



UNIVERSITI KUALA LUMPUR
INSTITUTE OF MEDICAL SCIENCE TECHNOLOGY

FINAL EXAMINATION
OCTOBER 2025 SEMESTER

COURSE CODE : HDB30303
COURSE TITLE : CLINICAL LABORATORY CYTOPATHOLOGY
PROGRAMME NAME : BACHELOR OF BIOMEDICAL SCIENCE (HONOURS)
DATE : 23 JANUARY 2026
TIME : 3:00PM - 6:00PM
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. The _____ stain allows a distinct differentiation to be made between eosinophilic and cyanophilic squamous cells in smears for hormonal evaluation.
 - A. aceto-orcein
 - B. Papanicolaou
 - C. Shorr's
 - D. May-Grunwald Giemsa

2. Participation of a cytopathology laboratory in the External Quality Assurance (EQA) activities serves to _____.
 - I. reduce the occurrence of false negative or false positive cases
 - II. compare performance with other laboratories
 - III. validate day-to-day test run
 - IV. monitor monthly test performance
 - A. I and IV only
 - B. I and II only
 - C. II and III only
 - D. III and IV only

3. A cytoscreener shall screen a minimum of _____ abnormal gynaecological smears per month to maintain competency.
 - A. 20
 - B. 100
 - C. 70
 - D. 140

4. Identify the rhomboid-shaped, orangeophilic structures seen in the sputum sample of a patient with bronchial asthma, as shown in the figure below. These structures are derived from degenerating eosinophils.

Refer Below - Figure1 : Sputum cytology smear .



Figure 1: Sputum cytology smear

- A. Charcot-Leyden crystals
- B. Ferruginous bodies
- C. Corpora amylacea
- D. Curschmann's spirals
5. A cytoscreener shall screen a maximum of _____ liquid-based cytology (LBC) gynaecological smears per day.
- A. 140
- B. 70
- C. 100
- D. 20

6. Which of the following statements about the laboratory procedure manual is true?
- I. The manual can be regularly updated without authorization.
 - II. The manual describes the criteria for specimen rejection.
 - III. The manual provides detailed steps of laboratory testing.
 - IV. The manual should include the requirements for specimen collection.
- A. II, III and IV only
 - B. I and II only
 - C. I, II and III only
 - D. III and IV only
7. Cytology assessment of the gastrointestinal tract is mainly performed for the _____.
- A. diagnosis of viral infection
 - B. investigation of gastroesophageal reflux disease
 - C. investigation of suspected malignancy
 - D. diagnosis of Barrett's esophagus
8. A cytopathology laboratory shall have at least a cytoscreener and a _____.
- A. cytotechnologist
 - B. cytopathologist
 - C. cytology technical assistant
 - D. cytoscientist
9. Fresh effusions specimen can be kept at room temperature for up to _____ hours.
- A. 48
 - B. 12
 - C. 2
 - D. 24

10. The following figure illustrates the cytological findings from a precancerous cervical lesion. The arrow shows a cell with the feature of _____.

Refer Below - Figure2 : Cervical cytology smear .

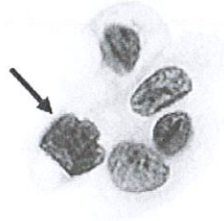


Figure 2: Cervical cytology smear

- A. abnormal mitotic figure
 - B. even chromatin distribution
 - C. irregular nuclear membrane
 - D. multinucleation
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 - Figure3 : FNAC smear of lymph node .

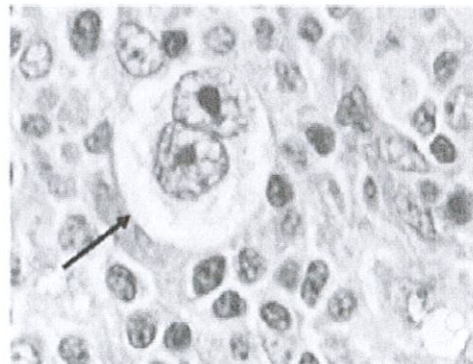


Figure 3: FNAC smear of lymph node

- A. plasma cell
- B. centroblast
- C. immunoblast
- D. Reed-Sternberg cell

12. The proportion of _____ cells is high in a cervical sample collected during the proliferative phase.
- A. superficial
 - B. basal
 - C. parabasal
 - D. intermediate
13. A cytoscreener shall perform screening of at least _____ gynaecological smears per year to maintain competency.
- A. 2000
 - B. 4000
 - C. 3000
 - D. 1000
14. The following figure illustrates the findings in a liquid-based cytology (LBC) cervical smear. The cell arrangement, known as the 'shish-kebab' effect, is due to _____ infection.

Refer Below - Figure4 : Cervical cytology smear .

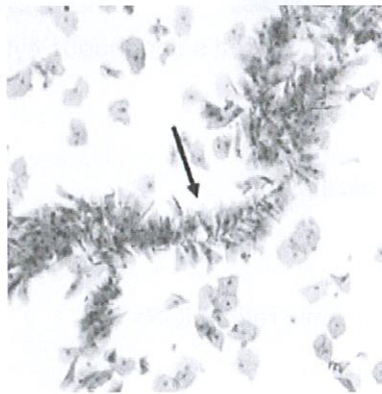


Figure 4: Cervical cytology smear

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

15. 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 area between the old and the new squamo-columnar junction in the cervix.
 - D. It is the site of transition between the columnar epithelium of endocervix and squamous epithelium of ectocervix.
16. The following figure shows a cytology smear demonstrating high-grade dysplasia in Barrett's esophagus. The cytologic features include _____.
- Refer Below - Figure5 : Barrett's esophagus cytology smear .*

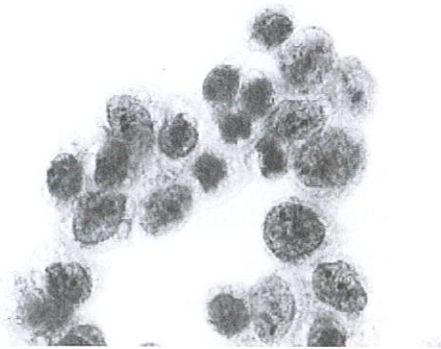


Figure 5: Barrett's esophagus cytology smear

- A. multinucleation
- B. cytoplasmic vacuolization
- C. nuclear molding
- D. high nuclear:cytoplasmic ratio (NCR)

17. 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 IV only
B. I, III and IV only
C. I, II and III only
D. II, III and IV only
18. The following figure illustrates the cytopathic changes observed in an esophageal cytology smear caused by *Herpes simplex* virus infection. The features shown include

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

Refer Below - Figure6 : Esophageal cytology smear .

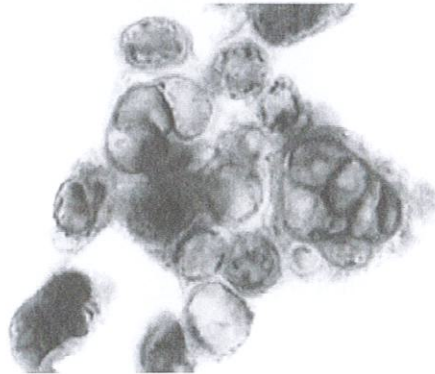


Figure 6: Esophageal cytology smear

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

19. The maximum workload limit for screening of conventional gynaecological smears is _____ slides per day.
- A. 100
 - B. 70
 - C. 20
 - D. 140
20. Fine needle aspiration cytology (FNAC) is carried out to _____.
- A. diagnose cat scratch disease
 - B. evaluate breast masses
 - C. evaluate anal lesion
 - D. diagnose salivary glands infection
21. Numerous cell clusters with _____-like pattern are one of the common cytological presentations of pleural malignant mesothelioma.
- A. carrot
 - B. mulberry
 - C. honeycomb
 - D. Swiss cheese
22. The addition of anticoagulant to a _____ specimen is recommended to prevent clotting.
- A. cerebrospinal fluid
 - B. bronchial washing
 - C. sputum
 - D. pleural effusion

23. A cerebrospinal fluid (CSF) sample composed predominantly of _____ indicates a high likelihood of acute bacterial infection.
- A. chondrocytes
 - B. lymphocytes
 - C. eosinophils
 - D. neutrophils
24. The cerebrospinal fluid (CSF) cytology evaluation is primarily done for the detection of _____.
- I. acute bacterial meningitis
 - II. primary CNS tumors
 - III. tumor metastasis to CNS
 - IV. amebic brain abscess
- A. I and II only
 - B. II and III only
 - C. I and III only
 - D. III and IV only
25. 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. The specimens are embedded in resin as the block medium.
 - D. Cell blocks provide additional architectural features.
26. Anal squamous intraepithelial lesions are morphologically identical to _____ lesions.
- A. gastric
 - B. duodenal
 - C. cervical
 - D. colorectal

27. Normal morphological findings of the small intestine typically show a _____ appearance.

- A. carrot
- B. mulberry
- C. honeycomb
- D. Swiss cheese

28. The figure below illustrates microorganism with flagella and pear-shaped seen in a duodenal brushing specimen. Identify the microorganism.

Refer Below - Figure7 : Duodenal cytology smear .

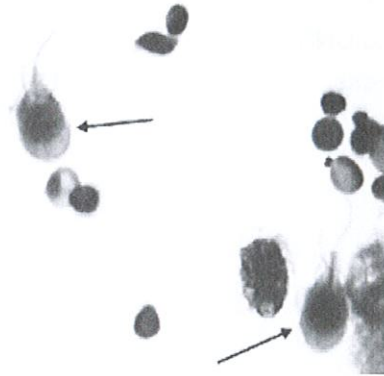


Figure 7: Duodenal cytology smear

- A. *Candida albicans*
 - B. *Giardia lamblia*
 - C. *Helicobacter pylori*
 - D. *Microsporidium* spp.
29. Agitation of slides during a staining procedure is important to _____.
- A. remove impurities
 - B. enhance nuclear stain
 - C. decolorize cytoplasmic stain
 - D. distribute dye evenly

30. Which of the following is the most likely cause of pale cytoplasmic staining in smears stained with the Pap stain?
- A. Lack of agitation during staining.
 - B. Excessive dipping in the alcohol rinses.
 - C. Excessive time in hematoxylin.
 - D. Smears have been air-dried prior to fixation.
31. _____ solution is used as the universal fixative to pre-fix fluid specimen.
- A. Carnoy's
 - B. 50% ethanol
 - C. Carbowax
 - D. 95% ethanol
32. The following figure illustrates the predominant cell arrangement observed in fibroadenoma of the breast, described as _____ clusters.
Refer Below - Figure8 : Breast cytology smear .

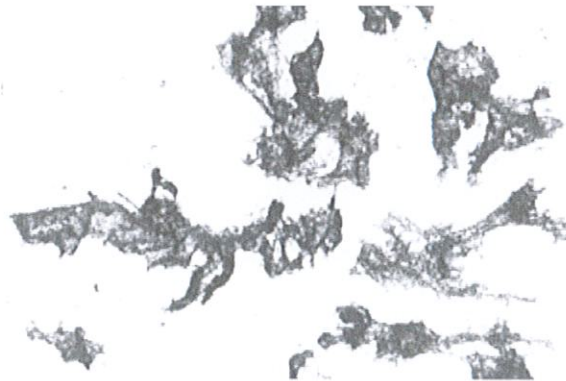


Figure 8: Breast cytology smear

- A. wreath-like
- B. antler horn-like
- C. papillary
- D. syncytial-like

33. Overstaining of the nucleus in smears stained with Pap stain may occur due to _____.
- A. too few dips in acid alcohol
 - B. prolonged fixation with Carnoy's fixative
 - C. excessive time in chlorinated tap water
 - D. bluing agent is not sufficiently alkaline
34. _____ smear stained with _____ stain is preferred for sex chromatin identification.
- A. Buccal; aceto-orcein
 - B. Vaginal; Shorr's
 - C. Cervical; May-Grunwald Giemsa
 - D. Thyroid; Papanicolaou

35. The following figure illustrates a smear aspirated from the breast, showing hypercellularity. The cells are present singly and in loosely cohesive clusters, with prominent, irregularly shaped nucleoli. Identify the most likely condition of the breast.

Refer Below - Figure9 : Breast cytology smear .

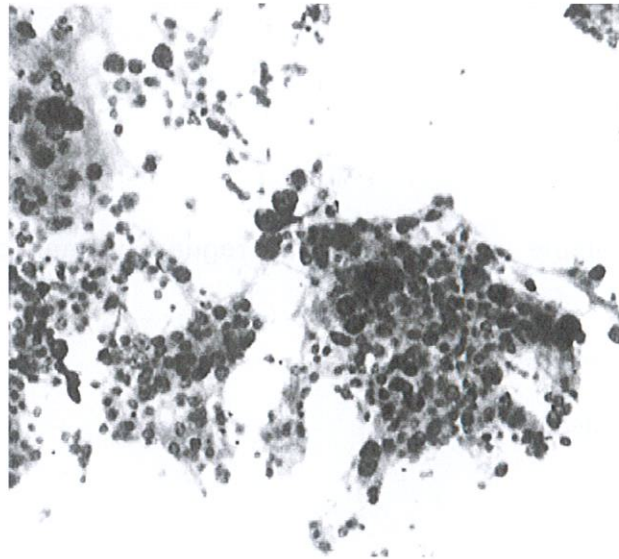


Figure 9: Breast cytology smear

- A. Invasive ductal carcinoma
 - B. Proliferative fibrocystic changes
 - C. Non-proliferative fibrocystic changes
 - D. Invasive lobular carcinoma
36. Papillary thyroid carcinoma cells show a characteristic feature of _____.
- A. protruded nucleus from the cytoplasm
 - B. pale and powdery chromatin
 - C. nuclear hyperchromasia
 - D. large cytoplasmic vacuole

37. A mixed population of _____ is the predominant cytological feature of Hashimoto thyroiditis.
- A. basophils
 - B. eosinophils
 - C. neutrophils
 - D. lymphocytes
38. A cervical sample collected from a pregnant woman consists primarily of _____ cells.
- A. glycogenated intermediate
 - B. degenerated parabasal
 - C. basal
 - D. superficial
39. Which of the following types of specimens is recommended for cytology smear preparation by the Bales method?
- A. Bronchoalveolar lavage (BAL)
 - B. Cerebrospinal fluid (CSF)
 - C. Sputum
 - D. Peritoneal effusion
40. Normal morphological findings of the salivary glands typically show aggregated acinar cells with _____ appearance.
- A. rosette-like
 - B. grape-like
 - C. top hat
 - D. scalloped edges

SECTION B (Total: 60 marks)

Answer **THREE (3)** questions only.

Please use the answer booklet provided.

Question 1

Cytological staining techniques are essential for accurate evaluation of cell morphology, with different stains selected according to specific diagnostic purposes. Among these, Shorr stain and Papanicolaou (Pap) stain are widely used in cytology, each with distinct applications. Differentiate between Shorr stain and Papanicolaou (Pap) stain based on their purpose, staining procedure, and staining results.

(20 marks)

Question 2

Quality assurance in a cytopathology laboratory ensures accurate and reliable test results. Discuss the quality requirements in the following areas as outlined in the quality management system (QMS).

- (i) Personnel
- (ii) Accommodation and environmental
- (iii) Laboratory equipment, reagents and consumables
- (iv) External quality assessment (EQA)

(20 marks)

Question 3

A 40-year-old man was referred to the Emergency and Trauma Department with fever, productive cough producing green sputum, and chest pain. He was started on antibiotics for suspected pneumonia, which was later confirmed by sputum culture showing bacterial growth. After several days, he developed worsening dyspnea, and a chest X-ray revealed pleural effusion. Thoracentesis was performed, yielding a large volume of purulent pleural fluid that was subsequently sent for cytological examination.

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 according to the 2-slides pull 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 4

A 35-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 cytotechnologist during the FNA procedure.
(4 marks)
- (b) Compare and contrast the procedure to prepare the cell block between the plasma-thrombin method and agar method.
(12 marks)
- (c) Identify two (2) most likely findings observed in the cytology smears and cell block.
(4 marks)

END OF EXAMINATION PAPER

