

GANPAT UNIVERSITY**B. TECH. SEMESTER: VII (BIOMEDICAL & INSTRUMENTATION ENGINEERING)****REGULAR EXAMINATION NOV. – DEC. 2015****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) Enlist the types of DC defibrillators? Draw the diagram of rectangular DC defibrillator and explain its working. 6
- (b) How the rate responsive pacemaker is different from other pacemakers? Explain it with diagram 6

OR

Que. -1

12

- (a) Give the difference between DC defibrillator and DC defibrillator with synchronizer. Draw the general block diagram of DC defibrillator with synchronizer and explain its working. 6
- (b) Explain the need of pacemaker. Enlist the types of pacemaker and explain any one of them. 6

Que. -2

11

- (a) Which are the communication techniques used between external & internal unit of programmable pacemaker unit. Explain the programmable Pacemaker. 6
- (b) Discuss the principle of surgical diathermy. Also discuss the commonly used electro surgery techniques 1) Electrotomy 2) Coagulation 3) Fulguration 5

OR

Que. -2

11

- (a) What are the advantages of disposable electrodes used for AED? Explain the key parameters to decide the reliable shock decision in AED? 5
- (b) Explain the types of electro-surgical techniques with electrodes used in surgical diathermy. 6

Que. -3

12

- (a) Give the advantages of biphasic waveform over monophasic waveform for defibrillation. 4
- (b) What is pacemaker? Pacemaker consists of? Give the classification of pacemaker on the basis of mode of operation 4
- (c) Write the number of important advantages of use of high frequency current in surgical diathermy. 4

Section – II

Que. – 4

12

- (a) Enlist and explain various designs of dialyzers used in machine? Which is most commonly used design among them. What is sorbent dialyser? 5
- (b) Explain the temperature regulation and conductivity measurement circuits used in dialysis machine? 5
- (c) Enlist and explain types of kidney diseases? 2

OR

Que. – 4

12

- (a) With the help of circuit diagram explain shortwave diathermy and automatic tuning in this machine. How diathermy is different from this therapy. 5
- (b) Explain working of spinal cord and Bladder stimulators with its applications 4
- (c) How pain control is explained by gate control theory, endorphin release theory and TENS. 3

Que. – 5

11

- (a) Draw neat block diagram of anesthesia machine. State and explain the components used in high pressure system 5
- (b) Enlist and explain problems associated with basic design of vaporizer? What is the solution to eliminate or minimize these problems 5
- (c) What is Pin index safety system? 1

OR

Que. – 5

11

- (a) Define and explain PEEP and CPAP. Explain APRV mode of ventilation 5
- (b) Explain pressure support ventilation (PSV) and APRV mode of ventilation. Draw related pressure, flow and volume diagram showing CPAP + PSV 5
- (c) What is Auto-PEEP. 1

Que. – 6

12

- (a) How blood vessels are accessed through Arteriovenous (AV) fistula and graft in hemodialysis with its advantages and disadvantages. 4
- (b) Draw neat diagram of circle system. What is the function of APL valve? How positive pressure ventilator can be used with this system 4
- (c) Draw pressure v/s time, volume v/s time and flow v/s time diagram for following ventilator modes: Volume Control mode with Tidal volume of 700 ml, Flow rate is 60 L/min, I:E ratio is 1:2. Total breaths /min or Respiratory rate is 12 breath / min, Peak inspiratory pressure is 20 cmH₂O, PEEP is 5 cmH₂O. Draw for machine triggered ventilation. 4

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