



UNIVERSITI KUALA LUMPUR
INSTITUTE OF MEDICAL SCIENCE TECHNOLOGY

FINAL EXAMINATION
MARCH 2025 SEMESTER

COURSE CODE : HDB30303
COURSE TITLE : CLINICAL LABORATORY CYTOPATHOLOGY
PROGRAMME NAME : BACHELOR OF BIOMEDICAL SCIENCE (HONOURS)
DATE : 23 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. Answer ALL questions for Section A.
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 18 PAGES OF QUESTIONS INCLUDING THIS PAGE

SECTION A (Total: 40 marks)

Answer ALL questions.

Please use the answer booklet provided.

1. Which of the following statements regarding quality in cytology services is true?
 - I. A satisfactory staff-to-workload ratio is essential.
 - II. The laboratory shall monitor the performance of individual screeners.
 - III. The laboratory tasks must be undertaken according to individual preferences.
 - IV. Standard Operating Procedure (SOP) should be regularly reviewed to ensure it accurately reflects current practice.
 - A. I, II and III only
 - B. I, III and IV only
 - C. II, III and IV only
 - D. I, II and IV only

2. The presence of numerous _____ in a cerebrospinal fluid (CSF) smear is most likely indicative of a parasitic infection.
 - A. lymphocytes
 - B. eosinophils
 - C. neutrophils
 - D. chondrocytes

3. Which of the following statements is true about cell blocks?
 - A. Cell blocks are prepared from fine needle aspiration (FNA) specimens only.
 - B. Pap stain is routinely used to stain the cell block sections.
 - C. Cell blocks provide additional architectural features.
 - D. The specimens are embedded in resin as the block medium.

4. Which of the following statements about specimen adequacy criteria is correct?
- A. Sputum: Numerous alveolar macrophages
 - B. Bronchial brushing: Numerous alveolar macrophages and free from ciliated bronchial epithelial cells
 - C. Bronchoalveolar lavage: Numerous squamous cells
 - D. Bronchial washing: Numerous squamous cells and ciliated bronchial epithelial cells
5. The maximum workload limit for screening of conventional gynaecological smears is _____ slides per day.
- A. 20
 - B. 140
 - C. 70
 - D. 100
6. A cytoscreener shall screen a maximum of _____ liquid-based cytology (LBC) gynaecological smears per day.
- A. 20
 - B. 140
 - C. 70
 - D. 100
7. A cytoscreener shall screen a minimum of _____ abnormal gynaecological smears per month to maintain competency.
- A. 20
 - B. 140
 - C. 100
 - D. 70

8. A cytoscreener shall perform screening of at least _____ gynaecological smears per year to maintain competency.
- A. 3000
 - B. 2000
 - C. 4000
 - D. 1000
9. Participation of a cytopathology laboratory in the External Quality Assurance (EQA) activities serves to _____.
- I. validate day-to-day test run
 - II. compare performance with other laboratories
 - III. reduce the occurrence of false negative or false positive cases
 - IV. monitor monthly test performance
- A. III and IV only
 - B. I and II only
 - C. I and IV only
 - D. II and III only
10. Which of the following statements best describes the 'transformation zone' in the female genital tract?
- A. It is the junction of the vaginal epithelium and ectocervical epithelium.
 - B. It is a change in the ectocervical stratified squamous epithelium to simple columnar epithelium.
 - C. It is the site of transition between the columnar epithelium of endocervix and squamous epithelium of ectocervix.
 - D. It is the area between the old and the new squamo-columnar junction in the cervix.

11. The following figure illustrates the finding in a fine needle aspiration cytology (FNAC) smear of the lymph node, showing the _____, the hallmark of classical Hodgkin lymphoma.

Refer Below - Figure1 : FNAC smear of lymph node .

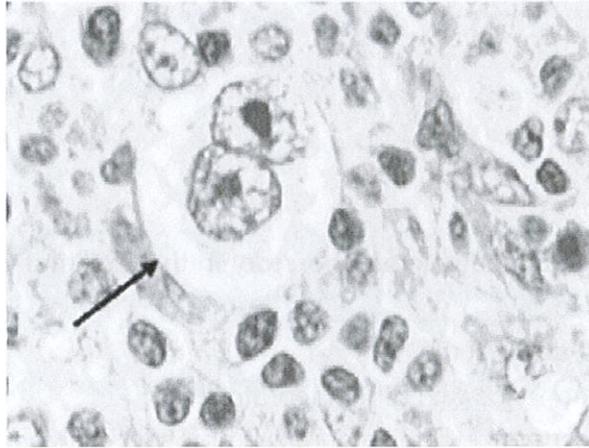


Figure 1: FNAC smear of lymph node

- A. immunoblast
 - B. plasma cell
 - C. Reed-Sternberg cell
 - D. centroblast
12. Agitation of slides during a staining procedure is important to _____.
- A. decolorize cytoplasmic stain
 - B. distribute dye evenly
 - C. enhance nuclear stain
 - D. remove impurities

13. Which of the following is the most likely cause of gray cytoplasm in smears stained with Pap stain?
- A. Smears have been air-dried prior to fixation.
 - B. Excessive dipping in the alcohol rinses.
 - C. Excessive time in hematoxylin.
 - D. Lack of agitation during staining.
14. The cytology smears intended for _____ stain are air-dried prior to the staining procedure.
- A. Papanicolaou
 - B. May-Grunwald Giemsa
 - C. Shorr's
 - D. aceto-orcein
15. _____ solution is used as the universal fixative to pre-fix cytological fluid specimen.
- A. 50% ethanol
 - B. Carbowax
 - C. 95% ethanol
 - D. Carnoy's
16. Under-staining of the nucleus in smears stained with Pap stain may occur due to _____.
- A. excessive time in hematoxylin
 - B. insufficient time in alcohol rinses
 - C. too many dips in acid alcohol
 - D. too few dips in acid alcohol

17. The following figure illustrates the findings in a smear from FNAC of the breast. The cells are predominantly arranged as antler horn-like clusters. The most likely condition is _____.

Refer Below - Figure2 : Breast cytology smear .

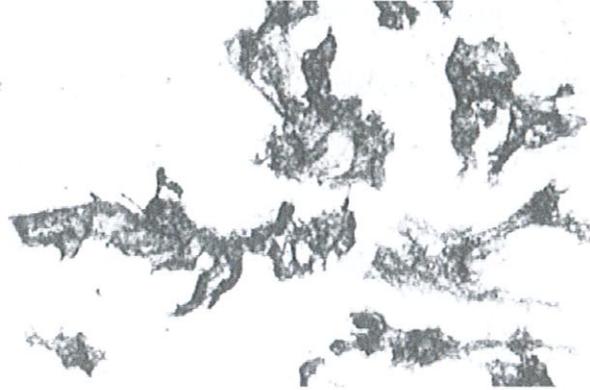


Figure 2: Breast cytology smear

- A. proliferative fibrocystic changes
 - B. non-proliferative fibrocystic changes
 - C. fibroadenoma
 - D. invasive ductal carcinoma
18. _____ smear stained with _____ stain is preferred for sex chromatin identification.
- A. Buccal; aceto-orcein
 - B. Thyroid; Papanicolaou
 - C. Cervical; May-Grunwald Giemsa
 - D. Vaginal; Shorr's

19. The following figure illustrates a smear aspirated from invasive lobular carcinoma (ILC) of the breast. The cells contain large intracytoplasmic vacuoles showing the morphology known as _____ appearance.

Refer Below - Figure3 : Breast cytology smear .

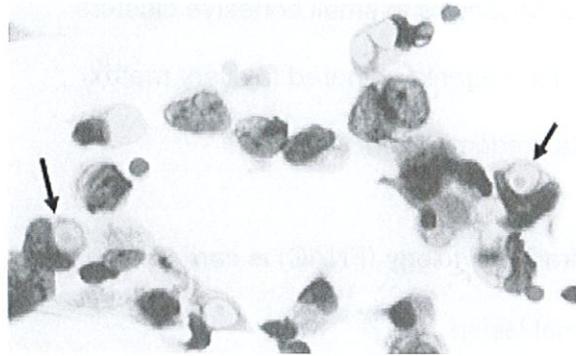


Figure 3: Breast cytology smear

- A. signet ring
B. lacy skirt
C. antler horn
D. lacy skirt
20. Papillary thyroid carcinoma cells show a characteristic feature of _____.
- A. large cytoplasmic vacuole
B. nuclear hyperchromasia
C. protruded nucleus from the cytoplasm
D. pale and powdery chromatin
21. A mixed population of lymphocytes is the predominant cytological feature of _____.
- A. papillary thyroid carcinoma
B. multinodular goiter
C. Hashimoto thyroiditis
D. thyroid follicular adenoma

22. _____ is a characteristic cytological feature for salivary gland pleomorphic adenoma.
- A. Squamoid cells predomination
 - B. Presence of oncocytes in small cohesive clusters
 - C. Presence of a magenta-coloured fibrillary matrix
 - D. Mucus cells predomination
23. Fine needle aspiration cytology (FNAC) is carried out to _____.
- A. evaluate anal lesion
 - B. evaluate thyroid nodule
 - C. diagnose salivary glands infection
 - D. diagnose cat scratch disease
24. Numerous cell clusters with _____-like pattern are one of the common cytological presentations of pleural malignant mesothelioma.
- A. mulberry
 - B. honeycomb
 - C. carrot
 - D. Swiss cheese
25. Cytological findings of a pleural effusion sample showing abundant clumped _____ and scattered macrophages, are characteristic for rheumatoid pleuritis.
- A. granular debris
 - B. fibrillary matrix
 - C. mesothelial cells
 - D. neutrophils

26. The addition of anticoagulant in a _____ specimen is recommended to prevent specimen clotting.
- A. cerebrospinal fluid
 - B. peritoneal effusion
 - C. bronchial washing
 - D. sputum
27. The following figure illustrates a finding in a cerebrospinal fluid (CSF) cytology smear showing the morphology of round, narrow-based budding yeast and capsulated microorganisms. The most likely microorganism is _____.

Refer Below - Figure4 : CSF cytology smear .

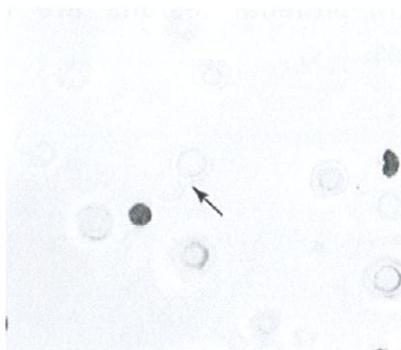


Figure 4: CSF cytology smear

- A. *Cryptococcus neoformans*
- B. *Candida albicans*
- C. *Histoplasma capsulatum*
- D. *Aspergillus fumigatus*

28. The cerebrospinal fluid (CSF) cytology evaluation is primarily done for the detection of _____.
- I. acute bacterial meningitis
 - II. tumor metastasis to CNS
 - III. primary CNS tumors
 - IV. amebic brain abscess
- A. III and IV only
 - B. II and III only
 - C. I and II only
 - D. I and III only
29. Anal squamous intraepithelial lesions are morphologically identical to _____ lesions.
- A. bronchial
 - B. duodenal
 - C. gastric
 - D. cervical
30. Normal morphological findings of the stomach typically show a _____-like appearance.
- A. carrot
 - B. honeycomb
 - C. Swiss cheese
 - D. mulberry

31. Duodenal adenoma and gastric adenoma share similar cytological features such as _____.
- A. marked nuclear pleomorphism
 - B. 'feathering' at the edges of cellular groups
 - C. inconspicuous nucleoli
 - D. increased cellularity
32. Cytology assessment of the gastrointestinal tract is mainly performed for _____.
- A. investigation of gastroesophageal reflux disease
 - B. investigation of suspected malignancy
 - C. diagnosis of Barrett's esophagus
 - D. diagnosis of viral infection
33. Cells arranged in 3D tight clusters are _____ in esophageal adenoma.
- A. absent to moderate
 - B. occasionally present
 - C. moderate to many
 - D. absent to rare
34. A cervical sample collected from a lactating woman consists primarily of _____ cells and immature intermediate cells.
- A. navicular
 - B. basal
 - C. parabasal
 - D. superficial

35. A high maturation value (MV) in hormonal cytology evaluation reflects a high _____ effect.
- A. luteinizing hormone (LH)
 - B. estrogen
 - C. progesterone
 - D. follicle stimulating hormone (FSH)
36. Malignant cells show cytologic feature of _____.
- A. irregular nuclear membrane
 - B. fine chromatin pattern
 - C. even chromatin distribution
 - D. low nuclear-to-cytoplasmic ratio (NCR)
37. A cytoscientist shall have a qualification of _____ and have undergone training in cytopathology.
- A. Diploma in Medical Laboratory Technology
 - B. Master in Pathology
 - C. Sijil Pelajaran Malaysia
 - D. Bachelor of Science
38. Which of the following statements about the laboratory procedure manual is true?
- I. The manual should include the requirements for specimen collection.
 - II. The manual describes the criteria for specimen rejection.
 - III. The manual can be regularly updated without authorization.
 - IV. The manual provides detailed steps of laboratory testing.
- A. I, II and III only
 - B. II, III and IV only
 - C. I, III and IV only
 - D. I, II and IV only

39. The following figure illustrates the finding in a cytology cervical smear. Tangled clumps of filamentous microorganisms appear as 'cotton-ball cluster' is most likely

Refer Below - Figure5 : Cervical cytology smear .

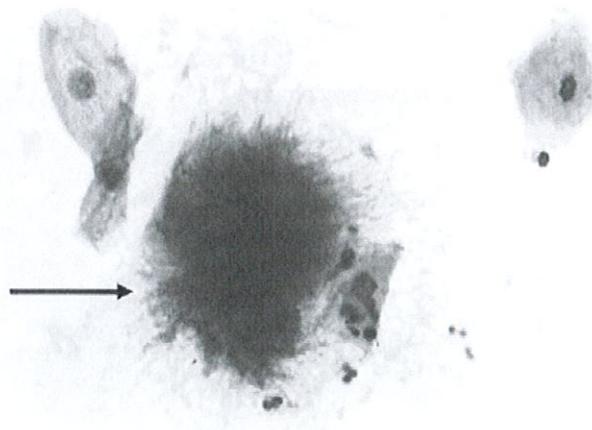


Figure 5: Cervical cytology smear

- A. *Trichomonas vaginalis*
- B. *Cryptococcus neoformans*
- C. *Actinomyces spp.*
- D. *Gardnerella vaginalis*

40. The following figure illustrates the cytopathic changes seen in an esophageal cytology smear due to viral infection. The features shown include _____.

- I. ground-glass nuclei
- II. multinucleation
- III. cytoplasmic vacuolization
- IV. nuclear molding

Refer Below - Figure6 : Esophageal cytology smear .

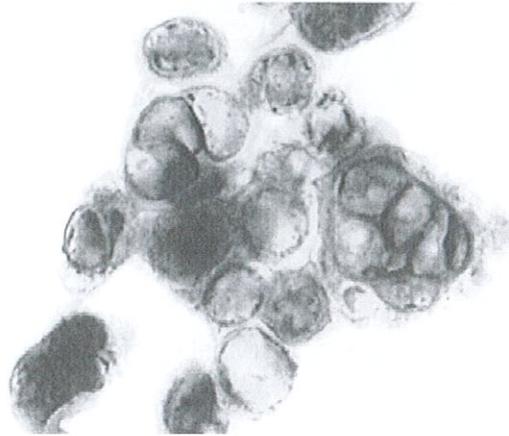


Figure 6: Esophageal cytology smear

- A. I, II and IV only
- B. I, II and III only
- C. I, III and IV only
- D. II, III and IV only

SECTION B (Total: 60 marks)

Answer THREE (3) questions only.

Please use the answer booklet provided.

Question 1

Quality assurance in a cytopathology laboratory is aimed at ensuring quality test results. Discuss the quality requirement in the following areas as governed by the quality management system (QMS).

- (i) Personnel
- (ii) Accommodation and environmental
- (iii) Laboratory equipment, reagents and consumables
- (iv) Internal quality control (IQC) activity

(20 marks)

Question 2

A 37-year-old male was referred to the Emergency & Trauma Department with complaints of fever, coughing green-colored sputum and chest pain. He was treated with antibiotics for suspected pneumonia, which was later confirmed by sputum culture demonstrating bacterial growth. After several days, he developed dyspnea, and pleural effusion was seen in the chest X-ray. He underwent a thoracentesis procedure, during which a significant volume of purulent pleural effusion was aspirated and subsequently sent for cytological analysis.

Based on the above information, answer the following questions.

- (a) Suggest possible gross characteristics of the pleural effusion specimen in terms of color and clarity. (2 marks)
- (b) Describe the procedure to prepare the pleural effusion cytology smear by cytocentrifugation method. (8 marks)
- (c) Explain the steps to examine the pleural effusion cytology smear under the light microscope. (8 marks)
- (d) Identify one (1) most likely finding in the pleural effusion cytology smear. (2 marks)

Question 3

The Papanicolaou stain, commonly known as the Pap stain, is a staining technique used in cytology to enhance the visualization of cells under a microscope. Developed by Dr. George Papanicolaou in the 1940s, it is primarily utilized in the detection of precancerous and cancerous cells.

- (a) Describe the advantages of the Pap stain for the detection of precancerous and cancerous cells.

(5 marks)

- (b) Discuss the common pitfalls encountered in the staining results and the causes.

(15 marks)

Question 4

A 45-year-old woman underwent a fine needle aspiration (FNA) procedure due to presence of lump in her thyroid gland. Other than cytology smears, cell blocks were also prepared from the FNA specimen. Examination of the smears and cell block revealed features suggestive of a classic papillary carcinoma of thyroid.

Based on the above information, answer the following questions.

- (a) Discuss the roles of the cytotechnologist during the FNA procedure.

(10 marks)

- (b) Describe the procedure to prepare the cell block according to the agar method.

(6 marks)

- (c) Identify two (2) most likely findings observed in the cytology smears and cell block.

(4 marks)

END OF EXAMINATION PAPER

