

**GANPAT UNIVERSITY**  
**B.Tech Sem. VI<sup>th</sup> Biomedical & Instrumentation Engineering**  
**Regular Examination May / June-2013**  
**2BM603: Diagnostic Techniques & Instrumentation**

Time: 3 Hours

Total Marks-70

**Instructions:-**

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

**SECTION-I**

- Q-1 (12)
- (a) What is dual frequency excitation? Give its advantages with necessary figures.
  - (b) Explain NMR type blood flow meter.

OR

- Q-1 (12)
- (a) Explain transit type and frequency difference type ultrasonic flow meter.
  - (b) Explain dye dilution method with suitable figure and equations.

- Q-2 (11)
- (a) Explain instantaneous heart rate meter using ECG of patient. Provide necessary diagram.
  - (b) Explain Fick technique of cardiac output measurement.

OR

- Q-2 (11)
- (a) Explain any two displacement type Plethysmography.
  - (b) Explain oscillometric method for blood pressure measurement with neat block diagram.

- Q-3 (12)
- (a) Categorize different types of temperature sensor with its range, sensitivity and cost.
  - (b) What are the clinical significances of Phonocardiogram?
  - (c) Explain widened QRS complex detection circuit.

**SECTION-II**

- Q-4 (12)
- (a) Explain any one noninvasive method for fetal heart rate detection.
  - (b) Explain different types of hearing aids with its disadvantages.

OR



Q-4 (12)  
(a) Explain abdominal electrocardiogram pickup and heart rate detection mechanism.

(b) Explain Hearing mechanism with neat figure.

Q-5 (11)  
(a) Explain single channel ECG telemetry transmitter circuit with necessary diagram.

(b) Explain Infrared gas analyzer.

OR

Q-5 (11)  
(a) Explain FEV, MMF, FVC and its clinical significance.

(b) Explain Pulse width modulation circuit with its diagram.

Q-6 (12)  
(a) Explain indirect uterine contraction method.

(b) Explain descending algorithm for audiometer.

(c) What is nitrogen washout technique?

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