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 II 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 B (40 MARKS)

1. The commonest gynaecological cytology specimen is:-
   a) Sputum
   b) Buccal smear
   c) Semen
   d) Cervical smear
   e) Ascitic fluid

2. Mordant are incorporated in staining solutions because they:
   a) Facilitate impregnation during demonstration of cells of the C.N.S
   b) Facilitate staining by forming lakes
   c) Increase selectivity of dyes
   d) Speed up staining reactions
   e) Promoting permanency of the colour formed

3. A cut tissue section is put on warm water just before it is attached onto a slide to:
   a) Remove major folds
   b) Melt para wax
   c) Flatten the tissue
   d) Remove air
   e) Provide more adhesion

4. The best knife to section tissue embedded in synthetic resins is:
   a) Plane wedge
   b) Bi-concave
   c) Plano concave
   d) Tool edge
   e) Glass

5. Scores on tissue sections may be as a result of:
   a) Very large blocks of tissue
   b) Nicks on knife edge
   c) Very soft para wax
   d) The embedding media containing dirt
   e) Loose knife

6. An example of water soluble mounting is /are:
   a) DPX
   b) Paramount
   c) Glycerine jelly
   d) Canada balsam
   e) Apathy's media

7. Which of the following pigments seen in tissue sections are endogenous:
   a) Melanin
   b) Lipofuschin
   c) Iron-ore
   d) Asbestoes rods
   e) Tattoo pigment

8. Haematoxylin dye will not give staining results unless:
   a) It is diluted
   b) It is ripened
   c) It is neutralized
   d) Alcohol is added
   e) A mordant is incorporated

9. Basic dye that display metachromacy include:
   a) Methyl violet
   b) Basic fuschin
   c) Congo red
   d) Toluidin blue
   e) Sudan black

10. Abarassive used during knife sharpening include:
   a) Mercury chloride
   b) Jeweler's rouge
   c) Potassium dichromate
   d) Aluminium oxide
   e) Starch paste

11. Fats can best be demonstrated in histology by:
   a) Frozen section technique
   b) Para wax technique
   c) Cryostat preparation technique

d) Celloidin section technique
e) Nitro-cellulose technique

12. The horizontal lines or furrows across the tissue sections are called:
a) Creases
b) Nicks
c) Chatters
d) Levels
e) Scores

13. Paraffin wax is a popular embedding medium for routine purpose because:
a) Thick sections are easily cut
b) Ribbons cannot be obtained
c) Blocks are durable with no problem in their storage
d) Provides good consistency of serial sections
e) Impregnation takes several weeks

14. The following waxes for embedding contain plastic polymers:
a) Bees wax
b) Ester wax
c) Para plast
d) Fibro wax
e) Water soluble waxes

15. The following are de-hydrants except:
a) Acetone
b) Dioxane
c) Celloidin
d) Ethyl alcohol
e) Xylene

16. A good mountant should not:
a) Crack
b) Harden quickly
c) Develop granules
d) Preserve the colour of the stain
e) Increase R.I.

17. Accentuators used in histological staining techniques may include:
a) Ammonium alloy
b) Phenol
c) Thymol

d) Potassium hydroxide
e) Celestine blue

18. Formalin pigments:
a) Are dark blue in colour
b) Can be removed by acid formalin
c) Are greenish yellow in colour
d) Results from proteins breakdown
e) Are dark brown in colour

19. Natural dyes include the following:
a) Orcein
b) Eosin
c) Carmine
d) Picric acid
e) Methylene blue

20. The methods of ripening employed for haematoxylin will include:
a) By air and sunlight
b) By treatment with Lysol
c) By addition of alcohol
d) By litmus
e) By chemical oxidizing

21. The type of staining where the dye dissolve more in the tissue structure than the original solvent is known as :
a) Histochemical
b) Metallic impregnation
c) Elective solubility
d) Supra-vital
e) Lysosome

22. Perl's Prussian blue is:
a) Stain for asbestos
b) Fixative for iron pigment
c) Stain for mercuric pigment
d) Stain for all endogenous pigment
e) Stain for iron pigments

23. Egg albumin is a popular adhesive because it:
a) Is easy to prepare
b) Does not give background
c) Promotes stain uptake

d) Is best stored at room temperature
e) Prevents fading of the stain

24. The tissue processing schedule follows:
a) Fixation clearing dehydration impregnation
b) Fixation decalcification rehydration clearing infiltration
c) Fixation decalcification dehydration clearing infiltration
d) Fixation dehydration clearing impregnation

SECTION B (60 marks)

25.(a) Giving examples describe types of samples /specimen used in histology (10 marks)
(b) Explain endogenous pigmentation giving the relevant example. (10 marks)

25. Describe the four artefact pigments how they are formed, appearance and removal (20marks)
26. Describe the end point of decalcification (chemical test). (20marks)

MARKING GUIDE

SECTION A

1. **D**
2. **B**
3. **A**
4. **D**
5. **B. D**
6. **C, E**
7. **A, B**
8. **B, E**
9. **A, D**
10. **B, D**
11. **A, C**
12. **C**
13. **C, D**
14. **C**
15. **C, E**
16. **A, C**
17. **B, D**
18. **D**
19. **A, C**
20. **A, E**
21. **C**
22. **A, E**
23. **A, B**
24. **C, D**

SECTION B

Q1.

a) Effusions Examples- pleural fluid,(from chest cavity) ,peritoneal fluid, sputum
b) Secretions e.g. mucous (from mucous membranes)

c) Aspirates-C.S.F, Bone marrow
d) Scrapping(from shed cells) - curettins of cervix, Uterine scrapping
e) Fluids- gastric fluid C.S.F, Urine

Q2.

a) Formalin pigment –commonily found in blood forming or containing organse.g. liver, spleens lungs,bone-marrow and along the blood vessels
Formed by fixation of tissues in acidic formaldehyde and come in contact with haemogrobine

Black brown in colour
Birefringent/anisocytosis

Barrets method
Verocay's method

b) Mercuric pigments-found in the tissue fixed in mercuric chloride containing fixative e.g. zenkers heidensusa fluids
Black deposit and are evenly distributed all over the tissues
By oxidation with iodine lugol or grams
Brown colour –bleaching in 5%sodium thiosulphate
c) Osmium tetraoxide pigments –deposited onto tissue tha have been fixed on Osmium tetraoxide containing fixatives e.g. flemming's fluid, champy's fluid

Use of bleaching agents

Wash the tissue in a running tap water over night to avoid a scum and insoluble oxide

d) Chrome deposits- deposits found in tissues that have been fixed in potassium containing fixatives e.g. champy's & reungand's fluids when tissue are not thoroughly washed in water after fixation with potassium dichromate

Yellow brown to black brown precipitate

Wash the sections in running tap water or 1% acid alcohol the wash in water

Q3. Formed in tissues by natural means

- Many formed as result of Hb breakdown

- Those formed due to Hb breakdown-haematogenous
- Those appearing naturally –autogenous

  Haematogeneous pigments
  - Haemosidering (free iron)
  - Haemogrobulin
  - Bile pigments
  - Pophyrin pigments

    Enterochromaffins granules

    Adrenal chromaffins

    Lipid pigments
    - Lipofuschin
    - Dubin Johnson pigments

    Uric acid

    Calcium

    Copper

Q4

Relies on the detection of dissolved calcium in the decalcifying solution when no further calcium is detected decalcification is complete.

Consist of two stages- positive result at either stage indicates that further decalcification of the tissue in fresh fluid.

Decant 5ml of the used decalcifying fluid into a clean test tube

Add a small piece of litmus

Add strong ammonia drop by drop whilst agitating the tube until the litmus paper turns blue indicating alkalinity

If the solution becomes turbid at this stage due to formation of calcium hydroxide, then decalcification is incomplete –not necessary to proceed further

If the solution remains clear, proceed with the second stage of test

Add 0.5 mls saturated aqueous ammonium oxalate stand 30mins

If turbidity occur due to formation of calcium oxalate then decalcification is incomplete-tissue requires further decalcification

If solution remains clear decalcification is complete