



قائمة الاسئلة

فيزياء وأجهزة الرنين المغناطيسي - المستوى الثالث - قسم أشعة - كلية الطب والعلوم الصحية - برامج العلوم الطبية التطبيقية - الفترة الثالثة - درجة الا

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- 1) Hydrogen atoms are abundantly present in the body. The hydrogen nucleus is the MR active nucleus used in MRI. The hydrogen nucleus contains
 - 1) - a single proton and single electron
 - 2) only a single proton
 - 3) - only a single neutron
 - 4) - a single proton and single neutron
- 2) A spinning top which is hit, performs a wobbling type of motion, protons in a strong magnetic field shows this motion, called

 - 1) - Oscillation
 - 2) - Get around
 - 3) Precession
 - 4) - Rotating around it self

- 3) The strength and direction of this field is represented by a vector called

 - 1) - 'The orientation of the arrow'
 - 2) - 'magnetic field'
 - 3) - 'The vector magnitude'
 - 4) 'magnetic moment'

- 4) When a patient is placed in the strong magnetic field in the MRI scanner, the hydrogen nucleus in the body,with the applied external magnetic field
 - 1) Align
 - 2) - Random
- 5) The rate at which proton precesses around external magnetic field.
 - 1) - Faraday's law
 - 2) Larmor's equation
 - 3) - Equations of motion
 - 4) - Equation of state
- 6) When radiofrequency pulses are directed at the protons of hydrogen atoms inside the human body, the following happens:
 - 1) - Excitation
 - 2) - Flipping (longitudinal magnetization to magnetization in transverse plane)
 - 3) - In phasing
 - 4) All of the above definitions are correct
- 7) Though simple and cheap to run, they are still extremely heavy and do not generate high fields
 - 1) - Resistive systems
 - 2) Permanent magnets
 - 3) - Superconductive magnets
 - 4) - Electromagnets
- 8) Better homogeneity can be achieved by electrical and mechanical adjustments by a process known as

 - 1) - "Coil"
 - 2) - "Shielding"
 - 3) "Shimming"
 - 4) - "Camera"

- 9)is indicated by a loud noise, warning message, dense white vapor (with vent failure), helium meter dropping considerably or the tilting of an image on the image screen.
 - 1) - Patient Positioning





- 2) Magnetic quench Hazards
- 3) Claustrophobia
- 10) The fastest scan acquisition modes in MRI . Uses: Improved cardiac and abdominal imaging.
- 1) Echo planar Imaging (EPI)
- 2) Inversion recovery (IR) pulse sequences
- 3) Gradient echo (GE) pulse sequences
- 4) Spin echo (SE) pulse sequences
- 11) These sequences use variable flip angles and lesser repetition time (TR). The gradients are used to rephase the protons. We can apply the gradients quickly to rephase the protons
- 1) Echo planar Imaging (EPI)
- 2) Inversion recovery (IR) pulse sequences
- 3) Gradient echo (GE) pulse sequences
- 4) Spin echo (SE) pulse sequences
- 12) When the tuning fork is vibrated or perturbed, it begins to at a specific frequency relative to sound.
- 1) Rotate
- 2) oscillate
- 3) Precession
- 13)made of materials with no electric resistance when placed at a temperature close to absolute zero (-273o C).
- 1) Resistive systems
- 2) Permanent magnets
- 3) Superconductive magnets
- 4) Electromagnets
- 14) Magnet room has to be shielded with a Faraday's cage to prevent interferences between frequency waves and those used with MR equipment.
- 1) inside
- 2) outside
- 15) Special coils called coils vary the strength of the magnetic field, frequency and phase of the electromagnetic wave in the transverse (X and Y axes) and longitudinal (Z axis) planes.
- 1) Shielding
- 2) Shimming
- 3) Camera
- 4) gradient
- 16) The definition is—all those planned and systematic actions necessary to provide adequate confidence that a structure, system or component will perform satisfactory in service
- 1) signal to noise ratio (SNR)
- 2) ISO (The International Organization for Standardization)
- 3) Quality Assurance (QA)
- 4) Quality Control (QC)
- 17) Depending on the TI value, we can classify the into: 1. (STIR) 2. (FLAIR)
- 1) Echo planar Imaging (EPI)
- 2) Inversion recovery (IR) pulse sequences
- 3) Gradient echo (GE) pulse sequences
- 4) Spin echo (SE) pulse sequences
- 18) Uses: 1. These are the most commonly used pulse sequences 2. May be used for almost every examination. Advantage. Good image quality. Disadvantages. Scan times are relatively long.
- 1) Echo planar Imaging (EPI)
- 2) Inversion recovery (IR) pulse sequences
- 3) Gradient echo (GE) pulse sequences





- 4) Conventional Spin Echo (CSE) Pulse Sequence
- 19) Magnetic Resonance Imaging. 1. High degree of technical expertise is required. 2. Longer imaging time. 3. Difficult to image critically ill and very uncooperative patients.
- 1) - Advantages
- 2) Disadvantages
- 20) The MR image depends on the following main factors :
- 1) - T1 relaxation time
- 2) - T2 decay time
- 3) - Proton density
- 4) All of the above definitions are correct
- 21) Caused by hydrogen nuclei giving up their energy to the surrounding environment or molecular lattice..
- 1) T1 Recovery
- 2) - T2 decay
- 3) - TE
- 4) - TR
- 22) Caused by one spin transferring energy to another spin rather than into the lattice.
- 1) - T1 Recovery
- 2) T2 decay
- 3) - TE
- 4) - TR
- 23) The factors that affect image contrast in diagnostic imaging: extrinsic contrast parameters
- 1) - T1, T2, Proton Density
- 2) TE, TR, flip angle
- 24) Fat, has low signal and is relatively hypointense on a Contrast image .
- 1) - T1
- 2) T2
- 3) - TE
- 4) - TR
- 25) It must be long enough to give both fat and water time to dephase.
- 1) - T1
- 2) - T2
- 3) TE
- 4) - TR
- 26) The image is obtained using a spin echo sequence with long TR and short TE or a gradient echo sequence with a low flip angle
- 1) - T1 W
- 2) - T2 W
- 3) Proton density (PD)
- 4) - Blood flow
- 27) [object]Hypointense: tissue with a long T1 Hyperintense: tissue with a short T2[/object:0:0:]
- 1) - T2 weighted images
- 2) - Proton density (PD)
- 3) T1 weighted images
- 4) - Blood flow
- 28) The time it takes 63% of the transverse magnetization to dephase (37% is left in phase) in a tissue.
- 1) - T1 recovery time
- 2) T2 decay time
- 3) - Proton density





- 4) - All of the above definitions are correct
- 29) is seen as a bright spot of increased signal intensity in the center of the image.
- 1) Point Artifacts
 - 2) - Wrap around Artifacts
 - 3) - Chemical shift Artifacts
 - 4) - Magic angle Artifacts
- 30) are bright and dark lines that are seen parallel and adjacent to borders of abrupt intensity change, as many be seen at CSF, spinal cord, fat and muscle.
- 1) - slice overlap artifact
 - 2) Gibbs Artifacts
 - 3) - Point Artifacts
 - 4) - Motion Artifacts
- 31) appears when the diameter of the scanned area is greater than the dimensions of the field of view used a part of the image is 'folded' on it self.
- 1) - Gibbs Artifacts
 - 2) - Chemical shift Artifacts
 - 3) - Motion Artifacts
 - 4) Aliasing Artifacts
- 32) The is a name given to the loss of signal seen in an image from a multiangle, multislice acquisitions, as is obtained commonly in the lumbar spine.
- 1) slice overlap artifact
 - 2) - Gibbs Artifacts
 - 3) - Chemical shift Artifacts
 - 4) - Motion Artifacts
- 33) System generated artifacts should be reported service engineer.
- 1) - Remedy for Point Artifacts
 - 2) - Remedy for Wrap around Artifacts
 - 3) Remedy for Zipper Artifacts
 - 4) - Remedy for Magic angle Artifacts
- 34) This is greater at higher field strengths and can be reduced by increasing the bandwidth.
- 1) Chemical shift Artifacts
 - 2) - Magic angle artifact
 - 3) - Motion Artifacts
 - 4) - Aliasing Artifacts
- 35) 1. Increase FOV 2. Filtering the frequency encoded direction 3. Oversampling in the phase encoded direction.
- 1) - Remedies for Point Artifacts
 - 2) Remedies for Wrap around Artifacts
 - 3) - Remedies for Chemical shift Artifacts
 - 4) - Remedies for Magic angle Artifacts

