ROLL NUMBER

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

**DATE: 25/03/2026**                                     **TIME: 10 to 11 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

1. In serum protein electrophoresis, IgA monoclonal proteins frequently migrate in which region

    A. Albumin
    B. Beta region
    C. Gamma region only
    D. Alpha-1

2. In sandwich ELISA, the signal intensity is:

    A. Inversely proportional to antigen concentration
    B. Independent of antigen concentration
    C. Directly proportional to antigen concentration
    D. Dependent only on enzyme concentration

3. A 55-year-old patient's blood sample shows increased potassium (6.8 mmol/L), high LDH, and a slightly pink serum. The patient has no symptoms of Hyperkalemia, and a repeat sample shows normal potassium levels. Which pre-analytical factor is the most likely cause of this falsely elevated result?

    A. Sample storage at 4°C
    B. Exposure of the sample to light
    C. Excess anticoagulant in the collection tube
    D. Hemolysis during sample collection

4. A 10-year-old boy presents with jaundice and dark urine after taking an antimalarial drug. Peripheral smear shows bite cells and Heinz bodies. Which defect best explains this condition?

    A. Reduced activity of glucose-6-phosphate dehydrogenase
    B. Absence of spectrin in RBC membrane
    C. Increased hemoglobin F synthesis
    D. Defective β-globin chain synthesis

5. A buffer solution is prepared by mixing 0.1 M acetic acid and 0.1 M sodium acetate. If a small amount of strong acid is added, the pH change will be minimal mostly because:

    A. The buffer components completely neutralize added acid
    B. The conjugate base reacts with the added $H^+$ ions
    C. The weak acid dissociates completely to maintain equilibrium
    D. The ionic strength of the solution increases

6. A technician measures ESR using a vertical tube of 200 mm length filled with diluted anticoagulated blood, and the distance RBCs fall in 1 hour is recorded. Which ESR measurement method is being used?

    A. Wintrobe method
    B. Sahli method
    C. Westergren method
    D. Lee-White method

7. Which of the following conditions is most likely to decrease ESR?

    A. Tuberculosis
    B. Pregnancy
    C. Rheumatoid arthritis
    D. Polycythemia vera

8. How many grams of NaOH (MW = 40 g/mol) are required to prepare 500 mL of 0.2 M NaOH solution?

    A. 2 g               B. 4 g               C. 8 g               D. 10 g

9. Which statement correctly distinguishes the hexokinase method from the glucose oxidase method for glucose estimation?

    A. Hexokinase assay measures absorbance of NADPH formed at 340 nm
    B. Hexokinase assay detects hydrogen peroxide generated during glucose oxidation
    C. Hexokinase method is less specific due to interference from reducing sugars
    D. Hexokinase assay uses peroxidase-mediated chromogen formation

10. The International Normalized Ratio (INR) is primarily used for monitoring therapy with:

    A. Warfarin                         C. Aspirin
    B. Heparin                        D. Low molecular weight heparin

11. In severe uncontrolled hyperglycemia, increased flux of glucose through the polyol pathway leads to cellular damage due to:

    A. Increased gluconeogenesis in peripheral tissues
    B. Excess production of NADH
    C. Depletion of NADPH and accumulation of sorbitol
    D. Increased synthesis of glycogen in tissues

12. A patient shows the following biochemical profile: AST: 950 U/L; ALT: 1100 U/L; ALP: Mildly elevated; Total bilirubin: Moderately elevated. Which condition is most consistent with this pattern?

    A. Bone disease with secondary liver involvement
    B. Extrahepatic biliary obstruction
    C. Acute viral hepatitis
    D. Alcoholic liver disease

13. Which of the following conditions is associated with increased serum uric acid levels?
    A. Anemia                         C. Hypoglycemia
    B. Gout                         D. Fanconi syndrome

14. Pseudohyponatremia is most likely to occur when sodium is measured using:

    A. Direct ion-selective electrode          C. Coulometric titration
    B. Enzymatic electrode                D. Indirect ion-selective electrode

15. The Clark electrode used in blood gas analyzers measures:

    A. Carbon dioxide via potentiometric detection
    B. Blood pH via glass membrane
    C. Partial pressure of oxygen
    D. Bicarbonate via enzymatic reaction

16. According to the Beer–Lambert Law, which of the following conditions will most likely cause deviation from linearity between absorbance and concentration?

    A. Constant optical path length
    B. Use of monochromatic light
    C. Highly concentrated solution causing molecular interactions
    D. Dilute solutions with non-scattering solutes

17. In a Levey–Jennings control chart, two consecutive control measurements fall outside ±2 SD on the same side of the mean. According to Westgard rules, which rule is violated?

A. $R_4s$ rule    B. $1_2s$ rule    C. $1_3s$ rule    D. $2_2s$ rule

18. Two laboratories measure serum cholesterol using the same method:
Lab A: Mean = 200 mg/dL, SD = 4 mg/dL
Lab B: Mean = 200 mg/dL, SD = 10 mg/dL
Which statement is correct regarding precision?

A. Lab B has higher precision due to higher SD
B. Lab A has higher precision due to lower coefficient of variation
C. Both laboratories have identical precision
D. Precision cannot be determined without external QC

19. A positive Benedict's test but a negative glucose oxidase strip test suggests the presence of:

A. Galactose                    C. Any reducing sugar
B. Lactose                      D. Fructose

20. Which lipid profile pattern represents the highest cardiovascular risk?

A. LDL 160 mg/dL, HDL 35 mg/dL    C. LDL 100 mg/dL, HDL 55 mg/dL
B. LDL 90 mg/dL, HDL 60 mg/dL     D. LDL 120 mg/dL, HDL 65 mg/dL

21. Which of the following best explains why reference values for biochemical analytes differ between populations?

A. Analytical instrument variability only
B. Biological variation such as age, sex, diet, and ethnicity
C. Laboratory technician skill
D. Reagent batch variability

22. Which anticoagulant is used for coagulation tests?
A. EDTA                          C. Heparin
B. Sodium citrate               D. Fluoride

23. In serum protein electrophoresis, the fastest migrating fraction is:

A. Albumin                      C. Beta globulin
B. Alpha globulin               D. Gamma globulin

24. A diagnostic test for a disease identifies 95 out of 100 affected individuals as positive. What is the sensitivity of this test?

A. 100%        B. 5%        C. 90%        D. 95%

25. In urine analysis, the presence of ketone bodies is commonly associated with:

A. Diabetes mellitus            C. Kidney stones
B. Liver cirrhosis              D. Anemia

26. Which anticoagulant acts by chelating calcium ions in blood?
A. EDTA                         C. Sodium fluoride
B. Heparin                      D. EGTA

27. **Reticulocyte count is useful for assessing:**
    A. Platelet function
    B. Bone marrow erythropoietic activity
    C. Leukocyte disorders
    D. Liver enzyme function

28. **In metabolic acidosis, blood pH is typically:**
    A. Above 7.35
    B. Below 7.35
    C. Exactly 7.4
    D. Above 8

29. **Transferrin saturation is calculated using:**
    A. Serum iron and TIBC
    B. Ferritin and albumin
    C. Hemoglobin and RBC count
    D. Calcium and phosphorus

30. **Which parameter is calculated using RBC count, Hb, and PCV?**
    A. ESR
    B. RBC indices
    C. Platelet count
    D. Reticulocyte count

31. **Which component of blood is primarily responsible for coagulation?**
    A. RBCs
    B. Platelets
    C. Neutrophils
    D. Lymphocytes

32. **Which of the following factors contributes most to pre-analytical errors in clinical laboratories?**
    A. Calibration error
    B. Improper sample collection
    C. Instrument malfunction
    D. Calculation mistakes

33. **Which condition is associated with decreased serum albumin levels?**

    A. Liver disease
    B. Hyperthyroidism
    C. Hypertension
    D. Polycythemia

34. **The normal range of serum sodium in adults is approximately:**

    A. 100–120 mmol/L
    B. 120–130 mmol/L
    C. 135–145 mmol/L
    D. 150–160 mmol/L

35. **Which hematological parameter indicates the average size of RBCs?**

    A. MCH
    B. MCV
    C. MCHC
    D. PCV

36. **Which of the following conditions may falsely increase serum potassium levels?**

    A. Hemolysis of blood sample
    B. Fasting state
    C. Hypoglycemia
    D. Proper centrifugation

37. **Which electrolyte plays the most important role in extracellular fluid balance?**
    C. Calcium
    D. Magnesium
    A. Potassium
    B. Sodium

38. **Serum ferritin is mainly used to assess:**
    A. Iron stores
    B. Calcium metabolism
    C. Vitamin levels
    D. Protein deficiency

39. **MCHC is calculated as:**
    A. Hb / RBC
    B. Hb / PCV
    C. PCV / RBC
    D. RBC / Hb

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40. **Which of the following is the most specific biomarker for myocardial infarct on?**

    A. CK-MB                               C. Troponin T
    B. LDH                                   D. AST

41. **In differentiating hepatic from bone disease as the cause of elevated alkaline phosphatase (ALP), which additional test is most useful?**

    A. Serum amylase                  C. Creatine kinase (CK)
    B. γ-Glutamyl transferase (GGT)      D. Lactate dehydrogenase (LDH)

42. **Which of the following may cause falsely low serum creatinine levels?**

    A. Excessive loss of water             C. Excessive protein intake
    B. Muscle wasting                      D. Hypertension

43. **In which organ is erythropoietin produced, stimulating red blood cell production?**

    A. Heart             B. Liver                C. Kidney             D. Spleen

44. **Homogentisic aciduria is related to**

    A. Doping in athletes               C. Defect in phenyl alanine metabolism
    B. Diabetes                        D. Excessive soft drink ingestion

45. **A patient undergoing chemotherapy for cancer presents with fatigue and recurrent infections. Laboratory tests show WBC count = 2,000 cells/µL. Which of the following is the most likely explanation?**

    A. Bone marrow stimulation
    B. Bacterial infection
    C. Bone marrow suppression due to chemotherapy
    D. Chronic inflammatory disease

46. **Among the following, which has the highest protein content**

    A. Chylomicron         B. VLDL            C. LDL             D. HDL

47. **Bence Jones proteins are associated with what disease?**

    A. Multiple myeloma              C. Inflammation
    B. Wilson's disease              D. Down's syndrome

48. **The normal protein content in CSF is**

    A. 15-45 mg/dl        B. 1-2 g/dl         C. 110-130 mg/dl       D. 1-5 mg/dl

49. **A blood sample collected for bilirubin estimation was left uncovered near a window for several hours before analysis. The laboratory result shows low bilirubin levels. Which pre-analytical factor is responsible?**

    A. Photodegradation due to light exposure     C. Sample contamination
    B. Increased hemolysis                     D. Excess anticoagulant

50. **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

### Name of category: MFCP - Technical Assistant (Lab)- A to Technical Assistant (Lab)- B - Biochemistry

### ANSWER KEY

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