BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – M.Sc.(MLT)-2023/M.Sc.(MLT)-2024
Course Name – Applied Hematology & Clinical Pathology
Course Code - MMTC01001
(Semester I)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) A patient's urine has a strong, foul odor. What potential causes should be considered, and what diagnostic steps might you take to determine the underlying issue?

a) Dehydration; perform a urine specific gravity test
b) Urinary tract infection; conduct a urine culture and sensitivity test
c) Normal variation; no further action required
d) Kidney stones; order a complete blood count (CBC)

(ii) Compare cerebrospinal fluid (CSF) and blood plasma in terms of their composition and functions.

a) CSF is red, while blood plasma is clear
b) CSF contains red blood cells, whereas blood plasma does not
c) CSF primarily cushions and protects the nervous system, whereas blood plasma transports nutrients and waste products
d) None of these

(iii) In what clinical conditions might the pH of cerebrospinal fluid (CSF) become abnormal?

a) In cases of dehydration
b) Inflammatory conditions of the central nervous system
c) During normal aging
d) After a heavy meal

(iv) In comparison to normal CSF, what would be the physical appearance of CSF in a patient with bacterial meningitis?

a) Clear
b) Cloudy
c) Yellow
d) Pink

(v) Identify the common type of anemia in children

a) Sickle cell Anemia
b) Iron deficiency Anemia
c) Thalassemia
d) Aplastic Anemia

(vi) A patient is suffered from vitamin K deficiency. Which of the coagulation factors will not be affected ?

a) Factor II
b) Factor VII
c) Factor VIII
d) Factor IX

(vii) A patient presents with symptoms suggestive of an autoimmune disorder. The Coombs' test results are positive for the presence of antibodies attached to the surface of their red blood cells. What autoimmune condition is most likely indicated by these findings?

a) Rheumatoid arthritis
b) Multiple sclerosis
c) Systemic Lupus Erythematosus (SLE)
d) Psoriasis

(viii) Which stain component helps visualize the nucleus of white blood cells in a thin blood smear?

a) Eosin
b) Hematoxylin
c) Methylene blue
d) Wright's stain does not stain nuclei

(ix) In the osmotic fragility test, what happens to red blood cells when they are exposed to solutions with increasing osmolarity?

a) They swell and burst (lyse) prematurely
b) They shrink and become more resistant to lysis
c) They change color
d) They clump together

(x) By analyzing stool concentration techniques, one can infer the presence of ova and cysts of parasites, particularly in patients with

a) Hypertension
b) Respiratory infections
c) Gastrointestinal symptoms
d) Hemophilia

(xi) By analyzing urine pH, one can infer information about a patient's dietary habits. For example, acidic urine may indicate

a) A high-protein diet
b) A high-carbohydrate diet
c) Adequate hydration
d) A vegetarian diet

(xii) Select the following conditions is characterized by an excess of red blood cells, leading to increased blood viscosity?

a) Hemochromatosis
b) Polycythemia vera
c) Thalassemia
d) Myelodysplastic syndrome

(xiii) Select Which of the following anatomical spaces is the primary location for CSF collection?

a) Subcutaneous tissue
b) Intravascular space
c) Subarachnoid space
d) Gastrointestinal tract

(xiv) Select the most common method used for collecting CSF in a clinical setting

a) Urine collection
b) Venipuncture
c) Lumbar puncture (spinal tap)
d) Saliva sampling

(xv) Choose G6PD deficiency is inherited in what kind of genetic pattern?

a) Autosomal dominant
b) Autosomal recessive
c) X-linked recessive
d) Mitochondrial

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Differentiate between acute lymphoblastic leukemia (ALL) and acute myeloid leukemia (AML). (3)
3. Write down the composition of PAP stain. (3)
4. In the analysis of hemoglobin electrophoresis results, what are the key parameters that help in the characterization of hemoglobin variants? (3)
5. Name three components commonly estimated in a routine urine dipstick test. (3)
6. What is the primary objective of cytochemical staining techniques in the analysis of leukemia cells. (3)

OR

Explain the clinical significance of hemoglobin A2 (HbA2) quantification using electrophoresis. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Discuss the role of platelet aggregation studies in the diagnosis and management of bleeding disorders, such as von Willebrand disease and aspirin-induced platelet dysfunction (5)
8. Explain the principle of Periodic Acid Schiff (PAS) staining in cytochemistry, including the chemical reaction involved and the cellular structures or substances it detects. (5)
9. Discuss the normal composition of CSF (5)
10. Explain the molecular basis of platelet activation and platelet aggregation. (5)
11. Describe the significance of liver function tests (LFTs) in the assessment of liver disorders, including the interpretation of key markers such as alanine transaminase (ALT), aspartate transaminase (AST), and bilirubin (5)
12. Explain the principle behind the Coombs' test and the significance of its results in diagnosing autoimmune hemolytic anemia (5)

OR

In clinical practice, how can you differentiate between chronic lymphocytic leukemia (CLL) and chronic myeloid leukemia (CML) based on clinical presentations, blood cell counts (5)

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