



(MAIN CAMPUS)

UNIVERSITY EXAMINATIONS
2018/2019 ACADEMIC YEAR

THIRD-YEAR SECOND TRIMESTER (FEB-MAY 2019) EXAMINATIONS

FOR THE DEGREE OF
BACHELOR OF MEDICAL LABORATORY SCIENCES

COURSE CODE: BML 322

COURSE TITLE: Systemic Clinical Chemistry

DATE: 30TH MAY 2019

TIME: 8.00 -10.00 AM

INSTRUCTIONS TO CANDIDATES

1. This paper has sections A, B and C
2. Answer the questions in each section as per the accompanying instructions
3. Write your registration number only; write it on every new leaf of the paper used
4. Answer questions on the university examination booklets provided only

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

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SECTION A: MULTIPLE CHOICE QUESTIONS (MCQs)

Instructions to the candidate

1. This section has twenty (20) multiple choice questions (MCQs)
2. Each question has a stem and four (4) options
3. Indicate the correct option(s) for each question by writing the corresponding letter

- Q1. Truth regarding erythropoietin (EPO) as a doping agent enhancing athletic performance by
- a) Increasing muscular blood flow
 - b) Increased haemoglobin for oxygen supply
 - c) Promoting skeletal muscle synaptic uptake of acetylcholine
 - d) Sustaining muscular activity by inhibiting synaptic acetylcholinesterase
- Q2. Chronic dysfunction of the liver as a biosynthetic organ is likely to be associated with
- a) Increased serum levels of C-Reactive Protein (CRP)
 - b) Diminished production of immunoglobulin proteins
 - c) A decline in blood albumin
 - d) A sharp rise in urinary bilirubin
- Q3. Which of the following biochemical derangements indicates likelihood of cardiovascular disease due atherosclerosis?
- a) Increased serum high density lipoprotein cholesterol
 - b) Severely decreased serum lactate dehydrogenase activity
 - c) Reduced blood atrial natriuretic peptide (ANP)
 - d) Increased serum sodium concentration
- Q4. Renal clearance of various substances from blood is measured as the rate glomerular filtration such substances (GFR) per unit volumes of urine. The truth about that includes all EXCEPT that
- a) (GFR) is the gold standard indicator for renal function
 - b) Creatinine is inferior because it is produced also endogenously
 - c) Inositol is one of the endogenous substances usable
 - d) Cystatin-C is currently the most reliable substance to use
- Q5. The quantity international normalized ratio (INR) can be considered one of the emerging disease biomarkers measurable in clinical chemistry
- a) Typically it rising rapidly in acute liver disease
 - b) Is a *dynamic* LFT, showing thrombolysis-thrombogenesis homeostasis
 - c) Estimated as thrombin formation-thrombin lysis ratio
 - d) It is likely to be decreased in chronic ratio liver disease
- Q6. Rhabdomyolysis is one of the muscular disorders and fact about it is that
- a) It could indicate toxicity from chronic CNS depressants use
 - b) Commonly affects cardiac muscles
 - c) Involves hepatic parenchymal tissue necrosis
 - d) Is accompanied with myoglobin excretion in urine
- Q7. Raised total bilirubinaemia accompanied with high urobilinogen
- a) Signifies severe biliary obstruction
 - b) Characterizes severe chronic hepatic dysfunction
 - c) Tends to be accompanied with elevated blood direct bilirubin
 - d) Strongly suggests presence of severe acute hepatocyte necrosis
- Q8. Myasthenia gravis is due to acetylcholine receptor autoantibodies; it
- a) Is an osteoskeletal immune disorder

- b) Affects mainly the central nervous system
 - c) Results from excessive production of adrenal medulla antibodies
 - d) Causes skeletal muscle paralysis
- Q9. Paget's disease is one of the pathologies of bone tissues and it is true that it
- a) Manifests with increased osteoblast activity
 - b) Characteristically goes with decreased serum alkaline phosphatase levels
 - c) Is accompanied with hypercalcaemia
 - d) Has high serum levels of acid phosphatase as a biomarker
- Q10. In body acid-base homeostasis, the conjugate base to haemoglobin is
- a) Carboxyhaemoglobin
 - b) Intracellular biphosphates (HPO_4^-)
 - c) Oxyhaemoglobin
 - d) Methaemoglobin
- Q11. Troponins are among the protein molecules found to serve well as disease biomarkers
- a) The cardiac variety include myoglobin and Creatine kinase
 - b) They include troponin C
 - c) Are increased the gold standard for myocardial necrosis diagnosis
 - d) They are commonly assayed through atomic emission spectrophotometry
- Q12. One or both of the following abnormalities could cause acute pancreatitis
- a) Reduced lipoprotein lipase activity in serum, chylomicronaemia
 - b) Increased salivary amylase, hypoglycaemia
 - c) Cholangectasis, Hepatobiliary necrosis
 - d) Reduced blood ethanol levels, ketosis
- Q13. Chronic pancreatic disease and chronic cholangectasis are pathological features
- a) Likely to lead to persistent steatorrhoea
 - b) Commonly incriminated in indirect hyperbilirubinaemia aetiology
 - c) Possibly due to high blood levels of bile acids
 - d) Capable of causing increased blood alkaline phosphatase levels
- Q14. Natriuretic peptides are have been increasingly recognized recently as disease indicators and the truth about them includes all EXCEPT that
- a) BNP variant is specific for cardiac failure
 - b) Can be elevated in cardiomyocyte necrosis
 - c) Are hormones in nature
 - d) Are elevated in blood in excessive ventricular tension
- Q15. In forensic chemical pathology low serum chloride levels could imply death due to
- a) Drowning
 - b) Sudden rise in body carbon monoxide
 - c) Exposure to extreme pO_2 when victim goes under water
 - d) Strangulation before damping in water
- Q16. Truth about the psychoactive injecting abuse drug heroin EXCLUDES the fact that
- a) Chronic exposure to it is detectable in stool samples
 - b) It is a diacetyl derivative of the alkaloid morphine
 - c) Nails and other so-called keratinized matrices are usable in its detection
 - d) Its pharmacotoxic effects include myocardial disease
- Q17. Xanthochromia is a cerebrospinal fluid (CSF) feature diagnostic of CNS disease, and it

- a) The term refers to increased opacity
 - b) Is synonymous with purulence
 - c) Typically occurs in viral meningitis
 - d) Increased levels arise from abnormally increased blood-brain barrier integrity
- Q18. In a toxicological investigation on urine a change in colour of the assay mixture to purple
- a) Is possible in iron reaction with Gerhardt's reagent
 - b) Occurs in Nitroprusside test for cocaine
 - c) Can be indicative of salicylate poisoning
 - d) May suggest poisoning of uncertain aetiology
- Q19. Oncofetal proteins are among molecules serving as diagnostic markers for neoplasms; they
- a) Are produced by adult tissues in normal health
 - b) Include prostate specific antigens (PSA)
 - c) Include carcinoembryonic antigen (CEA)
 - d) Detectable by Southern blotting
- Q20. Keratinized matrices such as hair and finger or toe nails are usable in toxicological analyses
- a) But offer a shorter window of detection of toxicants
 - b) For they require no preservatives for storage
 - c) Save unsuitability in diagnosis of toxicity from heavy metals
 - d) Especially screening for acute toxicity from abuse drugs

SECTION B: SHORT ANSWER QUESTIONS (SAQs)

- Q1. For the following clinical conditions, state the aetiology, one biochemical laboratory diagnostic marker and relevant assay method (**6marks**)
- a) Grave's disease
 - b) Humoral hypercalcaemia of malignancy
 - c) The hereditary metabolic disease cystinuria
 - d) Ricket's disease
- Q2. Explain the biochemical basis for using any two of the parameters measured in blood gas analysis in acid-base homeostasis chemical pathology (**6marks**)
- Q3. Provide the chemical principle underlying urinary ketone bodies and bilirubin assay by *Uristick* tests (**4Marks**)
- Q4. Explain the chemical pathology of *Helicobacter pylori* associated peptic ulcers in terms of the pathogenesis and names of the three (3) main laboratory diagnostic tests (**5marks**)
- Q5. State the site and mode of action, pharmacological and toxic effect and laboratory assay specimen and method of the abuse drugs: Heroin (**3marks**)
- Q6. Explain briefly how chronic overproduction of gastric acid contributes to fat malabsorption and steatorrhoea (**5marks**)
- Q7. Indicate the difference in the aetiology, pathogenesis and diagnostic biochemical features of Addison's and Cushing's diseases (**6marks**)
- Q8. Highlight the role of purine metabolism associated lithiasis in the pathogenesis of gouty arthritis and state the principle of assay of the principal catabolite implicated in this pathology (**5Marks**)

SECTION C: LONG ANSWER QUESTIONS (LAQs)

Instructions to the candidate

- Answer the following two questions
- They each carry twenty (**20 marks**)

Q1. Discuss biochemical and microscopical urinalysis in the investigation leading diagnosis of chronic kidney disease arising as diabetic complications (**20Marks**)

Q2. Describe the chemical pathology of chronic liver cirrhosis focusing on the accompanying functional impairments and underlying pathophysiological mechanisms, laboratory assays and associated changes in relevant biomarkers (**20Marks**)

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