Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech(BME)/SEM-6/BME-601/2011

2011

THERAPEUTIC EQUIPMENTS

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : 10 × 1 = 10

i) Argon laser is a

a) molecular laser b) ionic laser

c) solid-state laser d) dye laser.

ii) The Chronaxie value of cardiac muscle in around

a) 0·2 mili sec b) 2 mili sec

c) 0·08 mili sec d) none of these.

iii) For the pacemaker categorization VAT is

a) Value Added Tax

b) Ventricular sensing Atrial pacing Triggered mode

c) Atrial sensing Ventricular pacing Triggered mode

d) none of these.

iv) SCR mean

a) Silicon Controlled Rectifier

b) Source for Current & Resistor

c) Silicon Controlled Resistor

d) Silicon Controlled Reactor.

v) In defibrillation, spoon shaped electrodes are used in

a) Synchronized defibrillation

b) External defibrillators

c) Internal defibrillator

d) A.C. defibrillator.

vi) In a capacitive type defibrillator, dual pulse is used to reduce required

a) energy b) voltage

c) pulse duration d) none of these.

vii) In ventilator gas blending is done using

a) air and oxygen b) only air

c) oxygen and nitrogen d) none of these.

viii) The gas mixture which is generally delivered during anesthesia is

a) nitrous oxide and oxygen

b) nitrous oxide and CO_2

c) nitrous oxide and argon

d) oxygen and nitrogen.

ix) The suitable frequency range for ultrasonic therapy is

a) 800 KHz – 1 MHz b) 1 MHz – 5 MHz

c) 200 KHz – 500 KHz d) none of these.

x) The mathematical form of energy stored in a capacitor is

a) $\frac{1}{2}(CV^2)$ b) $\frac{1}{2}(CV^3)$

c) $\frac{1}{2}(C^2V)$ d) $\frac{1}{2}(C^2V^2)$.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Give different types of pacing mode in a tree or table pattern.

3. Draw and discuss the different kinds of waveform used in a muscle stimulator.

4. Briefly explain the working principle of ND-YAG laser.

5. How is the induced voltage to the cardiac tissue related with the radius of the spherical pacing electrode ? Discuss with mathematical deduction.

6. Write the different methods of short wave diathermy.

7. Briefly discuss the different modes of application of an Artificial Pace Maker.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

8. a) Explain the three main parameters used to describe a ventilation system.

b) What is PEEP function ? 9 + 6

9. a) Explain the 4-step process of laser generation.

b) What are the essential features of an implantable pacemaker ? 8 + 7

10. a) With schematic diagram discuss the basic part of an anesthesia machine. 5

b) Write the different power sources of an artificial pace maker. 5

c) Find the resistivity in ohm-meter of an object whose volume is 0·6 m^3 , if an electrosurgery unit delivers 56 W and a line current of 600 mA. 5

11. a) How can you control the pulse width and pulse duration of a pacemaker ?

b) Draw the circuit diagram with explanation of a dual peak delay line capacitor type defibrillator. Why is it more advantageous than a normal capacitive type defibrillator ?

c) Draw and discuss the block diagram of an implantable defibrillator. 2 + (6 + 2) + 5

12. a) Briefly discuss the different types of defibrillators used for cardiac defibrillation. 6

b) Write the different methods for testing of an electro surgery machine. 5

c) Draw the Strength-Duration Curve. Why is is very important for the physiological system ? 4

13. Write short notes on any *three* of the following : 3 × 5

a) Electrosurgery safety

b) CO_2 LASER formation

c) Different Inspiratory and Expiratory Phase of Respiration

d) Basic idea about a suction apparatus

e) Baby incubator.