



BRAINWARE UNIVERSITY

Term End Examination 2021 - 22

Programme – Bachelor of Science in Medical Radiology & Imaging Technology

Course Name – Conventional Radiography and Equipment

Course Code - BMRIT203

(Semester II)

Time allotted : 1 Hrs.15 Min.

Full Marks : 60

[The figure in the margin indicates full marks.]

Group-A

(Multiple Choice Type Question)

1 x 60=60

Choose the correct alternative from the following :

- (1) In modern image intensifier, the input screen is made-up of

| | |
|------------------------------------|------------------|
| a) Zn cd sulphide-silver activated | b) Cesium iodide |
| c) Calcium tungstate | d) Zn sulphide |
- (2) Brightness gain in image intensifier is

| | |
|---|---------------------------------------|
| a) Minification gain \times flux gain | b) Minification gain \div flux gain |
| c) Minification gain + flux gain | d) Minification gain - flux gain |
- (3) Flux gain is

| | |
|---|---|
| a) Number of output light photon divided by number of input X-ray photons | b) Number of output light photons multiplied by number of input X-ray photons |
| c) Number of output light photons plus number of input X-ray photons | d) Number of output light photons minus number of input X-ray photons |
- (4) Magnification mode results in

| | |
|------------------------------|-------------------------------|
| a) Better spatial resolution | b) Better contrast resolution |
| c) Higher patient dose | d) All of these |
- (5) During fluoroscopy

| | |
|------------------------------|--------------------|
| a) Real time dynamic viewing | b) Spot film taken |
| c) Contrast studies | d) All of these |
- (6) Large crystal size of phosphor in screen cause the following change in speed

| | |
|--------------|---------------------------------------|
| a) Increases | b) Decreases |
| c) No change | d) Initially decreases than increases |
- (7) Which of the Following Helps in Reducing Internal Radiation Exposure?

| | |
|-----------------------------|------------------------------------|
| a) Control of Contamination | b) Use Proper Protective Equipment |
| c) Good Hygiene | d) All of these |
- (8) What Does the Radiation Term ALARA Stand For?

| | |
|--------------------------------------|--|
| a) As Low As Reasonably Achievable | b) Accepted Lowest Achievable Radiation Alarms |
| c) As Long as Radiation is Allowable | d) Allowable Levels of Accepted Radiation |

- (9) In Radiography Quality Control, Which of the Following Means that the X-ray's Central Ray Will Actually Come Out on the Area Where the Cross-Hairs Meet?
- a) Beam perpendicularity
b) Field Congruence
c) None of the Above
d) All of these
- (10) What is the Device used for Generating Beams of Waves or Particles that Have Parallel Paths?
- a) Collimator
b) Echocardiography Machine
c) FMRI
d) Ultrasonography Machine
- (11) If a radiographic procedure requires 20 mAs for a focal spot-to-receptor distance (FRD) of 40 in., a FRD of 80 in. would require
- a) 5 mAs.
b) 10 mAs.
c) 40 mAs.
d) 80 mAs
- (12) The maximum field of view which can be obtained with a specific radiographic system is generally limited by the
- a) Focal spot size.
b) Anode size
c) Anode angle
d) Cathode
- (13) Changing from a 5:1 ratio to a 10:1 ratio grid will increase
- a) Patient exposure
b) Image contrast
c) Required KV or MAS
d) All of these
- (14) Potential sources of blurring within a radiograph receptor include
- a) Light cross-over within the film
b) Space between the film and intensifying screen
c) Spreading of light within the screen
d) All of these
- (15) When a geometric magnification technique is used, as in mammography, it can
- a) Increase patient exposure
b) Increase scattered radiation
c) Decrease blurring of small objects and improve visibility of detail.
d) Require a larger receptor
- (16) The general criteria of standard of quality are set by the _____.
- a) AERB
b) ACR
c) AAPM
d) All of these
- (17) Which of the following test tools is used for testing the "Congruence of optical and radiation fields"?
- a) kVp meter
b) Beam alignment test tool
c) Focal spot test tool
d) Collimator test tool
- (18) Collimator test tools are made of
- a) Plastic
b) Fibre glass
c) Tungsten plate
d) Molybdenum
- (19) In "congruence of optical and radiation fields" focus to film distance (FFD) is kept at
- a) 75 cm
b) 100 cm
c) 120 cm
d) 180 cm
- (20) X-rays were first discovered on
- a) November 8, 1895
b) October 8, 1895,
c) November 8, 1896
d) November 8, 1795
- (21) The vacuum amount in vacuum x-ray tube is
- a) about 10^{-2} Pa
b) about 10^{-4} Pa
c) about 1014 Pa
d) about 10^{-40} Pa
- (22) Coolidge tube also known as
- a) Cold cathode tube
b) Hot Cathode tube
c) Mix Tube
d) Dark Tube
- (23) x-rays are created from the conversion ofof electrons into electromagnetic radi

ation when they are decelerated by interaction with a target material

- a) kinetic energy
- b) potential energy
- c) both
- d) binding energy

(24) A common unit of energy is the....., equal to the energy attained by an electron accelerated across a potential difference of 1 V.

- a) ev
- b) volt
- c) mega electron
- d) none of these

(25) Major factors that affect x-ray production efficiency include the

- a) atomic number of the target material
- b) kinetic energy of the incident electrons
- c) both
- d) none of these

(26) which of the following is the binding energy of tungsten(L-Shell)?

- a) 10.2 keV
- b) 11.2 keV
- c) 12.2 keV
- d) 13.2 keV

(27) For continuous fluoroscopy, the tube current is relatively low, from

- a) 1 to 5 mA
- b) 2 to 10 mA
- c) 2 to 5 mA
- d) 5 to 10 mA

(28) Which of the following are the major selectable parameters on the x-ray generator control panel that determine the x-ray beam characteristics

- a) kv
- b) ma
- c) mas
- d) all of these

(29) The cathode is theelectrode in the x-ray tube.

- a) negative
- b) positive
- c) neutral
- d) none of these

(30) Useful electrons released from the filament to produce x-ray termed as

- a) thermions
- b) electrons
- c) current
- d) thermal electrons

(31) Filament is embedded onin the cathode side.

- a) focusing cup
- b) filament circuit
- c) focal spot
- d) target

(32) The anode is a metal target electrode that is maintained at a largerelative to the cathode.

- a) positive potential difference
- b) Negative potential difference
- c) False positive potential difference
- d) none of these

(33) The atomic number of molybdenum is

- a) 42
- b) 45
- c) 25
- d) 49

(34) The anode is a beveled disk mounted on aassembly supported by bearings in the x-ray tube insert.

- a) rotor
- b) stator
- c) induction motor
- d) none of these

(35) Rotor bearings aresensitive and are often the cause of x-ray tube failure.

- a) heat
- b) water
- c) voltage
- d) temperature

(36) Bearings require specialbecause of the vacuum inside the x-ray tube insert and also require thermal insulation from the anode, achieved by using a molybdenum (a metal with poor heat conductivity) stem attaching the anode to the rotor.

- a) heat insensitive
- b) nonvolatile lubricants
- c) . both A & B
- d) Volatile lubricants

- (37) Thesize is the area on the anode that is struck by electrons.
- a) actual focal spot
 - b) effective focal spot
 - c) both
 - d) none of these
- (38) Reduction in the x-ray beam intensity toward the anode side of the x-ray field caused by the greater attenuation of x-rays directed toward the anode side of the field by the anode itself known as
- a) heel effect
 - b) anode heel effect
 - c) anode angle
 - d) Both 1&2
- (39) The radiation emitted from out side the focal spot termed as
- a) Leakage
 - b) off focus
 - c) scatter
 - d) primary
- (40) circuit is used to trap gas in the insert and to maintain the vacuum.
- a) getter
 - b) filament
 - c) rectifier
 - d) vaccum
- (41) Between the x-ray tube insert and housing isthat provides heat conduction and electrical insulation.
- a) oil
 - b) water
 - c) heat
 - d) filament circuit
- (42) The x-ray equipment is designed to prevent the selection of x-ray tube kV greater than therating.
- a) maximul
 - b) minimal
 - c) useful
 - d) neutral
- (43) The PBL Stands for
- a) Positive beam limitation
 - b) Patient beam limitation
 - c) Partial beam limitation
 - d) none of these
- (44) Inherent filtration includes the thickness.....of the glass or metal insert at the x-ray tube port.
- a) 1 to 2 mm
 - b) 2 to 4 mm
 - c) 1 to 4 mm
 - d) 1 to 6 mm
- (45) Dedicated mammography tubes, require.....to permit the transmission of lowenergy x-rays.
- a) berylium
 - b) sillicon
 - c) glass
 - d) alluminum
- (46)is the most commonly used added filter material
- a) aluminum
 - b) mercury
 - c) lead
 - d) copper
- (47)” filters are used in CT to reduce dose to the periphery of the patient, where x-ray paths are shorter and fewer x-rays are required.
- a) Bow-tie
 - b) Equalization
 - c) added
 - d) inherent
- (48) The principal function of an x-ray generator is to provideat a high voltage to an x-ray tube.
- a) Current
 - b) Voltage
 - c) Potential Difference
 - d) resistant
- (49) Variatiation in the intensity of the Beam is termed as
- a) Scatter Beam
 - b) off focus beam
 - c) Attenuation
 - d) Anode Heel Effect
- (50) The SI unit of power is
- a) watt
 - b) joule

- c) power
d) ampere
- (51) The focal spot size (i.e., large or small) is usually determined by thesetting
a) ma
b) kv
c) mas
d) technique
- (52) The....., also known as the automatic exposure control (AEC) system
a) . Backup timer
b) Phototimer
c) Countdown timer
d) Digital timer
- (53) Anboosts the signal, which is fed to a voltage comparator and integration circuit.
a) Timer
b) Backup timer
c) Apmlifier
d) AEC
- (54) The power rating of an x-ray tube or generator is thepower that an x-ray tube focal spot can accept or the generator can deliver.
a) maximul
b) minimul
c) useful
d) none of these
- (55)is the SI unit of energy
a) joule
b) Ampere
c) Ohm
d) Volt
- (56) Tube voltage (kV) determines the maximum energy in thespectrum and affects the q
uality of the output spectrum.
a) Bremsstrahlung
b) Characteristic
c) Both
d) none of these
- (57) The quantity of x-rays is directly proportional to the product of tube current and.....
a) exposure time
b) filament circuit
c) kv
d) ma
- (58) which of the following modifies the quantity and quality of the x-ray beam by preferentially removing the low-energy photons in the spectrum.
a) beam filtration
b) collimator
c) BLD
d) none of these
- (59)affects the quality of the emitted x-ray spectrum
a) Anode Material
b) Generator Waveform
c) Filament
d) focal spot
- (60) Electrons emitted from the tungsten filament form a small cloud in the immediate vicinity of the filament. This collection of negatively charged electrons forms what is called the
a) positive charge
b) space charge
c) space charge effect
d) negative charge