



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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## UNIVERSITY EXAMINATIONS 2023/2024

SECOND YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF  
SCIENCE IN MEDICAL LAB

### HML 3223: HISTOLOGY

DATE: APRIL 2024

TIME: 2 HOURS

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#### INSTRUCTIONS:

Part I: Short Answer Questions

Part II: Long Answer Questions

Part III: Multiple Choice Questions (MCQs)

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#### PART I SHORT ANSWER

1. List 6 factors that affect the fixation process. (6 Marks)
2. What are the characteristics that make paraffin wax an ideal embedding agent? (4 Marks)
3. Which are some of the precautions taken to prevent floaters? (5 Marks)
4. List some of the equipment required for paraffin section cutting. (10 Marks)
5. Regarding knives used in sectioning:
  - a. Define the term honing. (2 Marks)
  - b. List any 4 types of hones you know. (4 Marks)
  - c. List any 4 lubricants that can be used during honing. (4 Marks)
6. List 5 advantages of automated tissue processing. (5 Marks)



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## **PART II (40 MARKS) – Long Answer questions**

1. Discuss in detail the different steps involved in Hematoxylin and Eosin staining. (20 Marks)
2. You have been appointed as the safety officer in your histopathology laboratory.
  - a) What are some of the safety concerns or hazards in the laboratory that you have to make your colleagues aware of? (10 Marks)
  - b) List some of the protective and preventative measures that should be in place to address the above safety concerns or hazards. (10 Marks)

## **PART III (40 MARKS) – Multiple Choice Questions**

1. Which of the following is the most widely used clearing agent? (1 mark)
  - a) Chloroform
  - b) Alcohol
  - c) Xylene
  - d) Methanol
2. Which of the following regarding Hematoxylin & Eosin staining, is true? (1 mark)
  - a) Hematoxylin is an acidic dye that binds nucleic acids in the nucleus imparting a blue -black color.
  - b) Eosin is a basic dye that binds to nucleic acids imparting a blue-black color.
  - c) Both A and B are true.
  - d) None of the above.
3. Which of the following is added as a preservative in Eosin solutions to prevent fungal organism growth? (1 mark)
  - a) Picric acid
  - b) Methanol
  - c) Ethanol
  - d) A crystal of thymol
  - Match the following statements with the choices below.
4. Substances stained by acidic dyes. (1 mark)



5. Basic dyes staining specific tissue components a different colour from the original dye. (1 mark)
6. Substances in stains that form a link between the tissue and the stain. (1 mark)
7. Removal of wax (First step of staining) (1 mark)
8. A stain that is applied after the original dye to provide contrast between various cells and tissues. (1 mark)
- a) Counter-stain
  - b) Regressive staining
  - c) Indirect staining
  - d) Basophilic
  - e) Acidophilic
  - f) Mordant
  - g) Metachromatic staining
  - h) Deparaffinization
9. Which of the following statements are true regarding supra-vital staining (1 mark)
- a) It is a method of staining used to examine living cells.
  - b) Living cells do not take up supra-vital stains, only dead cells do.
  - c) Janus green is a commonly used supravital stain.
  - d) It is done by injecting the dye into any part of the human body.
10. Prussian blue staining is used to stain which of the following metals? (1 mark)
- a) Copper
  - b) Zinc
  - c) Iron
  - d) Selenium
11. What should be the ratio between the volume of tissue and fixative? (1 mark)
- a) 1:5
  - b) 1:10
  - c) 1:20
  - d) 1:100
12. What is the usual concentration of the commercial formaldehyde available? (1 mark)

- a) 7 – 10%
- b) 17 – 27%
- c) 37 – 40%
- d) 40 – 50%

13. The desire to maintain a safe laboratory environment for all begins with? (1 mark)

- a) Prevention
- b) Ubiquity
- c) Microbiology
- d) Accidents

14. Which of the following is a prerequisite to rejection of a specimen at the reception? (1 mark)

- a) Incorrect or no patient identification.
- b) The investigation is not offered by the laboratory.
- c) Miss-match in the number of specimens mentioned on the form and those presented at reception.
- d) All of the above.

15. Which of following stains is used as a special stain for amyloid? (1 mark)

- a) Periodic Acid Schiff (PAS)
- b) Von Kossa
- c) Congo-red
- d) Fite

16. What does the acronym SOP denote? (1 mark)

- a) Standard Operating Principles
- b) Standard Operating Procedures
- c) Standard of processes
- d) Standard of Principles.

17. Good laboratory practices include: (1 mark)

- a) Smelling and tasting chemicals
- b) Not washing hands before and after a laboratory procedure.
- c) Confining long hair and loose clothing.



d) Using damaged equipment and glassware.

18. Which of the following types of Personal Protective equipment (PPE) is frequently used in the laboratory? (1 mark)

- a) Safety glasses
- b) Laboratory coats
- c) Gloves
- d) All the above

19. Which of the following practices are allowed in the laboratory? (1 mark)

- a) Applying cosmetics
- b) Eating and drinking
- c) Handling contact lenses
- d) None of the above

20. Which of the following is **NOT** part of a technician's responsibility?

- a) Record keeping
- b) Quality control
- c) Specimen preservation
- d) Receiving cash for services





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