



“Investing in Africa’s Future”

FACULTY OF HEALTH SCIENCES

2015/2016 FIRST SEMESTER EXAMINATIONS

COURSE CODE: SLS102
COURSE TITLE: CLINICAL CHEMISTRY
DATE: 25 November 2015
TIME: 3 hours

INSTRUCTIONS

The mark allocation for each question is indicated at the end of the question

Credit will be given for logical, systematic and neat presentations.

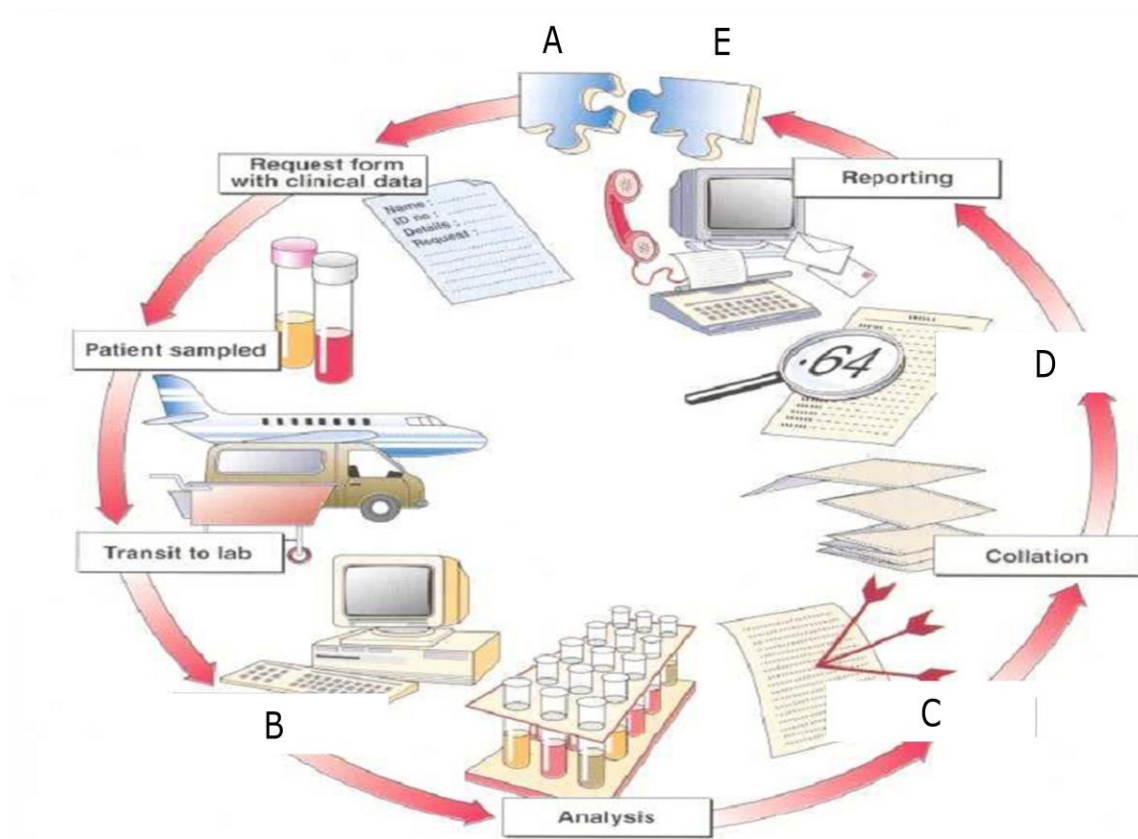
Section A comprises Multiple Choice Questions and is compulsory. Total marks are 30.

1. Chylomicrons are
 - (a) Small fat globules
 - (b) Units of measurement
 - (c) Both of the above
 - (d) Neither of the above
2. Cataracts in the eye lens and retinal damage are diabetic complications caused by
 - (a) Polyol formation
 - (b) Glycosylated haemoglobin
 - (c) Neither of the above
 - (d) Both of the above
3. Which of the following is **not** triggered by insulin insufficiency?
 - (a) Hyperglycemia
 - (b) Polydipsia
 - (c) Polyuria
 - (d) Glycosuria
 - (e) None of the above
 - (f) All of the above
4. In the Friedwald equation, TG/5 estimates
 - (a) Triglycerides
 - (b) VLDL-C
 - (c) HDL-C
 - (d) None of the above
 - (e) All of the above
5. Which of the following is good cholesterol
 - (a) LDL-C
 - (b) VLDL-C
 - (c) Both of the above
 - (d) Neither of the above

For questions 1-5, indicate true (T) or false (F).

6. The following specimens for clinical chemistry analysis should **not** be stored in a refrigerator:
 - (a) Whole blood (T/F)
 - (b) Serum (T/F)
 - (c) Plasma (T/F)

7. The following are used to diagnose and monitor heart attacks
- (a) Creatinine kinase (T/F)
 - (b) Gamma glutamyl transferase (T/F)
 - (c) Troponins T and I (T/F)
8. Indicate which type of error (random[R] or systematic [S]) arises from the following:
- (a) Air bubbles in reagent (R/S)
 - (b) Deterioration of reagents (R/S)
 - (c) Wrong calibrator values (R/S)
 - (d) Fading photometric light source (R/S)
9. In spectrophotometry, the Beer-Lambert starts to become unreliable when analyte concentration exceeds?
- (a) 0.1M
 - (b) 0.01M
 - (c) 0.001M
 - (d) 1M
10. State the missing steps A-E in the clinical biochemistry cycle below:



11. Why is it generally preferable to use absorbance as a measure of absorption rather than % Transmittance?

- (a) Because %T cannot be measured as accurately as absorbance
- (b) Because %T is dependent on the power of the incident radiation
- (c) Because absorbance is proportional to the concentration of the analyte, whereas %T is not
- (d) All of the above
- (e) None of the above

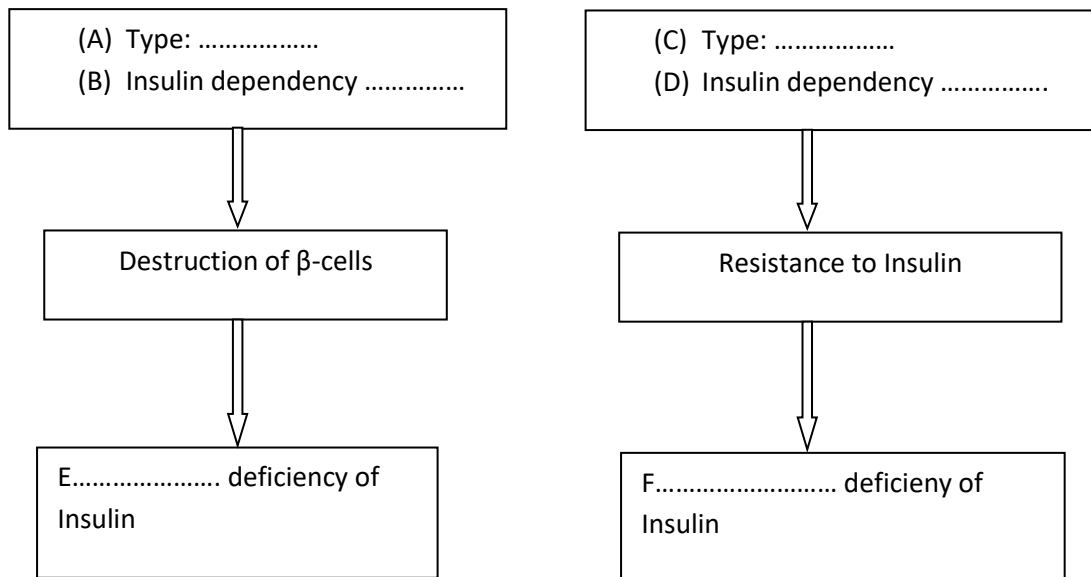
12. In the equation, $A = \epsilon bc$, what quantity is represented by " ϵ "?

- (a) Absorbivity
- (b) Molar absorbivity
- (c) Path length
- (d) None of the above
- (e) All of the above

13. Which of the following relationships between absorbance and %Transmittance is **incorrect**?

- (a) $A = \log_{10} 100 / \%T$
- (b) $A = 2 - \log_{10} \%T$
- (c) $A = \log_{10} 1 / \%T$

14. Label the missing diabetes categories A-D in the diagram below



SECTION B: Answer all questions. (30 Marks)

1. How many milliliters of water must be added to 30.0 mL of 10.0 M KCl to make a solution that is 0.50 M KCl? (6)
2. What volume of 0.7690 M LiOH will contain 55.3 g of LiOH? (6)
3. If $\epsilon_b = 0.347$ liter/mole, what is the concentration if
 - a. the absorbance is 0.362? b. the % transmittance is 63.2? (6)
4. If the transmittance is 50.8% in a 1.00 cm cell, what is the absorbance in a 5.00 cm cell?
Hint: Convert to absorbance, $A = -\log(T)$ (6)
5. Describe briefly the main types of analyte detected or measured by clinical chemistry tests (6)
6. Briefly describe the main applications of clinical chemistry tests (6)
7. The mean for a group of an analyte's control values = 112 mg/dL, with a standard deviation of 5.4 mg/dL
 - (a) What is the coefficient of variation of the readings? (3)
 - (b) Is a reading of 120mg/dL three weeks later acceptable performance for the same control? (3)

SECTION C: Answer any three questions (42 Marks)

1. Describe the main types of specimens used for clinical chemistry tests, giving examples of analytes detected in them. (15)
2. Give an overview of the main types of clinical chemistry laboratory tests (15)
3. Discuss common causes of error in the laboratory and potential consequences. (15)
4. You are given a vial containing 48.88 nmole of lyophilised primer.
 - (a) Calculate the volume of water (μ L) required to dissolve the primer and make a 100 μ M stock solution. (6)
 - (b) What volume of the stock solution and water do you need to prepare 500 μ L of a 10 μ M working stock solution? (6)
 - (c) What volume of this primer should you add into a 25 μ L reaction mix that needs 0.25 μ M of primer. (3)

TOTAL 100 MARKS