



BRAINWARE UNIVERSITY

Term End Examination 2024-2025

Programme – B.Sc.(MLT)-2022/B.Sc.(MLT)-2023

Course Name – Clinical Biochemistry

Course Code - BMLTC302

(Semester III)

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)

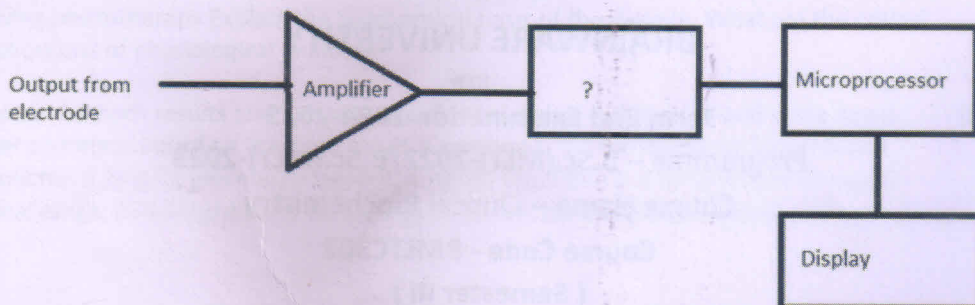
1 x 15=15

1. Choose the correct alternative from the following :

- (i) After more than 4 days starvation a patient is given 75 gm glucose for OGTT. Conclude about the result-
 - a) Insulin tolerance is increased
 - b) Insulin level increased
 - c) Growth hormone levels are increased
 - d) Cortisole level is raised
- (ii) A baby born out of a gestational diabetes mother may observe with all of the following except-
 - a) hypoglycaemia
 - b) macrosomia
 - c) hypocalcaemia
 - d) low insulin level
- (iii) Urease Nesslerization method is used to estimate-
 - a) Titrable acid in gastric juice
 - b) creatinine level in blood
 - c) BUN
 - d) Uric acid
- (iv) After the age of 40 GFR is observed to decrease by-
 - a) 0.5ml/min
 - b) 0.25ml/min
 - c) 1ml/min
 - d) 10ml/min
- (v) All of the following are bile duct enzymes and observed to increase in hepatobiliary diseases except-
 - a) GGT
 - b) 5'-NTP
 - c) ALP
 - d) AST
- (vi) Cite the normal reference ranges for sodium and potassium in the blood, respectively _____.
 - a) Sodium: 3.5-5.0 mmol/L; Potassium: 135-145 mmol/L
 - b) Sodium: 135-145 mmol/L; Potassium: 3.5-5.0 mmol/L
 - c) Sodium: 0.1-0.5 mmol/L; Potassium: 3.5-5.0 mmol/L
 - d) Sodium: 135-145 mmol/L; Potassium: 0.1-0.5 mmol/L
- (vii) Differentiate between flame photometry and ion-selective electrode methods for estimating sodium and potassium levels in blood.

- a) Flame photometry uses flames for measurement, while ion-selective electrodes use electrodes.
b) Flame photometry is more accurate than ion-selective electrodes.
c) Ion-selective electrodes are faster than flame photometry.
d) Flame photometry requires sample preparation, while ion-selective electrodes do not.

(viii)



A block diagram of digital pH meter is given here. Identify the unmarked component.

- a) Filter
b) Buffer
c) A/D converter
d) D/A converter
- (ix) When discussing the differences between a microcentrifuge and a refrigerated centrifuge, which parameter is often compared?
a) Manufacturer
b) Material
c) Maximum speed
d) Color
- (x) Identify which centrifugation depends on buoyant densities.
a) Isopycnic centrifugation
b) Gradient centrifugation
c) Density gradient centrifugation
d) Differential centrifugation
- (xi) In RIA, ----- component competes with the patient's antigen for binding to a limited number of antibody sites.
a) Substrate
b) Secondary antibody
c) Tracer or labeled antigen
d) Enzyme
- (xii) ELISA (enzyme-linked immunosorbent assay) allows for rapid screening and quantification of the presence of _____ in a sample.
a) amino acid
b) antigen
c) DNA
d) Protein
- (xiii) Which of the following is not the application of Radioimmunoassay_____.
a) RIA used to determine insulin, growth hormone.
b) Radioimmunoassay (RIA) can detect drugs such as Heroin & Morphine.
c) RIA used for determination of folic acid, vitamin B12.
d) RIA used to determine concentration of Glycoproteins
- (xiv) Which zinc salt destroy smell or odor?
a) Zinc hydrate
b) Zinc Sulphate
c) Zinc Gluconate
d) Zinc Pyrophosphate
- (xv) Metal fume fever caused by_____.
a) Lead oxide
b) Zinc oxide
c) Zinc Phosphate
d) Zinc stearate

Group-B

(Short Answer Type Questions)

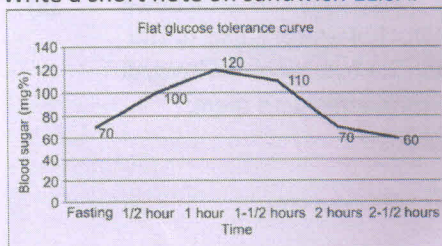
3 x 5=15

2. Explain how CPK levels are useful in early detection of heart disease? (3)

3. (3)

Analytes	Patients	Normal ranges
BUN	6.1mmol/L	2.9-8.9mmol/L
Total CO ₂	22.0mmol/L	24-30mmol/L
Chloride	95.0mmol/L	96-106mmol/L
Potassium	4.0mmol/L	3.5-5mmol/L
Sodium	142.0mmol/L	136-145mmol/L
Calculate the anion gap with the laboratory findings.		

4. What are the effects of high TG level and high ratio of TC/HDL-C? (3)
5. Write a short note on sandwich ELISA. (3)
6. (3)



Illustrate the curve and describe the disease condition in case of disease.

OR

(3)

Following are the laboratory reports of a person with advanced liver cirrhosis.		
Analyte	Patient	Normal
Blood urea nitrogen	115 mg/dL	8-25 mg/dL
Blood ammonia	180 ug/dL	10-60 µg/dL
The patient was given a-ketoglutarate intravenously. Interpret what is the biochemical basis for giving such treatment?		

Group-C

(Long Answer Type Questions)

5 x 6=30

7. A researcher wants to measure plasma glucose concentration of a test sample through UV- spectrophotometer. Correlate the test he can perform mention the principle and procedure of that test. (5)
8. Illustrate the importance of sexual hormonal assay in diagnosing reproductive disorders. (5)
9. Describe the significance of thyroid hormonal assay in the diagnosis. (5)
10. A 50-year-old man was admitted with loss of appetite, nausea, vomiting, difficulty in breathing and fatigue. History revealed that he had similar symptoms 5 years back and was diagnosed with hypertension and kidney failure. On examination, temperature was 36.8°C, respiratory rate was 22/min, pulse rate 64/min, BP was 170/100 mm Hg, marked pallor was present, chest and lungs showed bi- lateral basal rales, abdomen was soft, flat and tender. No other abnormality was detected. Patient was an Occasional alcoholic, and a chronic smoker. Laboratory investigations showed-Blood urea 65 mg/dL, serum creatinine 2.4 mg/dL, serum calcium 6.4 mg/dL, serum potassium 4.9 mg/dL, and serum sodium 139 mmol/L. Urine examination results were-Color straw colored, pH 5.0, specific gravity 1.020, appearance turbid, volume 900 mL/24 h, albumin 3+, sugar negative, pus cells 1-3/HPF, RBC - 1-2/HPF, and epithelial cells rare. What is the probable diagnosis? (5)
11. Classify the different type of autoanalyzer. (5)

12. A 3-day-old baby was found to have yellowish discoloration of skin and sclera. It was a full term, normal vaginal delivery with birth weight 2.5 kg. Mother noticed that baby was little lethargic, but there was no difficulty in feeding, no fever or any discharge from umbilicus noted. Urine and bowel output were also normal. There was no history of anemia or known heredity for hemolytic disorders in family members. Blood group of both the parents and baby was O +ve. Laboratory findings showed: Sr. total bilirubin: 9.2 mg/dL Sr. direct bilirubin: 1.0 mg/dL Sr. indirect bilirubin: 8.2 mg/dL Sr. bilirubin level decreased after receiving phototherapy Explain the biochemical basis of the disease. What are the critical complications of physiological jaundice? (5)

OR

Compare the both results and critically explain the clinical significance and write down proper comment based on the both result. Condition 1: VLDL cholesterol 20mg/dl and chilomicron 0.2mg/dl (normal range, 0–0.4mg/dl) Condition 2: Chylomicrons 50 mg/dl (normal range, 0–0.4mg/dl) and TG 350mg/dl. Define the correlation with them. (5)

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