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فيزياءجهاز الرنين المغناطيسي-الثالث -التصوير التشخيصي-كلية الطب-درجةالامتحان(70)

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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 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) Hypointense: tissue with a long T1 Hyperintense: tissue with a short T2
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 boarders of abrupt intensity change, as many be seen at CSF, spinal cord, fat andmuscle.
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