17673

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3 Hours / 100 Marks Seat No. | | | | | | | | |

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

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

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

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

Marks

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

(i) State the principle of thermography. Draw and label the block diagram of a thermography machine.

(ii) Give the steps for maintenance of an ultrasound machine.

(iii) State the principle of MRI system with neat diagram.

(iv) State two transducers used in nuclear imaging. Sketch with label any one transducer.

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

(i) Give the principle of Angiography. Draw and explain the block diagram of an Angiography system.

(ii) What are the limitations of stationary anode X-ray tube. Draw a labelled block diagram of stationary anode X-ray tube. What materials are used as target and filament. State with reason.

Marks

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

a) How CT scan is different from radiography in terms of image obtained. Explain spiral CT scan.

b) Give any four technical specifications of an ultrasound machine.

c) Name the different components and functions of endoscopy machine.

d) Give the construction of an SCR and draw its characteristics.

e) State the steps in installation of angiography machine.

f) What steps need to be followed to solve the following faults occurring in a CT scan machine.

(i) Blue image

(ii) Image does not show desired object.

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

a) Draw the block diagram of Ascan machine and state function of each block.

b) Give the principle of nuclear imaging system.

c) Draw a labelled diagram of Image Intensifier. Explain how X-Ray energy gets converted to light.

d) Give the steps involved in maintenance of X-Ray machine.

e) Draw and state the function of each block of MRI detection system.

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

(i) Define RF shielding, shimming. Explain any (one) magnet used in MRI machine.

(ii) The interior of a hollow organ or cavity of the body is to be examined. Which machine will be helpful in this case. Draw and label its block diagram.

(iii) Draw and label high voltage circuit and filament control circuit of an X-Ray machine.

(iv) Give the steps in maintenance of angiographic machine.

Marks

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

(i) Give the risk involved in handling X-ray machine. List out the steps involved in installation of X-ray machine.

(ii) Draw and label television camera used in fluoroscopy. Give any four applications of fluoroscopy.

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

a) Describe the maintenance procedure of NMI machine.

b) State any four clinical applications of ultrasound scanning.

c) List the biological effects of magnetic resonance imaging.

d) Explain X-ray tube ratings. Calculate heat units for an X-ray tube with maximum

(i) kVp = 120 kVp

(ii) mA = 80 mA and exposure time = 8 sec.

e) State the properties of X-rays.

f) Mention Image reconstruction techniques in CT scan. Explain Ring Artifact in CT imaging.

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

a) Draw the block diagram of X-ray machine. Give function of each block.

b) Give applications of CT Scan.

c) What is pulse echo technique? State the transducers used for ultrasound scan. Explain any one.

d) What are radioactive isotopes? Give its significance.

e) Write stepwise installation procedure for ultrasound machine.