17673

**11819**

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

***Instructions :*** (1) All Questions are *compulsory.*

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

(3) Assume suitable data, if necessary.

**Marks**

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

(a) Identify the Imaging Equipment from the Equipment parts given and write the functions of each part.

(i) Light Source

(ii) Eye Piece

(iii) Optical fiber

(b) Explain need of maintenance for any biomedical Equipment and also list out steps to be carried out for maintenance of ultrasound m/c.

(c) Give the functions of MRI machine components given below :

(i) A Magnet

(ii) An RF transmitter

(iii) A Gradient System

(iv) A Detection System

(d) List the two most commonly used Nuclear Medical Imaging Transducer and draw a neat labelled diagram of any one of them.

**(B) Attempt any ONE of the following :** **6**

(a) When is the Angiography procedure used. Draw block diagram of Angiography and explain the significance of DSA (Digital Subtration Angiography) technique used exceptionally for heart.

(b) State the purpose of using timer circuits in X-ray machine.

Identify the name of timer circuit given below in fig 1.

Who determines the length of X-ray exposure in the circuit diagram.

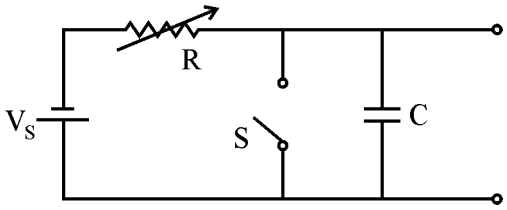


**Fig. 1**

**2. Attempt any FOUR :** **16**

(a) Draw setup of Fourth Generation CT machine and explain working principle of CT Machine.

(b) Draw labelled diagram of ultrasonic transducer and explain it.

(c) Enlist any four Clinical Applications of endoscopy.

(d) Identify and label the symbol and characteristics of components given in fig.2

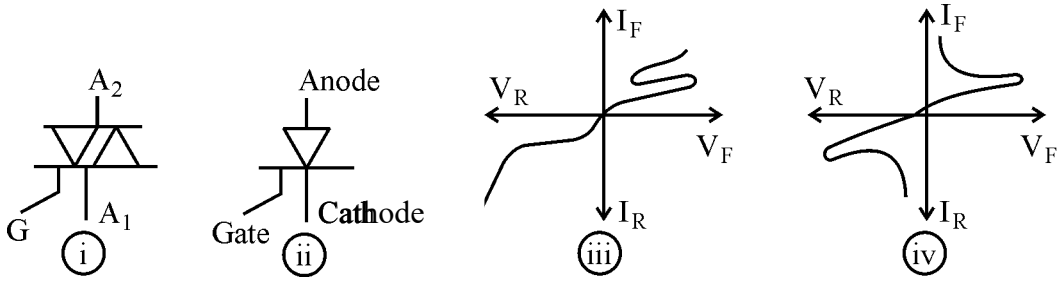


**Fig. 2**

(e) Enlist Installation steps for Angiography.

(f) Explain the risks involved in handling MRI.

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

(a) List Any four properties of ultrasound.

(b) Explain working principle of NMI.

(c) Draw labelled diagram and explain the necessity of Image Intensifier tube in fluoroscopy machine.

(d) What are the Risks in Handling of X-ray machine in medicine.

(e) Explain the terms :

(i) RF shielding

(ii) Shimming

**4. (A) Attempt any THREE of following :** **12**

(a) Draw block diagram of detection system of MRI and state its function.

(b) Give possible cause and solution for following faults in Endoscope machine.

| Fault | Possible cause | Solution |
|---|---|---|
| 1. Instruments do not pass easily through the biopsy access channel | ? | ? |
| 2. No fluid flow or suction through scope | ? | ? |
| 3. Leakage in flexible endoscope | ? | ? |
| 4. Electrical Shock | ? | ? |

(c) Draw and explain X-ray emission spectrum.

(d) Enlist maintenance steps for angiography machine.

**(B) Attempt any ONE of the following :** **6**

(a) Explain the need of periodic cleaning and give causes & Action taken for following defects of X-ray machine.

| Defect | Cause | Action taken |
|---|---|---|
| 1. Radiograph does not show desired object | ? | ? |
| 2. More dark Image or high density in radiograph. | ? | ? |

(b) Draw and explain working of Television camera used in fluoroscopy system.

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

(a) Enlist steps to be carried out for Daily maintenance and weekly maintenance for Endoscope.

(b) Enlist any four Clinical Applications of Ultrasound.

(c) Explain Biological effects of MRI Imaging.

(d) Write the steps to be carried out for Installation of the X-ray machine.

(e) Write the procedural steps for processing the film with respect to X-ray machine.

(f) Draw and explain Spiral CT Scan principle in multislice scanning.

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

(a) Give functions of the following in X-ray M/c (1) Grids (2) Cassettes (3) X-ray tube (4) Filament transformer

(b) Enlist three Image Reconstruction techniques in C.T. and explain Ring Artefacts.

(c) Draw block diagram of basic pulse echo system and explain it.

(d) Draw block diagram of Thermography machine and state its basic principle of working.

(e) List out steps to be carried out for installation's of ultrasound machine.

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