16982

# BRAINWARE UNIVERSITY

## Term End Examination 2024-2025
## Programme – B.Sc.(MRIT)-2022
## Course Name – Ultrasonography & Echocardiography
## Course Code - BMRITC604
## ( 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) Define the primary function of the atrioventricular (AV) valves in the heart.

a) To pump blood into the pulmonary artery.
b) To prevent backflow of blood into the ventricles.
c) To receive oxygenated blood from the lungs.
d) To facilitate the release of carbon dioxide.

(ii) Define Doppler ultrasound.

a) A technique to visualize organs.
b) A technique to assess blood flow using frequency changes.
c) A technique to measure light waves.
d) A technique to measure body temperature.

(iii) Select the type of transducer best suited for imaging superficial structures.

a) Curved array transducer
b) Linear array transducer
c) Phased array transducer
d) Convex transducer

(iv) Identify the effect that occurs when the frequency of sound waves decreases due to motion away from the transducer.

a) Positive shift
b) Negative shift
c) No shift
d) Reverse shift

(v) Identify the most appropriate ultrasound transducer for cardiac imaging.

a) Linear array transducer
b) Phased array transducer
c) Curved array transducer
d) Convex transducer

(vi) Identify the tissue type that will cause the most attenuation of ultrasound waves.

a) Fat
b) Bone
c) Muscle
d) Liver

(vii) Select the frequency range of ultrasound commonly used for obstetric imaging.

a) 1-3 MHz
b) 5-10 MHz
c) 10-15 MHz
d) 20-40 MHz

(viii) Identify which artifact is caused by gas within the gastrointestinal tract in ultrasound imaging.

a) Reverberation
b) Ring-down artifact
c) Acoustic shadowing
d) Enhancement

(ix) Define the primary indication for an abdominal ultrasound.

a) To assess liver function
b) To detect blood clot formation
c) To visualize abdominal organs and detect abnormal growths
d) To measure the size of the pancreas

(x) Identify which of the following is a contraindication for Doppler ultrasound.

a) Pregnancy
b) Allergy to contrast media
c) Known history of blood clotting disorders
d) Severe obesity

(xi) Identify the most appropriate ultrasound for assessing a suspected ectopic pregnancy.

a) Transvaginal ultrasound
b) Abdominal ultrasound
c) Pelvic ultrasound
d) Color Doppler ultrasound

(xii) Select the indication for using color Doppler ultrasound.

a) To visualize the size of a tumor
b) To measure the flow of blood within vessels
c) To examine organ structure
d) To identify cysts or abscesses

(xiii) Identify which of the following is a contraindication for performing a transabdominal ultrasound in the early stages of pregnancy.

a) Presence of a full bladder
b) Inability to maintain a supine position
c) The gestational age of the fetus
d) Use of contrast agents

(xiv) Select the primary advantage of ultrasound over CT scans.

a) Ultrasound uses ionizing radiation.
b) Ultrasound has superior resolution for bones.
c) Ultrasound is less expensive and does not require ionizing radiation.
d) Ultrasound can provide 3D images of soft tissues.

(xv) Identify the correct preparation for a patient undergoing a transabdominal ultrasound.

a) Full bladder and fasting for 12 hours
b) Full bladder, no food intake 2-4 hours prior
c) Empty bladder and fasting for 12 hours
d) Empty bladder and no fasting required

## Group-B

(Short Answer Type Questions) 3 x 5=15

2. Define the basic function of ultrasound equipment. (3)
3. Define the Doppler effect in ultrasound. (3)
4. Differentiate between use of pulse-wave and continuous-wave Doppler in echocardiography. (3)
5. Differentiate between 2D and 3D ultrasound imaging. (3)
6. Explain the role of a piezoelectric crystal in a transducer. (3)

**OR**

Explain the purpose of adjusting the depth in ultrasound imaging. (3)

## Group-C

(Long Answer Type Questions) 5 x 6=30

7. Describe different waves of normal ECG and how they originate. (5)
8. Explain the basic principles of ultrasound physics and how sound waves are used for imaging in medical diagnostics. (5)
9. Explain the significance of Time Gain Compensation (TGC) in ultrasound imaging and how it compensates for signal attenuation at varying depths. (5)
10. Explain the role of M-mode in evaluating dynamic movement of structures, particularly in cardiology and fetal imaging. (5)

11. Compare pulse-wave and continuous-wave Doppler techniques and their clinical significance. (5)
12. Analyze the principles of ultrasound physics and their application in echocardiography. (5)

**OR**

Differentiate between M-mode, 2D, and Doppler echocardiography based on principles and applications. (5)

**********