

**GANPAT UNIVERSITY**  
**B. TECH. SEMESTER V BIOMEDICAL & INSTRUMENTATION ENGINEERING**  
**REGULAR EXAMINATION NOVEMBER/ DECEMBER- 2014**  
**2BM703: THERAPEUTIC TECHNIQUES & INSTRUMENTATION**

Time: 3 Hours

Total Marks: 70

**Instruction:**

1. All the questions are compulsory.
2. Answer of each section must be written in separate answer books.
3. Figure to the right indicates marks.
4. Assume data, if needed.
5. Conventional terms / notations are used.

**SECTION: I**

- Que. 1** **[12]**
- a) What is cardio-version? Draw the general block diagram of DC defibrillator with synchronizer and explain its working. 06
  - b) External Pacemakers are used for? Explain the external pacemakers in detail. 06
- OR**
- Que. 1** **[12]**
- a) Give the types of fibrillation and their differences. 04
  - b) How the power sources are important for implantable pacemakers? Explain all the power sources for pacemaker in detail. 06
  - c) Explain the monophasic and biphasic waveform for external DC defibrillators. 02
- Que. 2** **[11]**
- a) Explain the types of electro-surgical techniques with electrodes used in surgical diathermy. 06
  - b) A type of stimulation used in physiotherapy is? With diagram explain how the heat is produced by the application of high frequency. 05
- OR**
- Que. 2** **[11]**
- a) Draw the block diagram of solid state electro-surgical unit and explain the surgical diathermy machine. 06
  - b) For ultrasound therapy unit explain the dose control and application techniques. 05
- Que. 3** **[12]**
- Answer the following questions (Any Three) :
- a) Give all the advantages of diathermy. 04
  - b) Explain the AC defibrillator with disadvantages. 04
  - c) List the problems associated with leads and electrode of pacemaker and give their remedial solution 04
  - d) Give the important advantages of high frequency in surgical diathermy. 04



SECTION: II

Que. 4

[12]

- a) What are the Dialyzer Characteristics? Explain in detail. 06  
b) Draw and briefly explain the Schematic diagram of hemodialysis machine. 06

OR

Que. 4

[12]

- a) Explain how diffusion, osmosis, filtration, ultra-filtration and convection help to remove fluid and wastes during dialysis. 06  
b) What is the purpose of the Dialysate? Why two concentrates are used to make dialysate? Explain the significant of each element of dialysate in brief. 06

Que. 5

[11]

- a) Draw and explain the Block diagram of Microprocessor controlled ventilator. 06  
b) Draw the Pressure Vs Time, Volume Vs Time and Flow Vs Time Waveform for the following Ventilator settings. 05

Case I (Volume Control Mode)		Case II (Pressure Control Mode)	
Tidal Volume ml	700	PC cmH <sub>2</sub> O	700
Flow L/min	60	Ti sec.	1.5
Insp. Pause sec.	0	Rate b/min	12
Rate b/min	12	PEEP cmH <sub>2</sub> O	5
PEEP cmH <sub>2</sub> O	5		

OR

Que. 5

[11]

- a) Draw the Pressure Vs Time, Volume Vs Time and Flow Vs Time Waveform for the following Ventilator modes. 06  
(1) VC-CMV (2) VC-IMV (3) PC-CMV (4) PC-IMV  
b) Draw and explain the block diagram of Microcontroller based Baby warmer. 05

Que. 6

[12]

- a) Draw and explain the Schematic diagram of Anesthesia machine including patient breathing circuit. 08  
b) What is Sorbent Dialysis? Explain the working principle of Sorbent Dialysis. 04

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