



# **THE KENYA POLYTECHNIC UNIVERSITY COLLEGE**

## **SCHOOL OF HEALTH SCIENCES AND TECHNOLOGY**

### **DEPARTMENT OF BIOMEDICAL LABORATORY SCIENCES AND TECHNOLOGY**

#### **DIPLOMA IN MEDICAL LABORATORY SCIENCES**

#### **END OF YEAR 1 EXAMINATION**

#### **HISTOLOGY**

**TIME: 3 HOURS**

#### **INSTRUCTIONS**

**This paper consists of TWO SECTIONS: A and B.**

**Answer ALL questions in SECTION A and B.**

**Circle the letters of ALL correct answers in each multiple choices questions**

**Any wrong answer for multiple choices will be penalized (0.5 marks)**

**Section A: (40 marks)**

1. A biopsy is:
  - a) Obtained from non-living body
  - b) Obtained from a living body
  - c) Obtained from the mortuary
  - d) Obtained from a histological laboratory
2. Compound fixatives are divided into:
  - a) Nuclear fixatives
  - b) Cytoplasmic fixatives and cytological fixatives
  - c) Cytoplasmic fixatives and microanatomical fixatives
  - d) None of the above
3. Cuboidal epithelial cells are found in:
  - a) Thyroid
  - b) Intestine
  - c) Stomach
  - d) Liver
4. The source of specimens processed in the histopathology laboratory include:
  - a) Theatre
  - b) Museum
  - c) Laboratory
  - d) Research
5. The following are histochemical fixatives **EXCEPT**:
  - a) Cold acetone
  - b) Schaudin's fluid
  - c) Chromic acid
  - d) Absolute alcohol
6. Pyknosis is:
  - a) Condensation of nucleus
  - b) Condensation of cytoplasm
  - c) Fragmentation of nucleus
  - d) Disappearance of nucleus
7. Means of decalcifying include the following **EXCEPT**:
  - a) X-ray method
  - b) Use of 10% Formic acid
  - c) Use of E.D.T.A. chelating agent
  - d) Calcium carbonate
8. The procedure used to prepare diseased tissues for microscopical examination is termed as:
  - a) Histological technique
  - b) Anatomical technique
  - c) Essential technique
  - d) Histopathological technique
9. During autolysis the cytoplasm undergoes the following changes **EXCEPT**:
  - a) It swells
  - b) It fragments
  - c) Becomes granular
  - d) Becomes homogenous mass with loss of normal staining reaction
10. Identify the nuclear fixatives from the following:
  - a) Carnoy's fluid
  - b) Muller's fluid
  - c) Orth's fluid
  - d) Formal saline

11. The following are methods of fixing histological specimens **EXCEPT**:
- Immersion
  - Drying
  - Freezing
  - Injection
12. Which of the following factors will influence the choice of a histological method:
- Urgency of investigations
  - The microtome available
  - The microscope available
  - The knife available
13. Forensic pathology is:
- Study of body tissue
  - Study of the eye disease
  - Study of tissue changes caused by criminal activity
  - Study of nervous system diseases
14. Tissues and cells prepared by dissociation method are examined by:
- Electron microscope
  - Dane ground microscopy
  - Phase contrast microscopy
  - Fluorescent microscopy
15. Chelating agent includes:
- Formalin
  - Formic acid
  - Versene
  - Carnoy's fluid
16. The property of Bouin's fluid are:
- Takes 15-24 hours to fix tissue
  - Makes collagen to shrink
  - Does not fix chromosomes
  - Does not preserve glycogen
17. The following are simple fixatives **EXCEPT**:
- Picric acid
  - Acetone
  - Acetic acid
  - Formal sublimite
18. Fixation artefacts include:
- Mercuric chloride pigment
  - Stain precipitate
  - Lipofuscin pigment
  - Ferric salts
19. Fixed tissues are preserved by storing in:
- Distilled water
  - Absolute alcohol
  - Buffered formal saline
  - Warm air oven
20. Vapour fixatives commonly used are:
- Formaldehyde
  - Paraformaldehyde
  - Sulphur dioxide
  - Xylose

21. Ion exchange resins are not used routinely for decalcifying tissue because they:
- Are too slow
  - Damage tissue
  - Interfere with staining reaction
  - Are too expensive
22. Criteria of a good decalcifying agent is:
- Formation of air bubbles
  - Impairment of staining
  - Reasonable speed
  - Presence of damage in tissue
23. Small bronchi are lined by:
- Simple columnar ciliated epithelia
  - Columnar epithelia
  - Stratified epithelia
  - Transitional epithelia
24. Sections of light microscopy are commonly cut at:
- 20  $\mu\text{m}$
  - 3-5  $\mu\text{m}$
  - 30-5  $\mu\text{m}$
  - 3-5 mm
25. Post-mordanting applies to:
- Autopsies
  - Secondary fixation
  - Restaining
  - Primary staining
26. Low temperatures:
- Retard fixation
  - Increases putrefaction
  - Increase commercial multiplication
  - Accelerates post-mortem changes
27. Nuclear fixatives include:
- Helly's fluids
  - Flemming's fluids
  - Bovin's solutions
  - Gendre's fluids
28. Flemming's fluids:
- Takes 30-90 minutes to fix a tissue
  - Penetrates tissue poorly
  - Renders tissue transparent
  - Penetrates tissue very fast
29. To prevent the acidity of formalin and hence the formation of paraformaldehyde add:
- Magnesium carbonate to the solution
  - Sodium chloride
  - Buffer solution to the formalin
  - Citric acid
30. Which of the following fixatives cannot allow the use of X-ray to determine the end-point of decalcification:
- Flemming's fluid
  - Carnoy's fluid
  - 10% formalin
  - Zenker's fluid

31. The first stage of autolysis where the cell nucleus condenses is known as:
- Karyorrhexis
  - Necrosis
  - Karyolysis
  - Pyknosis
32. Urgent biopsies are best fixed in:
- Carnoy's fluid
  - Flemming's fluid
  - Buffered 10% formalin
  - Mercuric chloride
33. The maximum temperature for autolysis and putrefaction is:
- 0° c
  - 37° c
  - 56° c
  - 47° c
34. The third stage of mitotic cell division is called:
- Meiosis
  - Telophase
  - Anaphase
  - Prophase
35. Prolonged exposure to the acidic vapour produced by osmium tetroxide may result in:
- Sinusitis
  - Dermatitis
  - Calcification of tissue
  - Blindness
36. Tissues fixed in formal sublimate should be taken to:
- 70% ethanol
  - 95% ethanol
  - 60-80% ethanol
  - Running tap water overnight
37. The organelle that contains digestive enzymes in a living cell is called:
- Lysosome
  - Golgi element
  - Centrosome
  - Mitochondria
38. All living cells are made up of a substance called:
- Connective tissue
  - Epithelial cells
  - Muscle tissue
  - Protoplasm
39. The most important procedure in the preparation of a tissue for microscopic examination is:
- Proper preservation
  - Proper identification
  - Choice of clearing agent
  - Staining technique
40. Bouin's fluid differ from formalin by including glacial acetic acid and:
- Picric acid
  - Chromic acid
  - Mercuric chloride
  - Potassium dichromate

**SECTION B: (60 MARKS)**

41. (a) Histological specimens are usually accompanied by a request form:
- i. List down all the information which must be on this form. (8 marks)
  - ii. What other information is given to the same specimen on arrival to the laboratory? (2 marks)
- (b) A tissue was taken out from the body and left on the bench unfixed for 24hours.  
List five changes that may have taken place to the tissue. (5 marks)
- (c) List the **FIVE** methods applied in a histology laboratory of getting a biopsy from a patient. (5 marks)
42. (a) Draw and label the following types of epithelial cells below.  
Give one function for each.
- i. Simple squamous epithelium (4 marks)
  - ii. Simple columnar epithelium (4 marks)
  - iii. Simple cuboidal epithelium (4 marks)
- (b) (i) Explain the purpose of fixation. (3 marks)  
(ii) State criteria of a perfect fixative. (5marks)
43. (a) (i) Define the term decalcification (2 marks)  
(ii) List six criteria of a good decalcifying agent and four examples of acids commonly used for decalcification (8 marks)
- (b) (i) Name four methods for determining the end point of decalcification (4 marks)  
(ii) Describe the chemical method (6 marks)