

Question 1

Which property refers to “Conversion from organised vibrations (i.e., ultrasound) to disorganised, random motion”?

- a) Absorption
- b) Attenuation
- c) Scattering
- d) Reflection

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Which property refers to “Conversion from organised vibrations (i.e., ultrasound) to disorganised, random motion”?

- a) **Absorption – Correct answer**
- b) Attenuation
- c) Scattering
- d) Reflection

Explanation: Absorption is the conversion of acoustic energy into heat.

Question 2

Which tissue attenuates more energy?

- a) Fat
- b) Skin
- c) Muscle
- d) Bone

Question 2

Which tissue attenuates more energy?

- a) Fat
- b) Skin
- c) Muscle
- d) **Bone – Correct answer**

Explanation: Bones attenuate (and absorb) more energy than soft tissues and can be at risk of unwanted overheating if in the acoustic path.

Question 3

Which of the sentences below is correct?

- a) Absorption increases with higher frequencies
- b) Absorption decreases with higher frequencies
- c) Absorption does not depend on frequency

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- a) **Absorption increases with higher frequencies – Correct answer**
- b) Absorption decreases with higher frequencies
- c) Absorption does not depend on frequency

Explanation: Acoustic waves are absorbed more at higher frequencies, which causes increased temperature elevation and reduced penetration.

Question 4

The thermal isoeffective dose is expressed in terms of:

- a) Cumulative equivalent minutes at 41 °C
- b) Cumulative equivalent minutes at 42 °C
- c) Cumulative equivalent minutes at 43 °C
- d) Cumulative equivalent minutes at 44 °C

Question 4

The thermal isoeffective dose is expressed in terms of:

- a) Cumulative equivalent minutes at 41 °C
- b) Cumulative equivalent minutes at 42 °C
- c) Cumulative equivalent minutes at 43 °C – Correct answer**
- d) Cumulative equivalent minutes at 44 °C

Question 5

For every degree above 43 °C the time to achieve the same effect is:

- a) Halved
- b) Doubled
- c) Quartered
- d) Tripled

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- c) Quartered
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Question 6

Thermal dose requires a knowledge of:

- a) Maximum temperature anywhere in the field
- b) Minimum temperature anywhere in the field
- c) Temperature distribution as a function of time
- d) Temperature distribution at the end of heating period

Question 6

Thermal dose requires a knowledge of:

- a) Maximum temperature anywhere in the field
- b) Minimum temperature anywhere in the field
- c) Temperature distribution as a function of time – Correct answer**
- d) Temperature distribution at the end of heating period

Question 7

Which of the following is a challenge for temperature measurements under ultrasound:

- a) Spatial resolution
- b) Surface heating
- c) Scattering
- d) Low heating rate

Question 7

Which of the following is a challenge for temperature measurements under ultrasound:

- a) **Spatial resolution – Correct answer**
- b) Surface heating
- c) Scattering
- d) Low heating rate

Explanation: Ultrasound energy can be focused in small areas, with typical size of millimetres.

Question 8

Viscous heating is typical of:

- a) MR Thermometry
- b) Infrared Thermography
- c) Thermochromic materials
- d) Thermocouples

Question 8

Viscous heating is typical of:

- a) MR Thermometry
- b) Infrared Thermography
- c) Thermochromic materials
- d) **Thermocouples – Correct answer**

Explanation: For many applications, the size of the thermocouple is comparable to the wavelength resulting in viscous heating artifacts.

Question 9

Which of the following is an advantage of MR thermography:

- a) Can measure deep in tissues
- b) Temporal Resolution
- c) Spatial Resolution

Question 9

Which of the following is an advantage of MR thermography:

- a) **Can measure deep in tissues – Correct answer**
- b) Temporal Resolution
- c) Spatial Resolution

Explanation: MR Thermography can contactlessly measure the temperature within the body in 3D.