



UNIVERSITI KUALA LUMPUR
ROYAL COLLEGE OF MEDICINE PERAK

FINAL EXAMINATION
MARCH SEMESTER 2026

COURSE CODE : RXD24003
COURSE NAME : IMAGE PROCESSING AND QUALITY ASSURANCE II
PROGRAMME NAME : DIPLOMA IN MEDICAL IMAGING
DATE : 30 JUNE 2026
TIME : 2.30 PM – 4.30 PM
DURATION : 2 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please read CAREFULLY the instructions given in the question paper.
2. This question paper has information printed on both sides of the paper.
3. This question paper consists of TWO (2) section; Section A and Section B.
4. Answer ALL questions in Section A. For Section B, answer THREE (3) questions ONLY.
5. Please mark/write your answers on the OMR answer script or answer booklet provided.
6. Answer ALL questions in English language ONLY.

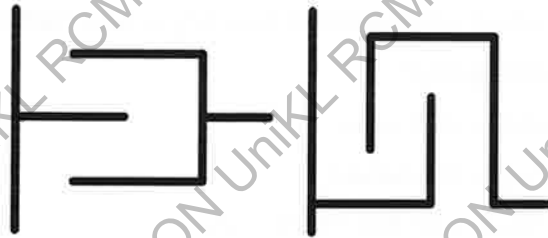
THERE ARE 9 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A: MULTIPLE OF CHOICE QUESTIONS (Total: 25 marks)

INSTRUCTION: Answer ALL questions.

Please use the objective answer sheet provided.

1. Identify the type of door entrance for the darkroom in the figure below:



- A. Labyrinth door
B. Double door
C. Revolving door
D. Single door
2. Conversion factor in image intensifier refers to _____.
A. ratio of exposure to patient dose
B. ratio of brightness to contrast
C. ratio of kilovoltage peak (kVp) to milliamperage (mA)
D. ratio of light output to x-ray input
3. Find the recommended relative humidity in a darkroom.
A. 20-30%
B. 40-60%
C. 70-80%
D. 10-20%
4. Recognise the factors that affect the safelight uniformity:
I. Bulb wattage
II. Number of safelights
III. Room colour
IV. X-ray exposure time
A. I and III
B. II and IV
C. I, II and III
D. II, III and IV

5. Identify the main factor that controls subject contrast in radiography.
- A. Milliampere seconds (mAs)
 - B. kVp
 - C. Focal spot size
 - D. Subject image distance (SID)
6. Select the **CORRECT** effect when relative humidity is less than 40%.
- A. Films might stick together.
 - B. Electrostatic charge increases.
 - C. Electrostatic charge decreases.
 - D. Basic fog and density on film might increase.
7. Identify the other name for composite type of automatic film handling system.
- A. Centralised system
 - B. Dispersed system
 - C. Manual system
 - D. Analog system
8. Find the **CORRECT** characteristic of modular type of automatic film handling system.
- A. Entire system fails if one part is faulty.
 - B. Less flexibility.
 - C. Work continues if processor fails.
 - D. Requires full darkroom.
9. Which quality assurance (QA) test is suitable to monitor the consistency of radiographic image contrast?
- A. Focal spot test
 - B. Step wedge test
 - C. kVp accuracy test
 - D. Timer accuracy test
10. Identify the cause of non-drying films in daylight film processing system.
- A. High exposure of x-ray.
 - B. Incorrect fixer pH and silver level.
 - C. Low temperature of processor.
 - D. Insufficient processing time.

11. Identify the cause of quantum noise.
- A. Insufficient x-ray photons.
 - B. High contrast resolution.
 - C. Excessive brightness.
 - D. Inability to detect motion changes.
12. Identify the **CORRECT** illuminator brightness for general radiography.
- A. 500 cd
 - B. 1500 cd
 - C. 3000 cd
 - D. 1000 cd
13. Find the **CORRECT** brightness variation between areas during the illuminator QA test.
- A. $\pm 10\%$
 - B. $\pm 5\%$
 - C. $\pm 20\%$
 - D. $\pm 30\%$
14. Select the factors that affect illuminator performance:
- I. Light color
 - II. Heat production
 - III. Brightness level
 - IV. Patient weight
- A. I and III
 - B. II and IV
 - C. I, II and III
 - D. II, III and IV
15. Recognise the effect on image contrast when the kVp value is increased.
- A. Contrast increases
 - B. Contrast decreases
 - C. Brightness increases
 - D. Brightness decreases

16. Identify the type of actinic marker used for information recording in the figure below:



- A. Identification camera
B. Photometer
C. Contact printing
D. Densitometer
17. Select the **CORRECT** factors that influence the brightness gain:
- I. Patient age
II. Input phosphor quality and quantity
III. Image blurring or lag
IV. Photocathode emission level
- A. I and III
B. II and IV
C. I, II and III
D. II, III and IV
18. Choose the **CORRECT** types of distortion in fluoroscopy:
- I. Spatial distortion
II. Barrel distortion
III. Pincushion distortion
IV. Veiling glare
- A. I and III
B. II and IV
C. I, II and III
D. II, III and IV
19. Which device is used to reduce scatter radiation and improve image contrast?
- A. Grid
B. Filter
C. Lead apron
D. Collimator light

20. Select the **CORRECT** statement regarding distortion in radiographic image.
- A. The larger object image distance (OID), the larger object appears on image.
 - B. The larger source image distance (SID), the larger object appears on image.
 - C. The shorter object image distance (OID), the larger object appears on image.
 - D. The shorter source image distance (SID), the smaller object appears on image.
21. Identify an indicator used for steep slope (high gamma) on the Hurter and Driffield (H&D) curve.
- A. Low contrast
 - B. High contrast
 - C. Wide latitude
 - D. Low exposure
22. Recognise the factors that affect photographic unsharpness.
- A. Thickness and size of halation layer.
 - B. Thickness and size of emulsion layer.
 - C. Thickness and size of phosphor layer.
 - D. Thickness and size of anti-halation layer.
23. Identify the cause of shape distortion on the radiographic image.
- A. OID
 - B. SID
 - C. Grid alignment
 - D. Incorrect computed radiography (CR) angle
24. Select the **CORRECT** statements regarding the film characteristic curve:
- I. High film contrast, wide film latitude
 - II. High film contrast, narrow film latitude
 - III. The steeper the curve, the lower the contrast
 - IV. The steeper the curve, the higher the contrast
- A. I and II
 - B. I and III
 - C. I and IV
 - D. II and IV
25. What is the minimum percentage (%) of mAs that causes a visible shift in film density?
- A. 10%
 - B. 20%
 - C. 30%
 - D. 40%

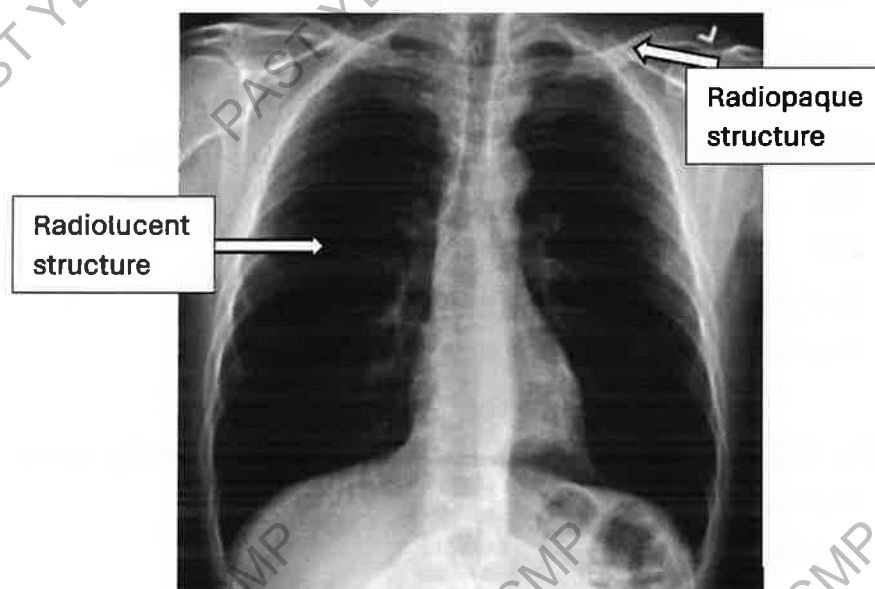
SECTION B: MODIFIED ESSAY QUESTIONS (Total: 75 marks)

INSTRUCTION: This section consists of **FOUR (4)** modified essay questions (MEQ).

You are required to answer **ONLY THREE (3)** questions in the answer booklet provided.

Question 1

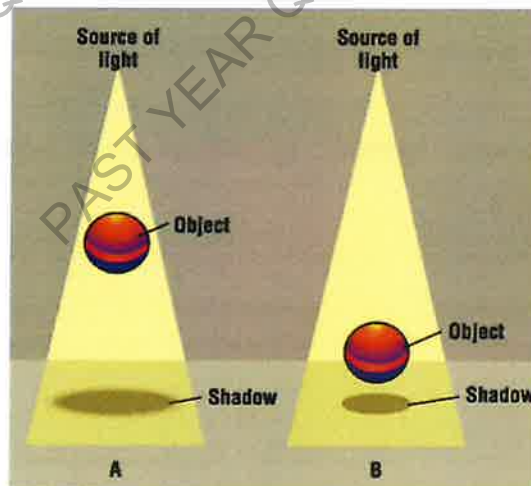
- (a) List **FIVE (5)** factors that affect the safelight uniformity in the darkroom. (5 marks)
- (b) Explain the quality assurance (QA) test for illuminator. (10 marks)
- (c) Find the differences between the radiolucent and radiopaque structures on the radiographic image shown below:



- (d) Find **FOUR (4)** factors that controlled the subject contrast in radiographic image. (4 marks)

Question 2

- (a) Identify **FIVE (5)** reasons to perform the safelight test in the darkroom. (5 marks)
- (b) Explain the types of distortion that may occur in the image intensifier (II). (10 marks)
- (c) Find **FOUR (4)** types of contrast in radiographic image. (4 marks)
- (d) Relate the object image distance (OID) with the size distortion that is shown in the diagram below:



(6 marks)

Question 3

- (a) List **FIVE (5)** components in the darkroom. (5 marks)
- (b) Referring to composite type (centralised system) of automatic film handling system:
- i. Describe the advantages. (5 marks)
 - ii. Describe the disadvantages. (5 marks)
- (c) Find the reasons why mAs is the factor that controls radiographic density. (6 marks)
- (d) Relate the relationship between kilovoltage peak (kVp) and image contrast in radiographic imaging. (4 marks)

Question 4

- (a) List **FIVE (5)** factors that influence the image quality in image intensifier.
(5 marks)
- (b) Explain the methods to reduce noise in fluoroscopy system.
(10 marks)
- (c) Relate between radiographic contrast with subject contrast.
(6 marks)
- (d) Find the reason why the shoulder and elbow joint should be at the same level during an elbow joint x-ray examination.
(4 marks)

END OF EXAMINATION PAPER