BRAINWARE UNIVERSITY

Term End Examination 2023-2024
Programme – B.Sc.(MLT)-2022
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) A 45-year-old woman presents with severe hot flashes, night sweats, and mood disturbances. Her periods have become irregular and less frequent. Which hormonal test is most relevant for this patient?

a) Serum Estradiol Level
b) Serum Testosterone Level
c) Serum Progesterone Level
d) Serum Thyroid Stimulating Hormone (TSH) Level

(ii) Which cardiac enzyme is specific for cardiac muscle injury and is used in the diagnosis of myocardial infarction?

a) Amylase
b) Creatine kinase-MB (CK-MB)
c) Lactate dehydrogenase (LDH)
d) Alkaline phosphatase (ALP)

(iii) Patient A, a 28-year-old female, presents with breast tenderness, mood swings, and bloating a week before her menstrual period. Which hormonal test is most relevant for this patient?

a) Serum Progesterone Level
b) Serum Estradiol Level
c) Serum LH and FSH
d) All of these

(iv) A Person' s HbA1C is >6.5%.Conclude the result

a) Long term uncontrolled diabetes
b) Severe acute rise of blood glucose
c) Patient\'s diabetes is under control
d) Acute pancreatitis

(v) Neonatal hypoglycaemia is observed when blood glucose level is less than-

a) 35 mg/dl
b) 50mg/dl
c) 70mg/dl
d) 60mg/dl

(vi) Microalbuminuria is observed when-

a) Urinary albumin is >20 µg/min
b) Urinary albumin is >200 µg/min
c) Urinary albumin is >300 µg/min
d) Urinary albumin is < 20 µg/min

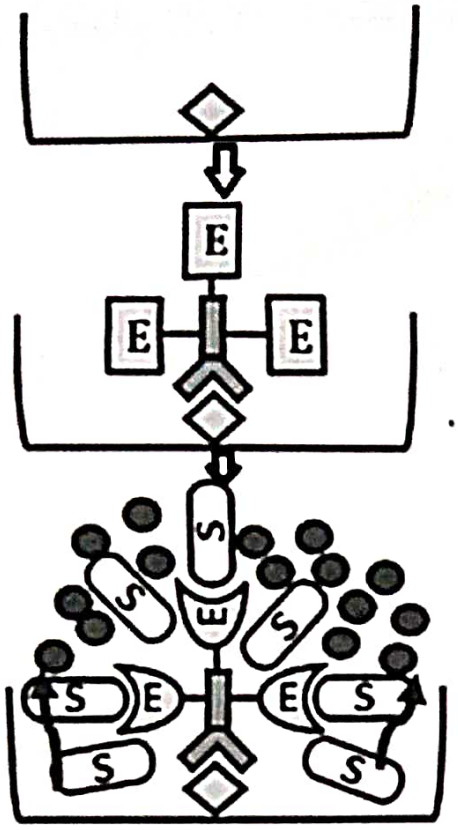
(vii) BUN can be estimated by-

a) Jaffe\'s method
b) Berthelot method
c) Floin-Wu method
d) All of these

(viii) Rise in blood urea in pre renal cases is observed mainly due to-

a) Dehydration
b) Multi-organ failure
c) renal failure
d) Increased urea synthesis

(ix)



Identify the types of ELISA

a) Indirect
b) Direct
c) Sandwich
d) Compititive

(x) A 25-year-old female patient presents with hand tremors, heat intolerance, and weight loss. Which thyroid function test should be ordered to evaluate her condition?

a) Serum TSH (Thyroid-Stimulating Hormone)
b) Serum T3 (Triiodothyronine)
c) Serum T4 (Thyroxine)
d) Serum Thyroid-Stimulating Immunoglobulins (TSI)

(xi) GFR is observed at birth-

a) 90ml/min
b) 30ml/min
c) 60ml/min
d) 125ml/min

(xii) How does smoking impact lipid profiles in the body?

a) Increases HDL cholesterol levels
b) Decreases LDL cholesterol levels
c) Decreases HDL cholesterol levels
d) Increases VLDL cholesterol levels

(xiii) ALP is observed to increase in all of the following except-

a) Paget\'s disease
b) Osteogenic sarcoma
c) Osteomalacia
d) Osteoporesis

(xiv)

Column A Enzyme	Column B Substrate
A. Horse radish Peroxidase	i. PNPP
B. Alkaline phosphatase	ii.ONPG
C. Beta galactosidase	iii. TMB and OPD

In ELISA specific antigen is detected by the addition of substrate with their specific enzyme that can generate a color. Here Enzyme (Column A) and their Specific Substrate (Column B) are given in this table. Relate the enzyme with its specific substrate

a) A.II B. I C III
b) A. I B.II C III
c) A. III B. I C II
d) A II B III C I

(xv) Why is it important to assess sodium and potassium levels in patients with heart conditions

a) Because sodium and potassium levels have no impact on heart function.
b) Because imbalances in sodium and potassium can affect cardiac rhythm and function.
c) Because sodium and potassium only affect the nervous system.
d) Because heart conditions are not related to electrolyte levels.

Group-B

(Short Answer Type Questions) 3 x 5=15

2. (3)

Laboratory examination of a patient shows the following levels:

Analyte	Patient	Normal
Calcium	17.5 mg/dl	8.5-10.5mg/dl
Phosphate	1.8mEq/l	3.5-5.0mg/dl
Chloride	110.0mEq/l	98-106mEq/l
Bicarbonate	17.0mEq/l	21-28mEq/l

Levels of sodium and potassium were nor- mal, physical examination reveals band of keratopathy (calcium deposit of the cor- nea). Illustrate in which conditions can cause increased calcium and decreased phosphate and explain the reason of disease occurence.

3. A 20-year-old female presents with nausea, vomiting, loss of appetite, itching all over body (pruritis) and muddy sclera. Write the name of investigations which would you like to carry out on urine and blood of the patient? (3)
4. Why is it important to have a linear relationship between absorbance and concentration in the Beer-Lambert Law? (3)
5. Define ELISA and Classify this based on the working principle (3)
6. A 48-year-old man was hospitalized with the complaint of hematemesis (vomiting of blood) after violent physical exertion. The patient had a previous history of alcohol abuse. On physical examination, the liver was felt as firm and enlarged and pedal edema was noted. Serum AST, ALP, and bilirubin was found to be high and serum total protein was found to be low. Explain what is your diagnosis for the case? (3)

OR

Calculate the urea blood clearance using the provided values for urea concentration in urine 1500 mg/dL, urine flow rate (2.5 mL/min), and urea concentration in blood 50 mg/dL). Evaluate the calculated clearance value alongwith BUN and explain its significance in assessing kidney function. (3)

Group-C

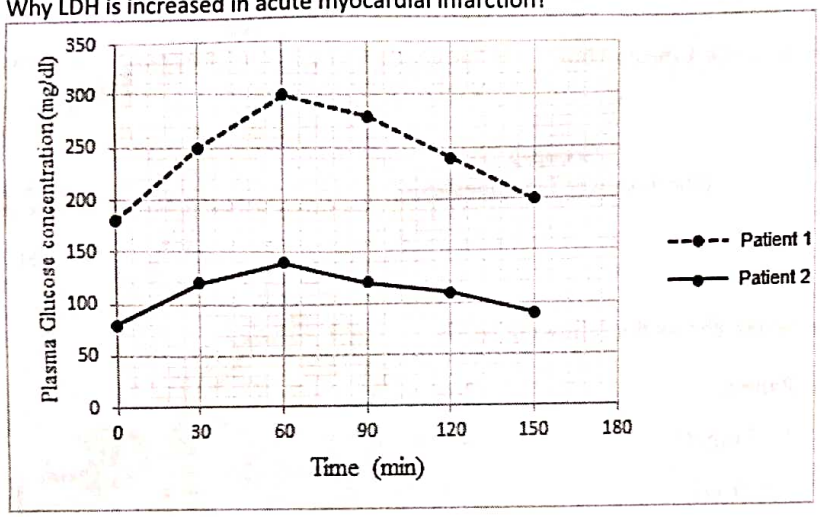
(Long Answer Type Questions) 5 x 6=30

7. A laboratory running glucose test shows a decrease in the value of patient samples when compared to results from other laboratories what can be the reason and how should the system be rectified for maintaining standard of the laboratory? (5)
8. Explain the methodology behind sexual hormone assay of LH and FSH and its relevance in clinical settings. (5)
9. A 12-year-old boy is admitted to the hos- pital with the bout of abdominal pain and a long history of abdominal complaints. He had the abdominal pain 4 hours after intake of fried food. On arrival at the hos- pital, a blood specimen was taken. The plasma was found to be milky. What kind of lipid abnormality would you suspect in the patient? (5)
10. A 50-year-old man was admitted with loss of appetite, nausea, vomiting, difficulty in breathing and fatigue. Historyrevealed that he had similar symptoms 5 years back and was diagnosed with (5)

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?

11. Why LDH is increased in acute myocardial infarction? (5)

12. (5)



A lab technologist performs oral glucose tolerance test (OGTT)of two patients. (Patient 1 and Patient 2). He measured the plasma glucose level at 30 minutes interval and results are graphically plotted below. Criticize the result and describe the process for OGTT .

OR

A 50 year old man have renal function disorder. The patient have weight 80kg, height 182cm, plasma Cr- 6mg/dl, urine Cr-50mg/dl and urine flow 60ml/min. Calculate and evaluate the amount of Creatinine clearance, along with the eGFR and write a proper clinical significance of basis of the disease occurrence and progression in patient. (5)

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