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ROLL NUMBER [ ]

WRITTEN TEST FOR THE POST OF TECH.ASST. (LAB) – A To B
BIOCHEMISTRY

DATE: 19/03/2024 **TIME: 9.30 to 10.30 AM**

DURATION: 60 MINUTES **Total Marks: 50**

INSTRUCTIONS TO THE CANDIDATES

1. Write your Roll Number on the top of the Question Booklet and in the answer sheet.
2. Each question carries 1 mark.
3. There will not be any Negative Marking.
4. **Write legibly the alphabet of the most appropriate answer (A, B, C or D) in the separate answer sheet provided.**
5. Over-writing is not permitted.
6. Candidate should sign in the question paper and answer sheet.
7. No clarifications will be given.
8. Candidate should hand over the answer sheet to the invigilator before leaving the examination hall.

Signature of the Candidate

19/3/24

Technical Assistant (Lab) MFCP-1

Biochemistry

1. Smaller red blood cells in mean corpuscular volume (MCV) measurements indicates:
   a. Vitamin B12 deficiency
   b. Iron-deficiency
   c. Folic acid deficiency
   d. Hypothyroidism
2. An elevated serum unconjugated bilirubin is observed in:
   a. Glomerulonephritis
   b. Obstructive jaundice
   c. Defects in intestinal absorption
   d. Haemolytic jaundice
3. What is the primary purpose of External Quality Assurance (EQAS)?
   a. To evaluate the competence of laboratory personnel
   b. To monitor laboratory equipment maintenance
   c. To ensure accuracy and reliability of laboratory test results
   d. To assess patient satisfaction with laboratory services
4. How often are EQAS proficiency testing samples typically distributed to participating laboratories?
   a. Quarterly
   b. Monthly
   c. Annually
   d. Biannually
5. Which of the following is NOT a function of proteins in a normal human?
   a. Enzymatic catalysis
   b. Structural support
   c. Energy storage
   d. Transport of molecules
6. Which disorder is caused by a deficiency in the enzyme glucose-6-phosphatase, leading to impaired gluconeogenesis and glycogenolysis?
   a. Galactosemia
   b. Tay-Sachs disease
   c. Glycogen storage disease type I (von Gierke disease)
   d. Maple syrup urine disease
7. What is the primary defect in individuals with galactosemia?
   a. Deficiency of phenylalanine hydroxylase
   b. Deficiency of glucocerebrosidase enzyme
   c. Deficiency of tyrosinase enzyme
   d. Deficiency of galactose-1-phosphate uridyltransferase
8. Which condition results from the excessive production of uric acid due to impaired purine metabolism?
   a. Gaucher's disease
   b. Gout
   c. Phenylketonuria
   d. Wilson's disease
9. Which anticoagulant is used to collect blood samples for molecular diagnostic tests like PCR?
   a. EDTA
   b. Heparin
   c. Citrate
   d. Molecular tests typically do not require anticoagulants
10. Which anticoagulant chelates calcium ions?
    a. Heparin
    b. DCF-DA
    c. Citrate
    d. Warfarin
11. Which of the following has the highest hydrogen ion concentration?
    a. pH 10
    b. pH 2
    c. pH 7
    d. pH 4

12. Buffers are substances that:
    a. Completely prevent pH changes in a solution
    b. Resist changes in pH when acids or bases are added to a solution
    c. Rapidly change pH in response to acid or base addition
    d. Increase the hydrogen ion concentration in a solution
13. The coefficient of variation (CV) is calculated as:
    a. Standard deviation/Mean x 100
    b. Mean/Standard deviation
    c. Mean x Standard deviation
    d. Standard deviation – Mean
14. In clinical biochemistry, the term "linearity" refers to:
    a. The ability of laboratory staff to work efficiently in a linear fashion
    b. The ability of an instrument to produce consistent results over a range of analyte concentrations
    c. The ability of a test to accurately diagnose linear diseases
    d. The linear relationship between sample volume and test result accuracy
15. Which instrument is used to amplify and detect DNA sequences for diagnostic purposes?
    a. Spectrophotometer
    b. Centrifuge
    c. Microscope
    d. PCR machine
16. Which clinical parameter is typically measured using the principle of flow cytometry?
    a. Hemoglobin concentration
    b. Platelet count
    c. White blood cell differential count
    d. Blood glucose level
17. Which of the following neurodegenerative diseases is typically associated with elevated levels of tau protein in cerebrospinal fluid (CSF)?
    a. Alzheimer's disease
    b. Parkinson's disease
    c. Huntington's disease
    d. Amyotrophic lateral sclerosis
18. Which of the following cardiac biomarkers is most commonly used for diagnosing acute myocardial infarction?
    a. Creatine
    b. Troponin
    c. Deoxy Myoglobin
    d. Atrial natriuretic peptide (ANP)
19. Which of the following ratios is commonly used to assess cardiovascular risk, calculated using the values from the Lipid profile?
    a. LDL/HDL ratio
    b. Total cholesterol/HDL ratio
    c. Triglycerides/HDL ratio
    d. VLDL/HDL ratio
20. Which of the following electrolytes is primarily responsible for maintaining the body's acid-base balance?
    a. Sodium
    b. Potassium
    c. Chloride
    d. Bicarbonate
21. Which electrolyte is regulated by the hormone aldosterone?
    a. Sodium
    b. Potassium
    c. Calcium
    d. Magnesium
22. Which electrolyte imbalance is commonly associated with neuromuscular irritability, tetany, and prolonged QT interval on ECG?
    a. Hypokalemia
    b. Hyperkalemia
    c. Hypocalcemia
    d. Hypermagnesemia

23. What condition is characterized by a deficiency in all types of blood cells?
    a. Hemophilia
    b. Thalassemia
    c. Aplastic anemia
    d. Sickle cell anemia
24. What condition is characterized by an excessive increase in white blood cells, particularly neutrophils?
    a. Leukopenia
    b. Neutropenia
    c. Leukocytosis
    d. Thrombocytopenia
25. What is the primary method used for the manual determination of total cholesterol levels in blood samples?
    a. Gas chromatography
    b. Liquid chromatography
    c. Colorimetric assay
    d. Fluorescence microscopy
26. Which of the following urine tests is commonly used to screen for kidney diseases?
    a. Urine glucose
    b. Urine ketones
    c. Urine protein
    d. Urine bilirubin
27. Which of the following factors can contribute to preanalytical errors in the clinical chemistry laboratory?
    a. Insufficient sample volume
    b. Mishandling of specimens during analysis
    c. Failure to maintain proper laboratory hygiene
    d. Misinterpretation of quality control data
28. Which quality control measure is designed to monitor the precision of analytical procedures in the clinical chemistry laboratory?
    a. Calibration verification
    b. External proficiency testing
    c. Internal quality control
    d. Method validation
29. What is the main purpose of proficiency testing in the clinical chemistry laboratory?
    a. To assess the accuracy of test results, using external unknown samples
    b. To assess repeatability of test.
    c. To identify sources of error in testing procedures
    d. To validate new analytical methods
30. How can a Levey-Jennings plot be used to assess the performance of an assay?
    a. By calculating the mean of control values
    b. By identifying systematic errors
    c. By plotting patient results instead of controls
    d. By determining the reagent concentration
31. Which enzyme is common to all enzymatic methods for triglyceride measurement
    a. Glycerol phosphate oxidase
    b. Glycerol Phosphate dehydrogenase
    c. Glycerol Kinase
    d. Pyruvate Kinase
32. Osmolality can be defined as a measure of the concentration of a solution based on
    a. The number and size of particles present
    b. The number of particles present
    c. The isoelectric point of a particle
    d. The density of particles present
33. Which of the following apoproteins is inversely related to risk for coronary heart disease and is a surrogate marker for HDL?
    a. Apo E
    b. Apo B100
    c. Apo A-1
    d. Apo B

34. The VLDL fraction primarily transports which of the following
    a. Chylomicron
    b. Triglycerides
    c. Cholesterol
    d. Phospholipids
35. Which of the following blood gas disorders is most commonly associated with an abnormal anion gap?
    a. Metabolic alkalosis
    b. Respiratory Acidosis
    c. Respiratory alkalosis
    d. Metabolic Acidosis
36. A cerebrospinal fluid specimen is sent to the lab for glucose analysis. The specimen is cloudy and appears to contain red blood cells. Which of the following statement is correct.
    a. Specimen can be refrigerated as received and glucose assayed the next day.
    b. Specimen can be frozen as received and glucose assayed the next day.
    c. Specimen should be centrifuge and glucose assayed immediately.
    d. Glucose testing cannot be performed on the specimen.
37. Which of the following functions as a transport protein for bilirubin in blood
    a. Albumin
    b. Alpha 1 – globulin
    c. Beta-globulin
    d. Gamma-globulin
38. If elevated, which test would support a diagnosis of congestive heart failure
    a. Albumin cobalt binding
    b. Tropomyosin
    c. Homocysteine
    d. B-type natriuretic peptide
39. What does measuring the total iron binding capacity (TIBC) represent?
    a. Indirect measure of Iron stores
    b. Circulating protein-bound Iron
    c. Amount of Iron that transferrin can bind
    d. Amount of free Iron in serum
40. The renal threshold for glucose is
    a. 180 mg/dl
    b. 160 mg/dl
    c. 140 mg/dl
    d. 120 mg/dl
41. Which of the following crystals may be found in acidic urine?
    a. Calcium carbonate
    b. Calcium Oxalate
    c. Calcium phosphate
    d. Potassium carbonate
42. The bilirubin that is excreted in urine and measured on a dipstick is
    a. Conjugated bilirubin
    b. Unconjugated bilirubin
    c. Urobilinogen
    d. Stercobilin
43. If a dried smear cannot be stained immediately, it should be preserved by immersing in
    a. Methanol
    b. Ethanol
    c. Eosin
    d. Methylene blue
44. Which among the following is the normal range of Blood Urea Nitrogen (BUN) for an adult?
    a. 0.5-1.5 mg/dl
    b. 5-20 mg/dl
    c. 100-250 mg/dl
    d. 250-500mg/dl
45. The "Westgard" rule violation "when one control measurement in a group exceeds the mean +2s control limit and another one exceeds a -2s control limit":
    a. 2_{2s}
    b. 1_{2S}
    c. 1_{3S}
    d. R_{4S}
46. The normal protein content in CSF is
    a. 15-60 mg/dl
    b. 1-2 g/dl
    c. 110-130 mg/dl
    d. 1-5 mg/dl
47. For a given rpm, the RCF will depend on
    a. Length of the centrifuge tube
    b. Volume of the centrifuge tube
    c. Distance between axis of rotation and the centre of the centrifuge tube
    d. Radius of the centrifuge tube

48. A solution contains 100 g/L of NaCl (MW – 58.5). What is the molarity of the solution?
    a. 0.19M
    b. 1.7M
    c. 3.0M
    d. 5.1M
49. Normal reticulocyte count in infants
    a. 2-6%
    b. 0.5-2.5%
    c. >6%
    d. <0.5%
50. Characteristic color produced by Lithium in Flame photometry ?
    a. Violet
    b. Pale Green
    c. Red
    d. Yellow

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Technical Assistant (Lab) MFCP 1 Biochemistry

ANSWER KEY

1	b	21	a	41	b
2	d	22	c	42	a
3	c	23	c	43	a
4	a	24	c	44	b
5	c	25	c	45	d
6	c	26	c	46	a
7	d	27	a	47	c
8	b	28	c	48	b
9	a	29	a	49	a
10	c	30	b	50	c
11	b	31	c		
12	b	32	b		
13	a	33	c		
14	b	34	b		
15	d	35	d		
16	c	36	c		
17	a	37	a		
18	b	38	d		
19	b	39	c		
20	d	40	a		

Kaur
19/3/24