

**GANPAT UNIVERSITY****B. TECH SEM- VI (BM&I) REGULAR EXAMINATION- APRIL-JUNE 2017****2BM603: Diagnostic Techniques & Instrumentation****TIME: 3 HRS****TOTAL MARKS: 60**

- Instructions:** (1) This Question paper has two sections. Attempt each section in separate answer book.  
 (2) Figures on right indicate marks.  
 (3) Be precise and to the point in answering the descriptive questions.

**SECTION: I**

- Q.1 Answer the following questions: (10)**
- a) Why blood flow measurement is difficult to measure accurately? Give the working principle of electromagnetic blood flow meter and derive relationship between velocity and blood flow. (05)
- b) Biomedical telemetry system utilizes double modulation why? Explain frequency and PWM use in biomedical telemetry system. (05)

**OR**

- Q.1 Answer the following questions: (10)**
- a) Draw and discuss the NMR based blood flow measurement with their short coming for clinical use (05)
- b) What do you mean by single channel telemetry system? Explain the single channel ECG telemetry system with transmitter and receiver. (05)

- Q.2 Answer the following questions: (10)**
- a) Mention the name of dye used in dye dilution method for measurement of cardiac output? Explain the process of this method in detail. (05)
- b) Enlist the different types of transducer used in audiometry. Explain. (05)

**OR**

- Q.2 Answer the following questions: (10)**
- a) How to measure continuous cardiac output derived from the aortic pressure waveform? Explain in detail. (05)
- b) What is plythysmography? Explain the photoelectric method with neat sketch of block diagram for processing plythysmographic signal. (05)

- Q.3 Answer the following questions: (10)**
- a) What do you mean by telemetry system? Give the need of wireless telemetry system. (03)
- b) Write the application of wireless telemetry system in different fields. (03)
- c) Write short note on LASER Doppler blood flow meter. (04)

**SECTION: II**

- Q.4 Answer the following questions:** (10)
- a) Define following terms in respect to measurement of heart rate: (03)  
i) Average Calculation ii) Beat to beat calculation iii) Combination of i) and ii)
- b) What do you mean by ambulatory monitoring instruments? Which ambulatory monitoring instruments is used for measurement of ECG? Explain the working of instrument in detail. (05)
- c) \_\_\_\_\_ type of pneumotachometer has rotation blades. (01)
- d) Nitrogen washout technique is used for measurement of \_\_\_\_\_. (01)

**OR**

- Q.4 Answer the following questions:** (10)
- a) Determine a compensating factor for blood pressure measurement using indirect method, if the mercury manometer is 'h' mm higher or lower with respect to heart level. (04)
- b) What is the use of cardiocograph? Enlist direct and indirect method associated with it. (03)
- c) Calculate the cardiac output for the indication dilution curve having : (02)  
10 mg of indicator injected, Average concentration is 5 mg / l, Curve duration is 20 seconds.
- d) Write down the formula for measurement of blood velocity in ultrasonic Doppler method. (01)

- Q.5 Answer the following questions:** (10)
- b) What s evoked response? Draw the block diagram of evoked response audiometer and explain in detail. (05)
- c) Which transducer is used for measurement of labour activity? Draw the block diagram of it and explain. (05)

**OR**

- Q.5 Answer the following questions:** (10)
- a) What is the effect of fall in cardiac output on body? (02)
- b) Define following terms: (03)  
i) Dead space ii) Minute volume iii) Vital capacity
- c) What is the use of spirometer? Draw the functional diagram of basic water sealed spirometer and explain its working. (05)

- Q.6 Answer the following questions:** (10)
- a) Which device is works on a principle of mechano-electronic recording technique? Explain in detail. (05)
- b) Comment for the effect of open loop and closed loop mode on dilution curve in indicator dilution method. (03)
- c) What is the difference between constant rate and bolus? (02)

-----**END OF PAPER**-----