UNIVERSITI KUALA LUMPUR
INSTITUTE OF MEDICAL SCIENCE TECHNOLOGY

FINAL EXAMINATION

MARCH 2025 SEMESTER

COURSE CODE	:	HDD30303
COURSE TITLE	:	CLINICAL CHEMISTRY 2
PROGRAMME NAME	:	DIPLOMA OF MEDICAL LABORATORY TECHNOLOGY
DATE	:	24 JUNE 2025
TIME	:	9:00AM - 12:00PM
DURATION	:	3 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. This question paper consist of TWO sections.
4. Section A consist 25 MCQ or EMQ questions. Answer ALL questions.
5. Section B consist of four questions. Answer THREE (3) questions only.
6. Please write your answer on the answer booklet provided.
7. Please answer all questions in English only.
8. Please answer MCQ/EMQ questions using OMR sheet. ☐ *Tick if applicable*
9. Refer to the attached Formula/ Appendies. ☐ *Tick if applicable*

THERE ARE 11 PAGES OF QUESTIONS INCLUDING THIS PAGE

SECTION A (Total: 25 marks)

Answer ALL questions.

Please use the objective answer sheet provided.

1. A 20-year-old woman presents to the emergency department with 3 days of abdominal pain and dysuria. Based on examination, she is suspected of having a urinary tract infection. Which of the following specimens should be collected for a urine culture?

   A. Endstream clean catch specimen.

   B. Before bed specimen.

   C. 24-hour urine collection.

   D. Midstream clean catch specimen.

2. A 33-year-old man is suspected of having an osmotic diarrhea. Which of the following tests can be used to confirm his diagnosis?

   I. Fecal leukocyte
   II. Trypsin detection
   III. Lactose tolerance test
   IV. D-xylose tolerance test

   A. I and III only

   B. I and II only

   C. III and IV only

   D. II and IV only

3. A pleural effusion is found to have 3000 white blood cells per microliter and 5 g/total protein. From this, it can be determined that the patient's effusion is _____.

   A. an exudate

   B. non-inflammatory

   C. a transudate

   D. hemorrhagic

4. A suitable disinfectant for decontaminating blood and body fluids is _____.

   A. sodium hypochloride

   B. antimicrobial Soap

   C. hydrogen peroxide

   D. sodium hydroxide

5. Adding proteolytic enzymes to a semen sample is a helpful technique to _____.

   A. preserve the spermatozoa

   B. decrease the viscosity

   C. destroy the spermatids

   D. neutralize the pH

6. Amniotic fluid specimens are placed in amber-colored tubes before being delivered to the laboratory to prevent the oxidation of _____.

   A. alpha fetoprotein

   B. bilirubin

   C. phospholipid

   D. lecithin

7. Among the listed seminal fluid conditions, which could potentially inhibit sperm motility?

   I. High acidity
   II. High viscosity
   III. Low fluid volume
   IV. Slow liquefaction

   A. I and II only

   B. I and III only

   C. II and IV only

   D. III and IV only

8. Brown color of semen sample may indicate a _____.

   A. bacterial infection

   B. low concentration of spermatozoa

   C. contamination of urine

   D. presence of oxidized hemoglobin

9. Centrifuging an uncapped specimen may result in the creation of a biological hazard in the form of _____.

   A. sharps contamination

   B. aerosol

   C. vectors

   D. specimen contamination

10. Crystals are often found in urine. Which of the following crystals is most likely to indicate an abnormal condition?

    A. Calcium oxalates

    B. Uric acid crystals

    C. Thyrosine crystals

    D. Monosodium urates

11. Large orange-red droplets seen on direct microscopic examination of stools mixed with Sudan III represent _____.

    A. soaps

    B. fatty acids

    C. cholesterol

    D. neutral fats

12. The absence of coloration (almost clear) in a semen sample may suggest _____.

A. bacterial infection

B. low concentration of spermatozoa

C. presence of hemoglobin

D. contamination of urine

13. The correct procedure for labeling urine specimen containers is by _____.

A. using only non-permanent marker for labeling

B. attaching the label to the container

C. attaching the label to the bottom

D. attaching the label to the lid

14. The estimation of hyaluronic acid concentration by measurement of viscosity is useful in evaluating which type of fluid?

A. Spinal

B. Synovial

C. Pleural

D. Peritoneal

15. The main chemical components found in normal urine are _____.

A. urea, chloride, and water

B. urea, water, and protein

C. protein, sodium, and water

D. urea, bilirubin, and glucose

16. The medical term for the cessation of urine flow is _____.

    A. azotemia

    B. diuresis

    C. anuria

    D. dysuria

17. The presence of a neural tube disorder in an unborn fetus might be identified through the _____.

    A. decreased amniotic fluid phosphatidyl glycerol

    B. increased maternal serum alpha fetal protein

    C. decreased maternal serum acetylcholinesterase

    D. increased amniotic fluid bilirubin

18. The specimen choice for routine analysis is _____.

    A. Suprapubic aspiration urine

    B. Midstream clean-catch urine

    C. Random urine

    D. Timed urine

19. The typical pH range for a freshly voided urine specimen is _____.

    A. 4.0-8.5

    B. 4.5-8.0

    C. 3.5-8.0

    D. 3.5-9.0

20. Two fetal lung maturity (FLM) assessments were conducted on an unidentified amniotic fluid sample. The outcomes showed a positive lecithin-sphingomyelin (L/S) ratio but a negative amniostat test. Which of the following elements could be present in the sample contributing to this scenario?

I. Blood
II. Uric acid
III. Meconium
IV. Creatinine

A. II and IV only

B. III and IV only

C. I and III only

D. I and II only

21. Upon receiving an unidentified fluid in the laboratory with a request to confirm whether it is urine or another body fluid, which routine laboratory tests would likely indicate that the fluid is urine?

A. Glucose and ketones.

B. Uric acid and amino acids.

C. Protein and amino acids.

D. Urea and creatinine.

22. Urine color can vary from colorless to black. The reason urine looks amber is because of the presence of _____.

A. uroerythrin

B. biliverdin

C. bilirubin

D. urochrome

23. Which of the following are advantages of creatinine usage as substance for renal clearance test?

I. It is not affected by diet
II. It is an exogenous product
III. It is produced at a constant or steady rate
IV. It is readily reabsorbed by distal convoluted tubules

A. III and IV only

B. I and II only

C. I and III only

D. II and IV only

24. Which of the following substances, when present in urine, may indicate uncontrolled diabetes mellitus?

A. Red blood cells

B. Bilirubin

C. Ketones

D. Urobilinogen

25. Which of the tests conducted using the test strip might not be affected by the presence of ascorbic acid?

A. Blood

B. Specific gravity

C. Nitrite

D. Proteins

SECTION B (Total: 75 marks)

Answer THREE (3) questions only.

Please use the answer booklet provided.

Question 1

Amniotic fluid analysis is a crucial aspect of prenatal care, offering insights into the well-being of the developing fetus. By examining the composition and characteristics of this fluid, healthcare professionals can assess fetal health, detect genetic abnormalities, and evaluate lung maturity.

(a) State one (1) clinical purpose of differentiating between maternal urine and amniotic fluid, and describe the key differences in terms of composition.

(5 marks)

(b) Explain the constituents of amniotic fluid and discuss its significant function for fetal development.

(10 marks)

(c) Describe the physical characteristics of normal and abnormal amniotic fluid and their significance.

(10 marks)

Question 2

Urinalysis is a diagnostic test that involves the examination of urine to detect and manage a wide range of disorders such as urinary tract infections (UTIs), kidney disease, and diabetes. It is a common test that provides valuable information about the body's metabolic and renal status.

(a) Aided with a table, describe five (5) urine specimen collection techniques including the procedures and diagnostic use for each.

(15 marks)

(b) Error in handling of laboratory specimens can be divided into pre-analytical, analytical, and post-analytical errors. Suggest ways to overcome the error in collecting and handling of urine specimen.

(10 marks)

Question 3

Fecal analysis involves the examination of stool samples to gather valuable information about digestive health. By studying the composition and characteristics of feces, healthcare professionals can identify various digestive disorders, infections, and nutritional deficiencies.

(a) Outline the components of fecal matter.

(5 marks)

(b) Differentiate between the mechanisms of secretory diarrhea, osmotic diarrhea, and intestinal hypermotility, and provide one example of a cause for each.

(10 marks)

(c) Describe the macroscopic characteristics of normal and abnormal feces and their significance.

(10 marks)

Question 4

Aunty Rozila, a 65-year-old woman with a history of diabetes mellitus and recurrent urinary tract infections (UTIs), presents to the clinic with complaints of dysuria, frequency, and urgency for the past two days. She describes the dysuria as a burning sensation during urination, and she feels the need to urinate frequently, often with minimal urine output.
With regard of the above scenario, please answer the following question.

(a) Describe the procedure for conducting a urinalysis in a laboratory setting.

(10 marks)

(b) Interpret the possible laboratory findings that may indicate that Aunty Rozila experiencing UTI.

(15 marks)

END OF EXAMINATION PAPER