SECTION 1: MULTIPLE CHOICE QUESTIONS (20 Marks)

1. The grainy appearance of an image is described by which of the following:
   A. Spatial resolution (sharpness)
   B. Contrast resolution → pn
   C. The kV and mAs used
   D. Noise
2. A wire mesh is used to test:
   A. Focal spot size
   B. For screen lag
   C. film–screen contact
   D. Screen speed
3. Misalignment of the tube–part–image receptor relationship results in:
   A. Shape distortion – Elongation & foreshortening due 2 tube misalignment.
   B. Size distortion – SID, OID
   C. Magnification ↗
   D. Blur
4. Which of the following is (are) considered as geometric factor(s) controlling recorded detail?
   1. OID
   2. SID
   3. Screen speed
      A. 1 only
      B. 1 and 2 only
      C. 2 and 3 only
      D. 1, 2, and 3
5. The thickness of an intensifying screen has a significant effect on all of the following, except?
   A. Image contrast.
   B. Image blurring.
   C. Receptor sensitivity.
   D. Patient exposure.
6. Under-processing (under-development) of radiographic film can result in increased film:
   A. Sensitivity.
   B. Contrast.
   C. Fog.
   D. None of the above
7. The sensitivity (speed) of a radiographic film used with an intensifying screen can be affected by all of the following, except?
   A. Amount of exposure.
   B. Exposure time.
   C. Developer concentration.
   D. Development temperature.

8. If a "high" speed radiographic film is substituted for a "medium" speed film the results would be?

A. Higher contrast.
B. More visibility of detail because of more blurring.
C. Reduced patient exposure.
D. Increased quantum noise.

9. Conditions which can reduce contrast in a general radiographic image include?

A. Underexposure.
B. Overexposure.
C. Underdevelopment.
D. All of the Above

10. Foreshortening may be caused by?

1. The radiographic object being placed at an angle to the image receptor
2. Insufficient distance between the focus and the image receptor
3. Very little distance between the object and the image receptor

A. 1 only
B. 2 only
C. 1 and 2 only
D1, 2, and 3

11. When an intensifying screen continues to glow after the x-ray exposure has ended, the screen is said to possess?

A. Fluorescence
B. Incandescence
C. Luminescence
D. Lag

12. Which of the following has an effect on distortion? Which of the following has an effect on distortion?

1. Source–image distance
2. Angulation of the x-ray tube
3. Angulation of the part

A. 1 only
B. 1 and 2 only
C. 2 and 3 only
D. 1, 2, and 3

13. Which of the following can be used to determine the sensitivity of a particular film emulsion?

A. Sensitometric curve
B. dose–response curve
C. Reciprocity law
D. Inverse square law

14. The effects of scattered radiation on the x-ray image include the following:

1. It produces fog
2. It increases contrast resolution
3. It increases grid cut-off

A. 1 only
B. 2 only
C. 1 and 2 only
D. 1, 2, and 3

15. All of the following are related to radiographic contrast, except?
A. Photon energy
B. Grid ratio
C. object–image distance
D. Focal spot size

16. An x-ray image that exhibits many shades of gray from white to black may be described as having_____.
A. long-scale contrast
B. short-scale contrast
C. More density
D Good recorded detail

17. Which of the following contribute(s) to the radiographic contrast present on the finished image?
1. Tissue density
2. Pathology
3. Beam restriction
A. 1 and 2 only
B. 1 and 3 only
C. 2 and 3 only
D. 1, 2, and 3

18. Which region of the film characteristic curve indicates that the acceptable exposure has been used for the examination?
A. Toe region
B. Slope
C. Shoulder
D. Both A and C are correct

19. The grainy appearance of an image is described by which of the following?
A. Spatial resolution
B. Contrast resolution
C. The kV and mAs used
D. Noise

20. Length of time required for film to enter processor
A. 1 only
B. 1 and 2 only
C. 1 and 3 only
D. 1, 2, and 3

SECTION 2: SHORT ANSWER QUESTIONS (40 Marks)

21. Explain types of darkroom entrances. (5 Marks)
22. Describe the film characteristic curve and its major three features? (5 Marks)
23. Explain functions of the gelatin emulsion binder. (5 Marks)
24. Explain the following terms. (5 Marks)
    a. Contrast
    b. Dynamic range
    c. Spatial Resolution
    d. Noise
25. With help of an illustration, explain the formation of an invisible 'aerial' X -ray image. (5 Marks)
26. List the conditions the x-ray film needs to be protected from. (5 Marks)
27. Explain the procedure followed during the cleaning of Image intensifier. (5Marks)
28. List the Identifications (essential information) found on an x-ray image. (5Marks)

SECTION 3: LONG ANSWER QUESTIONS (40Marks)

29. Discuss in detail the construction of intensifying screen. (20Marks)
30. Discuss the factors affecting image quality of digital radiograph. (20 Marks)

1. Spatial resolution -> It describes how detailed an object can b represented by ē image.
   -> It influences how sharply we see objects
   -> ē ability 2 distinguish two neighbouring structures as separate.

2. Contrast resolution -> states ē distinct visibility of linear structures

3. Noise ~~& artifacts~~

4. Artifacts.

SECTION 1: MUTIPLE CHOICE QUESTIONS (40MARKS)

1. In what format must images be so that they can be sent throughout the image viewing system?
   A. PACS
   B. DICOM
   C. FPD
   D. PSP
2. Exposure latitude of digital projection radiography responds in ..... manner
   A. Linear
   B. Non- linear
   C. Curvilinear
3. A geometric characteristic of a computerized image is known as
   A. Sharpness
   B. Noise
   C. Mottle
   D. Spatial resolution
4. Image brightness on a display monitor is adjusted by
   A. Window level
   B. Scanning lines
   C. window width
   D. Matrix size
5. In order to change the visibility of digital image lookup table (LUT) alter the.
   A. Matrix
   B. Histogram
   C. Pixel size
   D. Pixel value
6. The smallest component of a matrix image that represents an x-ray intensity is called
   A. Pixel
   B. Histogram
   C. Algorithm
   D. Brightness
7. Digital radiography includes image acquisition methods that include
   A. Computed radiography
   B. Flat panel direct capture detectors
   C. Charged –couple device
   D. All of the above
8. Digital system are less sensitive to scatter radiation than film/ screen system
   A. True
   B. False

9. The amount of tissue included in the image is referred to as;
   A. Field of view
   B. Collimation
   C. Inclusion
   D. Digital view
10..... is the arrangement of pixel in rows and columns
   A. Pixelation
   B. Matriculation
   C. Matrix
   D. Spatial
11. An image formed by recording a continuous changing signal is known as
   A. Analog
   B. Digital
   C. Electric
   D. Photographic
12. Which of the following measures the efficiency of a system to convert the x-ray input signal into a useful output image.
   A. MTF
   B. DQE
   C. Exposure latitude
   D. Spatial resolution
13. When insufficient ..... is selected for an examination receptor does not receive the appropriate number of x-ray photons resulting into a low SNR
   A. Kilovoltage
   B. Exposure
   C. MAS
   D. Time
14. Which of the following is not a basic function of processing system in image management?
   A. Achieve query
   B. Patient demographic input
   C. Manual send
   D. Magnification
15. The following are demographic information about the patient EXCEPT?
   A. Exam date
   B. Pathological condition
   C. Other pertinent information
   D. Health care facility
16. In digital projection radiography, what process is used to normalize an image that has been taken with too great of an exposure?
   A. High- pass filtering

B. Low- pass filtering
C. Automatic rescalling
D. Aliasing

17. the useful signal is determined during which part of image processing
A. Image sampling
B. Histogram analysis
C. Exposure indices analysis
D. Digitization

18. The active layer in PSP plate is usually made of phosphor from what family group
A. Barium sulphite
B. Barium flourohalide
C. Cecium iodide
D. Amorphous selenium

19. What device in the reader detects the light being released from the PSP plate during reading
A. Laser
B. Photodetecter
C. Analog to digital converter (ADC)
D. Mirror optics

20. Which part of PSP plate reduces static electricity
A. Reflective
B. Conductive
C. Phosphor
D. Felt material

21. The PSP plate is read
A. By flooding it with bright light
B. After every PSP plate is erased
C. Manually by selecting the proper eraser method
D. All of the above

22. Which of the following is used as a photodetector
A. Gd_2O_2S
B. CsI
C. aSe
D. a-SiiH

23. A Gd_2O_2S scintillator is known as what type of phosphor?
A. Turbid
B. Unstructured
C. Structured
D. Both A and B

24. Which of the following can be done to decrease the chance of having image lag occur in the next image.

A. Decrease the amount of time between exposures
B. Increase the amount of time between exposures
C. Leave collimation open
D. Acquire the image requiring the highest technical factors first.

25. charged couple device (CCD) does all the following except?
A. Reduces the size of the projected light image
B. Transfer the image to a capacitor
C. Convert light x-ray photons
D. Acts as receptor via lenses or fiber optics.

26. The layer in a CCD chip that contains the electron gates is the,
A. Silicon dioxide layer
B. Polysilicon layer
C. Silicon substrate
D. All of the above

27. Which type of the monitor is the most common in hospitals
A. OLEB
B. CRT
C. LCD
D. Plasma

28. What device runs the start – up instruction during boot- up of the computer
A. CPU
B. Motherboard
C. Memory
D. Bios

29. What provides the interface between the computer and the network medium?
A. Network medium
B. Network hub
C. Network switch
D. Network interface card

30. Which of the following is the most delicate network communication medium?
A. Coaxial cable
B. Twisted pair wire
C. Fiber optic cable
D. Ethernet

31. In which type of work station can changes not be made to the patient demographics of an image set?
A. Reading work station
B. Review work station
C. Technologist QC work station
D. File room work station

32. What part of the archive contains the physical storage of the images within the achieve?
    A. Image manager
    B. Image storage
    C. Image server
    D. Both B and C
33. Which of the following are considered long term storage devices?
    A. MOD
    B. DVD
    C. DLT
    D. RAID
34. A systematic observation and assessment of different aspects of a radiology department would be what kind of activity?
    A. Quality assurance
    B. Quality control
    C. Quality adjustment
    D. Quality enhancement
35. The following are CR – detector related artifacts EXCEPT?
    A. Callibration related
    B. IP stains
    C. Cracks
    D. Fogging
36. An ultrasound mode that provides a two dimensional image representing a specific plane of a section through the body is known as ?
    A. A - scan (Amplitude mode)
    B. M- scan (motion mode)
    C. B – scan (brightness mode)
    D. Doppler
37. Which of the following is an advantage of using MRI as an imaging modality over CT – scan?
    A. Less time
    B. Minimal disturbance by the patient
    C. Cheap
    D. No radiation
38. The gamma rays used in the radionuclide emits ---------- amount of energy.
    A. 100 KeV
    B. 140 KeV
    C. 200 KeV
    D. 240 KeV
39. What is the meaning of signal strength in MRI
    A. The spinning time

B. Time needed form realignment
C. Measure of proton density
D. Chemical bonding of hydrogen atoms

40. The powder development may limit resolution in xeroradiographic due to .....

A. The electric charge acquired by particles
B. Thickness of the selenium layer
C. The depth
D. unsharpness

SECTION 2: SHORT ANSWER QUESTIONS (40MARKS)

1. Differentiate between indirect conversion detector and direct conversion detector. (4Marks)
2. Describe five (5) common post processing techniques. (10 Marks)
3. The digital data that is evaluated and manipulated during image processing is used to construct a histogram, describe the presentation of the data. (6Marks)
4. State the NY QUIST THEOREM (5Marks)
5. Briefly explain 3 basic functions of the processing system in image manipulation. (6Marks)
6. Name four (4) image acquisition errors (4Marks)
7. Explain five (5) other image recording methods. (5Marks)

SECTION 3: LONG ANSWER QUESTION (20 Marks)

1. Explain any five attributes in production of quality digital radiographic images.

SECTION 1: MULTIPLE CHOICE QUESTIONS (40MARKS)

1. Spectral sensitivity refers to the colour sensitivity of
   - A .Radiographic film
   - B .Safelight filters
   - C .Intensifying screens
   - D .Safelight filters and intensifying screen
2. The image receptor for a computer radiography (CR) is composed of
   - A .Amorphous selenium
   - B. Silver bromide
   - C .Barium flourohalide
   - D .Silver bromide
3. Which of the following inadequate film processing is evidence by streaks appearance
   - A. Developer exhaustion
   - B . Inadequate drying
   - C. Dirty rollers
   - D .Low developer temperature
4. .....occurs when the exit radiation interacts with a photostimulable imaging plate?
   - A .Energy absorption
   - B .Phosphorescence
   - C .Photo emission
   - D .Flouresencence
5. Which of the following is used in computed radiography (CR) to store a digital image?
   - A. Laser light
   - B .PSP plate
   - C .Flat panel detector
   - D. Film or screen cassette
6. The phosphor used in the CR imaging plate is
   - A .Lanthanum
   - B .Gadolinium
   - C .Barium fluorohalide
   - D. Yttrium
7. After an imaging plate is scanned by the CR reader unit, it is erased with:
   - A .Laser light
   - B .White light
   - C. Red light
   - D .Fluorescent light

8. The major advantage of CR and DR imaging system is
   A .Elimination of repeat images
   B .Higher contrast images
   C .ability to see images very fast
   D .Less dose to the patient
9. The ability of a digital system to convert the x-rays input electrical signal into useful radiographic image is termed as;
   A. Contrast resolution
   B. Spatial resolution
   C. Dynamic range
   D. Signal- to -noise ratio
10. The image management system used in digital radiology department is called?
   A .PSP
   B.SNL
   C.PACS
   D.DICOM
11. One of the following is not found in a cross section of a film
   A. Base
   B. Adhesive layer
   C. Reflective layer
   D. Emulsion
12. The following are factors that affects screen speed except
   A. Absorption efficiency
   B. Thickness of the phosphor layer
   C. Conversion efficiency
   D. Film size

Phosphor/grain size.
Thickness of I.s.
Nature of substratum layer.
presence / Absence of carbon granules
Cross over effect.

13. A CR imaging plate should be processed within ..... period of exposure, Otherwise the fading of the latent image will begin to impact the image quality
   A. 1hour
   B.48hrs
   C.30 minutes
   D. 2 hours
14. When using a CR it requires.....
   A .Increasing the distance
   B. Doubling the MAs
   C .Doubling the KV
   D. Reducing the image receptor distance

15. Crossover is a radiographic problem because it decreases
    A .Contrast
    B. Density
    C. Recorded details
    D. Film speed
16. The speed of intensifying screen can be reduced by adding
    A. More phosphor ← ↑ speed.
    B.A reflecting layer – ↑ speed.
    C. Larger phosphor layer – ↑ speed.
    D. Dye to the phosphor layer
17. The type of roller responsible for moving the film from the bottom of the tank upwards is a……..roller
    A. Transport roller
    B. Turnaround roller
    C. Crossover roller – from one tank to another.
    D .Entrance roller
18. Processing chemicals must be replenished to maintain activity and volume when depleted primarily by
    A. Diffusion
    B. Precipitation
    C. Condensation
    D. Exhaustion
19. A limitation of conventional film screen radiography is
    A. Poor resolution
    B. Poor soft tissue differentiation
    C. Increased quantum mottle
    D. Transporting cassettes.
20. When a film is not properly washed the radiograph will show brown staining of the image caused by
    A. Gelatin
    B. Thiosulphate
    C. Silver halide
    D. Barium flourohalides
21. The squeegee assembly in an automatic processor
    I. Functions to remove excess solution from films
    II. Is located near the crossover rollers
    III. Helps to establish the films rate of travel
    A. 1 only
    B. 2 and 3 only
    C. 1 and 2 only

D. 3 and 1
E. 1, 2 and 3,

22. With all other factors constant, as field of view (FOV) decreases on a digital image
    I. Pixel size decreases
    II. Resolution increases
    III. Resolution decreases
    A. 1 only
    B. 2 only
    C. 1 and 2 only
    D. 2 and 3 only

23. Exposed silver halide crystals are changed to black metallic silver by the
    A. Preservative
    B. Reducers
    C. Activators
    D. Hardener

24. Post-processing manipulation of digital images include(s):
    I. Image stitching
    II. Contrast enhancement
    III. Windowing
    A. 1 only
    B. 2 and 3 only
    C. 1, 2 and 3
    D. 1and 3

25. The principle advantage of rare earth screens over calcium tungstate screens is:
    A. Reduced noise
    B .Faster speed
    C .Lower cost
    D .None of the above

26. With regard to luminescence which of the following statements is true?
    A .There is two types; fluorescence and luminescence
    B .Materials that luminisce are called luminates
    C . Phosphorescence occurs only when a stimulus is applied
    D . Fluorescence lasts longer than phosphorescence and 3 only

27. When a film is inserted into an automatic processor
    A. The short dimension should be against the rail
    B. The long dimension should be against the rail
    C. Guide shoes grip it
    D. It should be centered on the feed tray

28. ~~It should be centered on the feed tray~~ Safelight filters are chosen based on
    A. Film sensitivity
    B. Power rating
    C. Dimensions of the darkroom
    D. Amount of light intensity

29. PACS system training during and after system installation;
    i. Must include several skill levels from radiologist to radiographer to support staff
    ii. Should only be done at equipment installation
    iii. Vital training that should not stop
    A. 1 and 2
    B. 2 and 3
    C. 1 and 3
    D. 1,2 and 3

30. When designing a darkroom the location should be
    A. Away from damp areas
    B. Accessible to water and power
    C. Centrally sited in the imaging department
    D. All the above

31. The following are true of safelights except
    A. Safelight filters completely absorb the undesirable wavelengths of light
    B. Too many safelights result in too great an intensity
    C. White light cannot be used since it causes fogging
    D .Amount of light controlled by the type of filter, wattage of the light source and distance from the working surface

32. What information, located on each box of film, is important to note and has direct relationship to image quality?
    A. Number of films in the box
    B. Manufacturer's name
    C. Expiration date
    D. Emulsion lot

33. The darkroom should be constructed and equipped so as to avoid;
    I. External light leaks
    II. Film bin light leaks
    III. Safelight fog
    A. 1 only
    B. 2 only
    C. 1 and 3 only
    D. 1, 2 and 3

34. During the developing stage in an automatic film processor;

I. Clearing agent removes undeveloped and unexposed silver halide crystals from emulsion
II. The latent image is converted to manifest image
III. An acidic PH is maintained

A. 2 and 3 only
B. 1, 2 and 3
C. 1 only
D. 2 only

35. If 25mAs is used with a 500 speed film-screen system to produce an optimal image, how much mAs is needed to produce the same density with a 100 speed system

A. 100mAs
B. 5mAs
C. 125mAs
D. 300mAs

36. Which of the following is not a separate stage in automatic processing

A. Drying
B. Development
C. Washing
D .Wetting

37. Between the fixing tank and the wash tank, the film passes through a;

A. Turnaround rack
B. Transportation rack
C. Crossover rack
D. Drying chamber

38..... sensitivity is the range of wavelength in which the film will exhibit its highest response

A. Peak
B. Spectral
C. Cut-off
D. Relative

39. Which of the following is in not an advantage of double emulsion film

A. More radiographic details
B .Less patient radiation dose
C .Parallax effect
D. No gradient.

40.A common plus –density artifact caused from bending the film is……

A .Halfmoon marks

B .Static discharge

C .Abrasion

D .Fogging

SECTION 2: (SHORT ANSWER QUESTIONS) 40 MARKS

1. Draw and label a cross-section of a CR plate. State the functions of the labeled parts of the cross section
(10marks)

2. List five (5) conditions for film storage and handling in screen-film radiography (5mks)

3. List and state the roles of the constituents of developer solution in automatic processing. (10 marks)

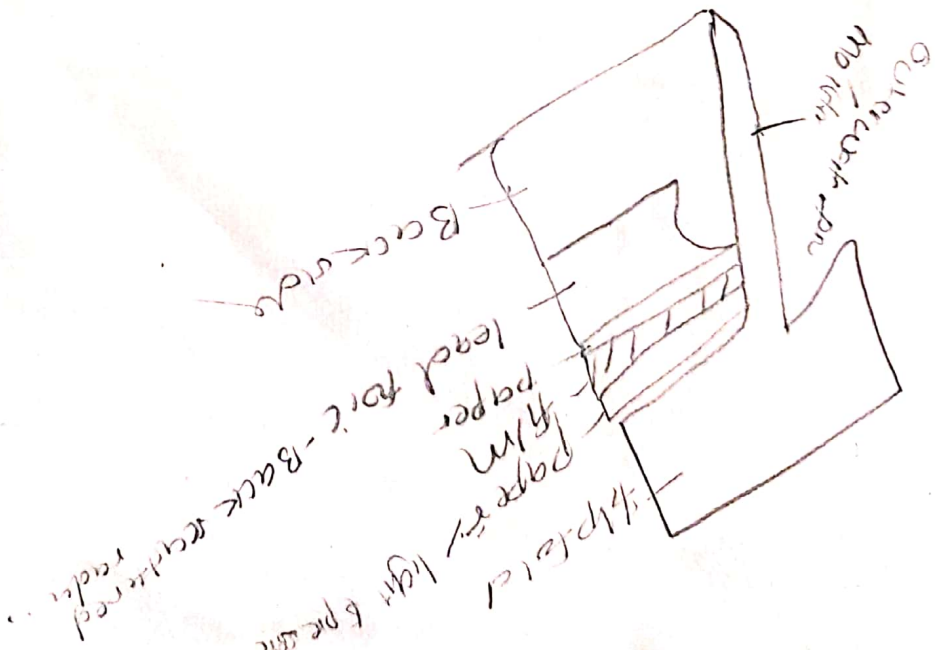
4. State five (5) advantages of digital imaging over screen film radiography (5marks)

5. Describe five (5) uses of white light in the darkroom (5marks)

6. List different types of entrances into the darkroom
(5marks)

SECTION 3 : LONG ANSWER QUESTION (20marks)

1. Using a well labeled diagram, describe the vertical transport system of rollers in automatic processor



SECTION 1: MULTIPLE CHOICE QUESTIONS (MARKS)

1. Movement , geometry and screen contact are three factors that affect radiographic;
   a. Contrast
   b. Unsharpness ✓
   c. Reticulation
   d. Density
2. The difference between the densities of two areas of a radiograph is called?
   a. Radiographic contrast ✓
   b. Subject contrast
   c. Film contrast
   d. Definition
3. Radiographic contrast is decreased by?
   a. Increased beam filtration ✓
   b. Reducing the field size irradiated
   c. Increasing the kV
   d. Increasing the focus to object distance
4. At a constant mAs, an increase is the kVp will
   a. Produce x-rays of increased wavelength
   b. Increase the effect of scatter on an x-ray
   c. Increase film contrast ✓
   d. Increased film blackening
5. Regarding intensifying screens which is the incorrect answer?
   a. Do affect resolution
   b. Help reduce patient dose ✓
   c. May increase noise on the final image
   d. Absorb more photons when thickness is increased
6. The image intensifiers input phosphor is generally composed of
   a. Cesium iodide
   b. Zinc cadmium sulfide
   c. Gadolinium oxysulfide ✓
   d. Calcium tungstate
7. To test for poor film-screen contact
   a. X-ray a lot of paper clips on the face of the cassette
   b. Open the cassette and look
   c. Place a sheet of fine wire mesh inside the cassette with the film and make an exposure
   d. Place metal markers on the face of a loaded cassette to indicate the light field and make an exposure
8. Static electricity;
   a. Produces an overall grey fog on processed films .
   b. Produces black lighting like marks on processed films ✓

c. Reduce the effects of the intensifying screens
d. Produces a straight line

9. A characteristic curve;
   a. Determines the shape of an object
   b. Represents the characteristics of a developer
   c. Is a graphical presentation of the relationship between exposure received and the density produced following processing the film ✓
   d. Characteristics of the fixer.
10. If the lid has accidentally been left off a box of unexposed films in white light.
   a. Throw all the films away
   b. Put the lid back on and do nothing until someone tells you their films are fogged
   c. Process three films and inspect ✓
   d. Call the manufacturer
11. Intensifying screens must be cleaned using
   a. Plenty of water
   b. Small circular motions followed by top to bottom sweeps
   c. Pouring screen cleaner onto the screen the wiping off
   d. A moistened cotton wool with proprietory screen cleaner or mild detergent ✓
12. Film screen contract test tool can be?
   a. Plastic sheet
   b. Perforated alluminium sheet
   c. Fine metal mesh ✓
   d. Sensitometer
13. In setting up a reject analysis, you should?
   a. Count all the unexposed films ✓
   b. Count only the film boxes in the film store
   c. Carry out the analysis without the staff knowing
   d. Count the films thrown in the dustbin only
14. The following are essential characteristic of a radiographic image, except?
   a. Noise
   b. Contrast
   c. Resolution
   d. Sharpness ✓
15. Unexposed films can be stored in the following areas, except?
   a. The hospital or x-ray department store
   b. The darkroom
   c. The imaging room
   d. In radioisotopes storage room ✓
16. Which of the following groups of exposure factors will produce the greatest radiographic density

a. 100 mA, 0.30 second
b. 200 mA, 0.10 second
c. 400 mA, 0.03 second
d. 600mA, 0.03 second ✓

17. The steeper straight line portion of a characteristic curve for a particular film the
    i. Slower the film speed
    ii. Higher the film contrast
    iii. Greater the exposure latitude
    a. 1 only
    b. 2 only
    c. 2 and 3 only ✓
    d. 1,2 and 3
18. Which of the following can be used to determine the sensitivity of a particular film emulsion
    a. Sensitometric curve ✓
    b. Dose-response curve
    c. Reciprocity law
    d. Inverse square law
19. Which a given exposure, as intensifying screen speed decreased how is radiographic density affected?
    a. Decreases
    b. Increases ✓
    c. Remains unchanged
    d. Is variable
20. Which of the following is not related to radiographic contrast
    a. Photon energy ✓
    b. Grid ratio
    c. Object film distance
    d. Focal spot size
21. It is the term used to describe unsharp edges of tiny radiographic details
    a. Diffusion
    b. Mottle
    c. Penumbra ✓
    d. Umbra
22. The primary source of scatter radiation is
    a. Patient
    b. Table top
    c. X-ray tube ✓
    d. Grid

23. Which of the following terms refers to light reflecting from one intensifying screen through the film to the opposite emulsion and screen
    a. Reflectance
    b. Cross over
    c. Scatter ✓
    d. Filtration
24. Radiographic contrast describe
    a. The sharpness of lines in a radiograph
    b. The differences in photographic density in a radiograph ✓
    c. The average photographic density in a radiograph
    d. The difference in density between two different radiographs
25. Which of the following does not affect radiographic contrast
    a. Attenuation differences in the component being inspected ✓
    b. The wave length of the radiation used
    c. The amount of scattered radiation ✓
    d. The level of current used for the exposure ✓
26. The amount of geometric unsharpness in a radiograph is affected by
    a. The source to film distance
    b. The source to abject distance ✓
    c. The size of the source
    d. All of the above
27. When using geometric magnification to produce a radiograph, the penumbra will be reduced by
    a. A longer exposure
    b. A faster film speed
    c. A smaller source spot size ✓
    d. More x-ray energy
28. The primary factor that limits the maximum mA that can be used during a radiographic exposure is
    a. Anode angle
    b. Focal spot size ✓
    c. Cathode temperature
    d. Exposure time ✓
29. The primary x-ray beam penetration (percent) through a patient can be increased by increasing the
    a. kV ✓
    b. mAs
    c. Film focus distance
    d. Beam area

30. The sensitivity (speed) of a radiographic film used with an intensifying screen can be affected by all of the following except
    a. Amount of exposure ✓
    b. Exposure time
    c. Developer concentration
    d. Developer temperature
31. Conditions which can reduce contrast in a general radiographic image include?
    a. under exposure ✓
    b. over exposure
    c. under development ✗
    d. all of the above
32. Relatively, low kV values are used in some x-ray procedure for the purpose of
    a. Increasing penetration
    b. Increasing contrast sensitivity
    c. Decreasing patient exposure ✓
    d. Decreasing area contrast
33. Under processing (underdevelopment) of radiographic film can result in increased
    a. Sensitivity
    b. Contrast
    c. Fog ✓
    d. Density
34. The amount of contrast in a radiograph can be affected by
    a. The latitude of the film
    b. Processing conditions ✓
    c. Amount of exposure
    d. Film screen contrast
35. When the smaller focal spot size of an x-ray tube is selected you would expect?
    a. Reduced scattered radiation
    b. Improved visibility of anatomical detail ✓
    c. Increased image noise
    d. Limited mA
36. When using a magnification technique in radiograph it is essential to have
    a. Low kV
    b. Low mAs
    c. A short exposure time
    d. A small focal spot ✓
37. A small focal spot size is used to
    a. Reduce patient exposure
    b. Decreasing image noise
    c. Increase visibility of detail ✓

d. Reduce image blurring

38. Quantum noise in radiography can generally be decreased by
    a. Using a film with higher sensitivity (speed)
    b. Using smaller focal spots
    c. Using high ratio grids
    d. Increasing the aluminium filtration
39. An air gap technique will generally improve image contrast because?
    a. It is used with a small focal spot
    b. The air absorbs scattered radiation ✓
    c. It is used with a small field of view
    d. The scatter is more diverging than the primary beam
40. _____ is the result of comparing screen-film based on the amount of light and intensity produced for a given exposure
    a. Recording detail
    b. Relative speed
    c. Resolution ✓
    d. Contrast

SECTION 2: SHORT ANSWER QUESTIONS (40 MARKS)

1. State elements that must be considered in the management of image qualities (5 marks)
2. Outline the benefits to be gained by using log relative exposure over relative exposure in sensitometry (5 marks)
3. List equipment needed for quality assurance programs in a radiology department (5 marks)
4. Explain the procedure of light leakage test of a cassette (5 marks)
5. Distinguish between signal and noise with respect to image quality (5 marks)
6. State five(5) conditions for storing radiographic film in an imaging department (5 marks)
7. Explain the importance of film reject analysis and state three causes of film rejects (5 marks)
8. Explain the white light leakage test of a darkroom(5 marks)

SECTION C: LONG ANSWER QUESTION (20 MARKS)

With the aid of a diagram describe the parts of a sensitometric curve (20 marks)