



BRAINWARE UNIVERSITY

Term End Examination 2023 Programme – B.Sc.(MRIT)-2020

Course Name – Quality Assurance & Radiation Safety (AERB Guidelines) in Diagnostic Radiology

Course Code - BMRIT601 (Semester VI)

Full Marks: 60

Time: 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 15=15

- 1. Choose the correct alternative from the following:
 - (i) Select the correct option, A Geiger counter counts radioactive particles by
 - a) Amplifying the sound theory make as theory strike the walls of tube

b) Emitting detectable light pulses when struck

- c) Collecting and measuring the charges of the particles
- d) Undergoing a chemical reaction with each incident particle
- (ii) Identify the range ion-chamber is capable of measuring gamma energy

a) > 25 keV

b) < 25 keV

c) 25 keV

- d) 50 keV
- (iii) Tell the name of radiographic QC procedure that is usually done once a year?

a) Retake analysis b) Visual inspection of cleanliness of imaging systems

c) Cassette and screen cleaning

- d) Safelight test
- (iv) Identify the device used for generating beams of waves or particles that have parallel paths?
 - a) USG machine

b) FMRI

c) ECG

- d) Collimator
- (v) Identify the tolerance limit of tube leakage radiation at 1 m from the focus is

a) >110 mR / hour

b) <115 mR/hour

c) >115 mR/hour

d) None

(vi) Select tissue weighting factor Gonad according to ICRP 2007

a) 0.08

b) 0.1

c) 0.09

d) 0.1

(vii) Identify Attenuation is define as

a) Penetration

b) Absorption

c) Scattering

d) Asorption+ Scattering

(viii) Predict the radiation unit to record the radiation received by radiation worker				
	a) Roentgen	b) Radiation		
,.	c) Curie	d) mSv for mammography?		
(IX	Choose up to what intensity of radiation is used	b) <20 Kev		
	a) <10 Kev c) <30Kev	d) <40Kev		
(x)	x) Choose the X-Ray is recorded on a plate coated with			
	a) Gold Halide b) Silver Halide			
	c) Copper Halide	d) Iron Halide		
(xi	Choose the following devices may be used to as	sess the accuracy of the exposure		
	timer?	L) Considerator		
	a) Solid-state detector c) Densitometer	b) Sensitometer d) None		
(xii	Identify the SI unit for measurement of quantity	•		
	a) Gray	b) Gray, Sievert, Bequerrel		
	c) Gray, Sievert	d) Roentgen, Sievert		
(xiii) Select the dose rate in the case of internally dep	osited radionuclides		
	a) Increases with time	b) Decreases with time		
(xiv	c) is a constent function of time	d) None		
(///	(xiv) Tell the most important problem involving radiation exposure of the public is a) radon b) medical examination			
	c) accidents in nuclear power plant	d) All		
(xv	Select a true statement about deterministic effe			
	a) has a threshold in dose ut the severity of	b) has a threshold in dose and the sever	rity of	
	the effect is otherwise dose-independent	the effect increases with dose		
	c) has no threshold in dose and the severity of the effect is a constant function of dose	d) has no threshold in dose and the sev	erity of	
	the effect is a constant function of dose	the effect increases with dose		
	Group	o-B		
	(Short Answer Ty	pe Questions)	3 x 5=15	
3 L	ofine quality common and available and a literature.			
 Define quality assurance and quality control in the context of CR/DR systems. Describe the importance of maintaining proper records for quality control in medical 			(3)	
imaging modalities. (3)				
4. Illustrate the differences between the newer radiation safety protocols and previous (3)			(3)	
g	guidelines.			
3. υ (ε	5. Differentiate between the radiation safety considerations for different patient populations (3) (e.g. pediatric vs. adult).			
6. Ji	stify the importance of proper training for the us	e of radiation monitoring instruments	(2)	
	OR		(3)	
Ju	stify the importance of continuous quality impro	vement in radiation monitoring	(3)	
þ	ractices.		` .	
	Group	n-C		
(Long Answer Type Questions)			F C .20	
		·	5 x 6=30	
7. (
'	radiography images and describe the quality control measures necessary to prevent and detect these artifacts.			
8. Explain the role of regulatory agencies in digital radiography and				
quality control, including the standards and guidelines used to evaluate and certify the			(5)	
	eveteme	to evaluate and certify these		

9. Classify different record-keeping systems used for quality control in various imaging (5) modalities, including radiography, computed tomography (CT), magnetic resonance imaging (MRI), and ultrasound. 10. Explain the concept of radiation dose optimization, and illustrate the different techniques (5) and strategies used to minimize radiation dose in imaging. 11. Infer the the concept of absorbed dose, and illustrate the differences between absorbed (5) dose, equivalent dose, and effective dose. 12. Distinguish between the different types of DNA damage caused by ionizing radiation, (5) including single-strand breaks, double-strand breaks, and base damage. (5) Classify different mechanisms of cell death caused by ionizing radiation, including apoptosis, necrosis, and mitotic catastrophe.
