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24225

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
  - (2) Answer each next main Question on a new page.
  - (3) Illustrate your answers with neat sketches wherever necessary.
  - (4) Figures to the right indicate full marks.
  - (5) Assume suitable data, if necessary.
  - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
  - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

**1. Attempt any FIVE of the following :**

**10**

- (a) Define blood pressure. List two methods of blood pressure measurement.
- (b) Give any four technical specification of pulse oximeter.
- (c) State the concept of fatal heart rate.
- (d) State the concept of Galvanic Skin Reflex.
- (e) Give normal values of amplitudes and duration of P wave used for ECG machine.
- (f) Suggest the device used for testing ability of hearing and understand the speech.
- (g) Enlist any two possible faults for EEG machine.



- 2. Attempt any THREE of the following : 12**
- (a) Identify the B.P. meter which records the blood pressure without using stethoscope and explain it.
  - (b) Explain lung volumes and lung capacities.
  - (c) List any four technical specification of EEG machine.
  - (d) Differentiate between direct and indirect blood pressure measurement techniques.
- 3. Attempt any THREE of the following : 12**
- (a) Write the maintenance steps of ECG machine.
  - (b) Suggest the instrument to measure oxygen saturation in blood and explain it with neat diagram.
  - (c) Explain block diagram of heart rate meter.
  - (d) Suggest the instrument which is used for diagnosing neurological conditions such as epilepsy, sleep disorders and brain injuries and explain it.
- 4. Attempt any THREE of the following : 12**
- (a) Draw the block diagram of digital temperature meter.
  - (b) If R-R interval rate is 0.8 second, calculate heart rate by beat-to-beat method.
  - (c) Draw and explain block diagram of ultrasonic FHR meter.
  - (d) Compare ECG & PCG.
  - (e) Suggest the equipment for detecting the hearing loss. Write any three important technical specifications for the same.

**5. Attempt any TWO of the following : 12**

- (a) Draw and explain block diagram of EMG machine. Give its technical specifications.
- (b) Draw block diagram and explain principle of operation of GSR meter. State its applications.
- (c) Suggest the name and draw the circuit to minimize the common mode signal between body of patient and floating ground in ECG machine.

**6. Attempt any TWO of the following : 12**

- (a) An EMG machine is received with following problems. State remedies to eliminate it.
    - (i) No signal or flat line
    - (ii) Excessive noise or artifacts
    - (iii) Weak or faint signal
    - (iv) Inconsistent readings
    - (v) Machine freezing or not responding
    - (vi) Overheating of device
  - (b) State any three faults related to ECG machine and give its remedies to eliminate it.
  - (c) Draw unipolar, bipolar and average electrode system for EEG recording.
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