17673

Instructions –   (1) All Questions are *Compulsory*.

(2) Answer each next main Question on a new page.

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) **Attempt any <u>THREE</u> of the following:**   **12**

   (i)   State the basic principle of working of nuclear imaging.

   (ii) State the steps involved in installation of an ultrasound machine.

   (iii) Draw and label the block diagram of an MRI detection system.

   (iv) What are radio isotopes. Give their significance. Draw and label a Geiger Muller Tube.

   b) **Attempt any <u>ONE</u> of the following:**   **6**

   (i)   Draw the block diagram of angiography system. State the function of each block. Give the significance of angiography.

   (ii) Draw the block diagram of an X-ray machine. Which controls in the X-ray machine are responsible for

   1) Quality of X-rays

   2) Quantity of X-rays

Marks

2. **Attempt any FOUR of the following:** **16**

   a) What are CT numbers? List any four applications of Computed Tomography.

   b) Draw and label the block diagram of an ultrasound B scanner machine.

   c) Draw and label the block diagram of thermography machine. State functions of each block.

   d) Draw the symbol, label terminals and sketch V-I characteristics of DIAC and TRIAC.

   e) Define the term maintenance and list the steps involved in maintenance of angiography machine.

   f) State the steps involved in installation of an MRI machine.

3. **Attempt any FOUR of the following:** **16**

   a) Enlist the transducers used in ultrasound scanning. Draw and explain anyone.

   b) Draw and label any one nuclear imaging transducer.

   c) Draw and label the block diagram of a fluoroscopy machine.

   d) State the causes of the faults occurring in an X-ray machine if:

   (i) Milliameter indicates flow of excessive current which does not change by mA control.

   (ii) More dark images are obtained.

   e) State the basic principle of NMR with diagram.

Marks

4. a) **Attempt any THREE of the following:** 12

  (i) State different types of magnets used in MRI. Explain anyone.

  (ii) Name the imaging technique which will be used to diagnose breast cancer, to monitor inflammatory bones and deep vein thrombosis. Explain the principle of working of this technique.

  (iii) Explain the need and placement of grids and collimators in X-ray imaging with suitable diagram.

  (iv) Define the term installation and state the steps included in installation of an angiography machine.

  b) **Attempt any ONE of the following:** 6

  (i) Enlist the steps involved in installation of an X-ray machine.

  (ii) State the difference between fluoroscopy and radiography based on

   1) diagram

   2) working principle

   3) viewing media

   4) advantages

   5) disadvantages

   6) application

Marks

5. **Attempt any FOUR of the following:** 16

   a) An endoscope has the following defects. What can be the reasons for these

      (i) There is no fluid flow

      (ii) There is leakage in flexible endoscope

   b) Identify the missing blocks in the Block diagram of ultrasound scanner and state the functions of each Block.
      (Refer Figure No.1)
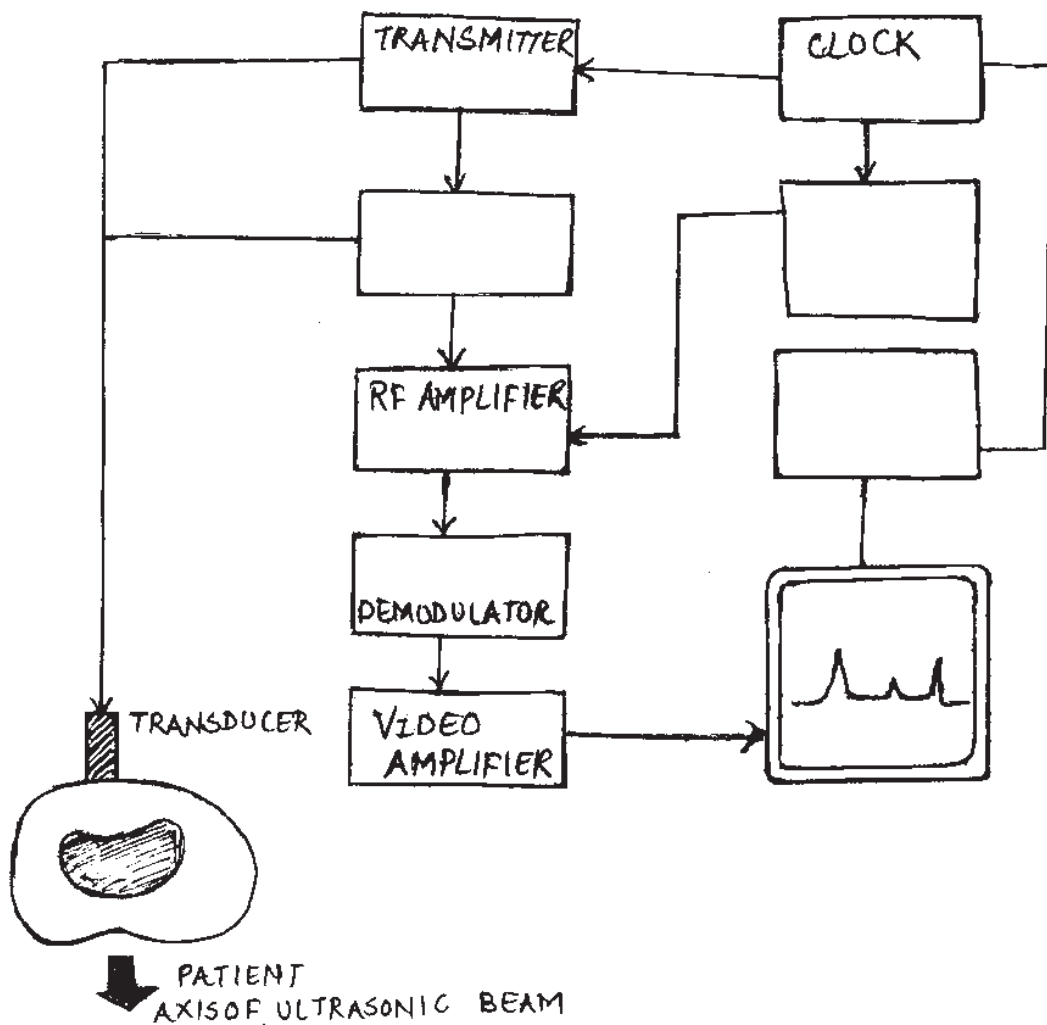
Fig. No. 1

    c) State the biological effects of MRI imaging.

    d) Enlist the risks involved in handling an X-ray equipment.

    e) State and explain X-ray tube ratings and give significance of Heat units.

    f) Draw the block diagram of CT machine. Enlist various image reconstruction techniques used in CT.

6.   **Attempt any <u>FOUR</u> of the following:**   **16**

    a) List the advantages and disadvantages of X-rays.

    b) Which imaging technique can be used to diagram different brain tissues, normal and coagulated blood. State the significance of each term in the equation. $I_t = I_o e^{-\mu x}$ used in this technique.

    c) State any four properties of ultrasound.

    d) Is Endoscopy an invasive or non-invasive imaging technique? Draw and label the parts of an endoscope machine.

    e) State the causes of the faults occurring in an ultrasound scanner.

       (i)   Image quality is poor

       (ii)   Equipment is not running.

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