

- N.B. (1) Question No. 1 is compulsory.
(2) Attempt any four questions out of remaining six questions.
(3) Assume suitable data.
(4) Assumption should be clearly stated.
(5) Use legible handwriting. Use blue/black ink.



Q.1 State with reason whether following statements true or false (20 Marks)
a) X-Ray spectrum used in CT can be polychromatic
b) Filtered back projection algorithm is computationally less expensive than back projection algorithm
c) CT can not differentiate between grey matter and white matter.
d) MRI is safe for all patients
e) Larmor frequency is independent of magnetic frequency.

Q.2 A) Explain the slice selection technique in MRI. (10 Marks)

B) Compare MRI with CT. Can MRI replace CT? (10 Marks)

Q.3 A) Discuss the construction and detectors used in MDCT. Explain how MDCT is superior over other generations of CT. (10 Marks)

B) Obtain the projections of the following image and reconstruct the image using ray reconstruction technique (10 Marks)

8	3
1	5

Q.4 A) Explain any two parameters with respect to Magnetic Resonance Spectroscopy:

(i) Chemical Shift

(ii) PRESS sequence

(iii) STEAM sequence

(10 Marks)

B) State the clinical applications of MR spectroscopy.

(10 Marks)

Q.5 A) Explain the spin energy states of hydrogen proton?

A hydrogen proton is placed in magnetic field of 1.5 Tesla calculate the amount of photon energy required to switch from spin up state to spin down state (Plank's constant = 6.6×10^{-34} J.Sec, Gyromagnetic ratio = 26.8×10^7 MHz/T) (10 Marks)

B) Define spin-spin relaxation time and explain spin-echo technique. (10 marks)

Q.6 A) What is chemical shift Imaging . (10 Marks)

B) Explain the single volume proton localization technique . (10 Marks)

Q.7 Write short note on (any three): (20 Marks)

a) Flat panel detector

b) PET-CT

c) Applied potential tomography

d) MRI safety
