17442

16117

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory.*

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) **Attempt any SIX of the following:** **12**

(i) List the sources of biomedical signal. (any four)

(ii) Give four specifications of medical instru. system.

(iii) List any two flow transducer.

(iv) Draw constructional sketch of optical transducer.

(v) Draw a labelled diagram of P_{O2} electrode.

(vi) Give any four bio-potential electrode.

(vii) List two types of thermocouple and state seebeck effect.

(viii) List optical transducer. (any two)

b) **Attempt any TWO of the following:** **8**

(i) Give brief classification of physiological transducer. Also list application of each type of X'ducer.

(ii) Give types of diaphragm with neat sketch describe working principle of corrugated diaphragm. Also list application.

(iii) Draw diagram of instrumentation amp^{r}. List four application.

P.T.O.

Marks

2. Attempt any FOUR of the following: **16**

a) With neat constructional details describe working of supported micro electrode.

b) Draw and explain a neat diagram of radiation thermometery.

c) Describe any four general difficulties while designing the man instrumentation system.

d) Describe thermal convection method for flow measurement.

e) With neat construction describe working of angular potentiometer.

f) Draw labelled diagram of reference electrode and explain its working.

3. Attempt any FOUR of the following: **16**

a) Define Biometrics and list any four sources of biomedical signal.

b) List requirements of biomedical amplifier. (any eight)

c) Describe metal plate surface electrode with a neat labelled diagram.

d) Compare thermister and RTD. (any four point)

e) Describe working of piezoelectric transducer.

f) Describe blood glucose sensor with neat diagram.

4. Attempt any FOUR of the following: **16**

a) Describe indicator dilution method for flow measurement.

b) Draw and justify characteristics of LVDT transducer.

c) Describe internal electrode with neat diagram.

d) Describe working of RTD with neat sketch.

e) List performance characteristics of transducer.

f) Describe working of ISFET (Ion-sensitive FET) with neat sketch.

Marks

5. Attempt any FOUR of the following: **16**

a) Draw the labelled diagram of different types of Bourdon tube. (four type)

b) Describe ultrasonic flow transducer with neat sketch.

c) Describe working of photomultiplier tube with neat sketch.

d) Describe how instrumentation amplifier can be used to reduce noise present in an ECG signal.

e) Define any four Dynamic characteristics of measurement system.

f) Describe any four factors that should be considered while designing any man instrumentation system.

6. Attempt any FOUR of the following: **16**

a) With neat working explain how LVDT is used for displacement measurement.

b) A platinum RTD has a resistance of 100 Ω at 25°C.

(i) Find its resist - at 65°C. The resist temp coefficient of platinum is 0.00392 Ω / Ω°C.

(ii) If the RTD has resist 07 150 Ω calculate the temp.

c) Describe electromagnetic transducer with neat diagram.

d) With neat labelled diagram explain working of P_{CO_2} electrode.

e) Draw a bridge amplifier. State its working.

f) (i) Give types of thermister and difference between them with respect to

1) Ch^r

2) Relation between resistance and temp.

(ii) State working principle of thermocouple.

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