unable to give you a health history due to altered mental status. The family reports the patient has gained over 10 lbs in 1 week and says it is mainly "water" weight. In addition, they report the patient hasn't been able to urinate or eat within the past week as well and was recently diagnosed with small cell lung cancer. On assessment, you note the patient's HR is 115 and BP 180/92. Patient sodium level is 90. Which of the following conditions do you suspect the patient is most likely presenting with?
   A. SIADH
   B. Diabetes Insipidus
   C. Addison's Disease
   D. Fluid Volume Deficient
   E. diabetes mellitus

3. C-reactive protein, a plasma protein that is elevated during inflammation and infections. C-reactive protein falls into the category
   A. Transport proteins
   B. Clotting proteins
   C. Plasma Enzymes
   D. Acute phase proteins
   E. None of the above

4. Albumin (69kDa) is the major plasma protein constituting 60% of total plasma proteins. Which of the following is the function of albumin
   A. Maintenance of osmotic pressure
   B. Binding and transport of fatty acids and bilirubin
   C. Transport of iron
   D. Transport of drugs such as sulphonamides
   E. all the above

5. Which of the following signs and symptoms is expected with Diabetes Insipidus?

A. Polyuria
B. Polydipsia
C. Polyphagia
D. Extreme thirst
E. all the above

6. **Which of the following protein has a half-life of approximately 48 hours and also measured as a biomarker for acute hepatic failure or malnutrition.**
   A. Albumin
   B. Transthyretin
   C. Ceruloplasmin
   D. Haptoglobin
   E. hemopexin

7. **A patient with SIADH is undergoing IV treatment of a hypertonic IV solution of 3% saline and IV Lasix. Which of the following findings requires intervention?**
   A. Sodium level of 136
   B. Patient reports urinating more frequently.
   C. Potassium level of 5.0.
   D. Assessment finding of crackles throughout the lung fields.
   E. none of the above

8. **Which is a possibility in the ECG of a pt with hypokalemia?**
   A. prolong PR interval
   B. prominent U waves
   C. T wave flattening
   D. T wave inversion in praecordial leads
   E. all of the above

9. **Which is a cause of hypokalemia?**
   A. insulin administration
   B. adrenaline infusion
   C. alkalosis
   D. toluene toxicity
   E. digoxin OD

10. **Which of the following is not a symptom of hypokalemia?**
    A. ileus
    B. constipation
    C. muscle weakness
    D. paralysis
    E. seizures

11. **Prediabetes is associated with the following:**
    A. Increased risk of developing type 2 diabetes
    B. Impaired glucose tolerance

C. Increased risk of heart disease and stroke
D. Increased risk of developing type 1 diabetes
E. All of the above

12. The anti-diuretic hormone is _____ in Diabetes Insipidus and _____ in SIADH.
A. high, low
B. absent, absent
C. low, high
D. low, low
E. high, high

13. Blood sugar is well controlled when Hemoglobin A1C is:
A. Between 12%-15%
B. Less than 180 mg/dL
C. Between 90 and 130 mg/dL
D. between 16% - 22%
E. none of the above

14. Which statement is correct?
A. Hyperlipidaemia can cause an artificially low Na+
B. If the hyponatremia is known to be of less than 48 hours duration it can be corrected quickly
C. In chronic hyponatremia, the Na+ should not be raised by more than 0.5mmol/l/hr
D. If the Na+ level is raised too quickly in a pt with chronic hyponatremia it vauses an increase in ICP
E. Central pontine myelinolysis is caused when hypernatremia is corrected to quickly

15. What are the different risk factors involved for the development of protein energy malnutrition?
A. Low socioeconomic conditions
B. Ignorance of parents about the importance of child nutrition
C. Infections like measles, Pertusis, diarrhea
D. Child abuse (Neglect)
E. All of the above

16. In the clinical work up of protein energy malnutrition, what laboratory investigations can be done in a routine laboratory setup?
A. Hemoglobin determination
B. Stained red blood cell morphology assessment
C. Serum albumin determination
D. Differential leukocyte count
E. All of the above

17. **What is the importance of hemoglobin determination in the assessment of protein energy malnutrition?**
    A. To diagnose anemia
    B. To diagnose polycythemia
    C. To assess the presence of abnormal red blood cell morphology
    D. All the above
    E. None of the above

18. **The risk factors for type 1 diabetes include:**
    A. Diet
    B. Genetic
    C. Autoimmune
    D. Environmental
    E. all the above

19. **Which of the following is a secondary cause of dyslipidemia?**
    A. Hypothyroidism
    B. Hyperthyroidism
    C. Diabetes
    D. Renal failure
    E. Protease inhibitors

20. **Which lipoprotein particle is considered to be atherogenic**
    A. LDL
    B. IDL
    C. VLDL
    D. Small-dense LDL
    E. all the above

21. **Haemolytic anaemias are defined as follows:**
    A. Those anaemias that result from a nutritional deficiency
    B. Those anaemias that result from bone marrow failure
    C. Those anaemias that result from an increase in the rate of red cell destruction
    D. Those anaemias that result from a reduction in the synthesis of normal globin chains
    E. All of the above

22. **With regard to hereditary haemolytic anaemias:**
    A. These are the result of a poor diet in childhood
    B. They are a result of poor antenatal care
    C. They result from intrinsic red cell defects
    D. They may result from an environmental change
    E. None of the above

23. **Examples of hereditary haemolytic anaemias include the following:**
    A. Hereditary spherocytosis
    B. Hereditary elliptosytosis
    C. South East Asian ovalocytosis
    D. Pyruvate kinase deficiency
    E. G6PD deficiency

24. **With regard to acquired haemolytic anaemias:**
    A. These are the result of an extracorpuscular change
    B. They can result from an environmental change
    C. These are the result of an intrinsic red cell defect
    D. Genetic abnormalities are typical
    E. All of the bove

25. **Examples of acquired haemolytic anaemias include the following:**
    A. Haemolytic transfusion reactions
    B. Haemolytic disease of the new born
    C. Infections such as malaria
    D. Secondary to liver or kidney disease
    E. Paroxysmal nocturnal haemoglobinuria

26. **Regarding the diagnosis of acute leukaemia in general:**
    A. It is defined as presence of >20% blast cells in blood or bone marrow at clinical presentation
    B. Can be diagnosed with <20% blasts if specific leukaemia associated cytogenetic or molecular genetic abnormalities are present
    C. Lineage of blasts is defined by morphology, immunophenotype, cytogenetic and molecular analysis
    D. Cytogenetic and molecular analysis is essential and usually performed on marrow or peripheral blood with very high blast count
    E. Typical myeloid immunophenotype is $CD13^+$, $CD33^+$,$CD117^+$ and TdT^-

27. **The following are recognized classes of acute myeloid leukaemia (AML):**
    A. AML with recurrent genetic abnormalities
    B. AML with myelodysplasia-related changes
    C. Therapy related myeloid neoplasms
    D. AML, not otherwise specified
    E. Myeloid sarcoma

28. **The following are clinical features of AML:**

A. Dominated by pattern of bone marrow failure caused by accumulation of malignant cells
B. Thrombocytopenia and DIC are characteristic of the promyelocytic variant of AML
C. Gum hypertrophy and infiltration
D. CNS disease
E. Severe anaemia

29. Results of investigations expected in AML include:

A. Normochromic normocytic anaemia with thrombocytopenia
B. Blasts on peripheral smear
C. Tests for DIC positive in acute promyelocytic leukaemia
D. Biochemical tests may show increased uric acid or LDH
E. Leukocytosis is usual

30. Some general principles of treatment include the following:

A. Central venous cannula insertion
B. Blood product support
C. Prevention of tumour lysis syndrome
D. Prompt treatment of fever
E. Maintenance of platelet count >$10x10^9$/L and Hb >8g/dL

31. Clinical features of chronic myeloid leukaemia (CML) include the following:

A. May occur in children, neonates and elderly
B. Symptoms of hypermetabolism e.g. weight loss, anorexia
C. Massive splenomegaly
D. Gout or renal impairment due to hyperuricaemia
E. Visual disturbances and priapism

32. The following laboratory findings may be present in CML:

A. Leukocytosis usually >$50x10^9$/L
B. Increased circulating basophils
C. Bone marrow is hypercellular with granulopoietic predominance
D. In 98% cases, Philadelphia chromosome on cytogenetic analysis
E. Presence of BCR/ABL-1 fusion gene by PCR analysis

33. The following treatment options are used to manage CML:

A. Chemotherapy
B. Radiotherapy
C. Combination of chemotherapy and radiotherapy
D. Imatinib, designed as a specific inhibitor of the BCR/ABL-1 fusion protein

E. Splenectomy

34. The response to imatinib is monitored as follows:
   A. Assessment starts with regular bone marrow analysis (3-6 months)
   B. A complete cytogenetic response is defined as absence of Philadelphia +ve cells
   C. By karyotypic analysis of the bone marrow together with PCR analysis for BCR/ABL-1
   D. Regular thyroid hormone profiles
   E. Once complete cytogenetic response is reached, monitoring continues with PCR quantification of BCR/ABL-1 transcripts at regular intervals

35. The following is true regarding the Philadelphia chromosome:
   A. There is translocation of part of the short arm of chromosome 22 to the short arm of chromosome 9
   B. The reciprocal translocation brings most of the ABL gene into the BCR region on chromosome 22
   C. The abnormal chromosome 22 is the Philadelphia chromosome
   D. The translocated chromosome 9 is the Philadelphia chromosome
   E. The translocation results in a 210kDa fusion protein product derived from the BCR/ABL-1 fusion gene

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Section B: Short answer questions: There are three (3) questions in this section. Each question in this section carries equal marks. Answer ALL the questions.

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1) Describe congenital benign disorders of white blood cells

2) A 3-month-old female child is brought to the paediatric emergency room with history of persistent inconsolable crying whenever she's crawling with high temperature, and recurrent cough. She is the first-born child and the mother gives history of having a sister with sickle cell disease. On examination, temperature is 38°C with fine crepitations on auscultation of the chest. She is moderately dehydrated with noticeable swelling around the metacarpophalangeal joints. She has pallor of the conjunctivae and mucous membranes. Full blood count results

were as follows: WCC = 23 x 10^9/L (4-10), HB = 5.2g/dL (13-17), Platelets = 755 x 10^9/L (150-400). The attending doctor suspects a genetic disorder of haemoglobin.

i. What is the likely diagnosis in this child?

ii. What is the underlying genetic abnormality in the diagnosis you have made?

iii. What confirmatory test should you request and what result should you expect?

iv. What complications of this condition are seen in this child?

v. What four (4) things should the treatment aim to correct in this child?

3) 71 - year - old woman was found by a neighbour drowsy and unwell. She had had an upper respiratory tract infection several weeks previously, and had been very slow to recover from this. She had been increasingly thirsty over this period.

The only past history was of diabetes mellitus, diagnosed about 5 years previously and claimed to be controlled by diet. On examination, she was very dehydrated, but her breath did not smell of ketones. The following results were obtained:

Serum	Result	Reference range
Urea	28.2	0.5 – 6.6 mmol/L
Na +	156	135 – 145 mmol/L
K +	4.4	3.6 – 5.0 mmol/L
Total CO 2	26	22 – 30 mmol/L
Glucose	38.2 mmol/L	

a) Calculate the effective plasma osmolality
b) Why is her sodium so high?
c) What acute diabetic complication has this patient most likely developed?
d) What test would you do to confirm the claim of her diabetes having been controlled by diet?
e) Which type of diabetes does this patient most likely have?