22477

12425

3 Hours / 70 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) Use of Non-programmable Electronic Pocket Calculator is permissible.

Marks

1. Attempt any FIVE of the following : **5 × 2 = 10**

(a) Classify transducer on any two basis.

(b) Define temperature and state its units.

(c) List different types of thickness measurement transducers.

(d) Select appropriate sensor for following application :

(i) To measure speed of rotating shaft.

(ii) To separate metallic & non-metallic object.

(e) Define speed and state its units.

(f) Draw labelled diagram of inductive pick-up.

(g) Compare AC tachometer & DC tachometer (any 2 points).

2. Attempt any THREE of the following : **3 × 4 = 12**

(a) Explain speed measurement using photoelectric pick-up.

(b) Explain the working of angular potentiometer with neat labelled diagram.

(c) Define following and state its units :

(i) Force

(ii) Pressure

(d) Convert 40 °C temperature into Fahrenheit and Rankine scale.

3. Attempt any THREE of the following : 3 × 4 = 12

(a) Explain piezoelectric effect and state the name of two piezoelectric material.

(b) Compare following types of thermocouple on basis of material used & temperature range :

(i) J (ii) K (iii) R (iv) S

(c) Choose appropriate sensor for following applications :

(i) To measure thickness of newspaper.

(ii) Detecting parts in place of robots.

(iii) To control the flow of electricity.

(iv) Monitoring quality & detecting automation errors on production lines.

(d) With neat labelled diagram explain ultrasonic type proximity sensor.

4. Attempt any THREE of the following : 3 × 4 = 12

(a) Name the different types of temperature sensors. Explain bimetallic thermometer with neat labelled diagram.

(b) With neat labelled diagram explain camera based width measurement.

(c) List different types of mechanical transducers. Also explain bellows with neat constructional diagram.

(d) Explain hydraulic force meter with neat labelled diagram.

(e) State and explain :

(i) Seebeck effect

(ii) Peltier effect

with suitable diagram.

5. Attempt any TWO of the following : **2 × 6 = 12**

(a) Compare U-tube manometer & well type manometer. (any 4 points). Give limitations of U-tube manometer.

(b) Explain radiation pyrometer with neat labelled diagram. State temperature ranges where pyrometers are used.

(c) Suggest suitable method to measure thickness of newspaper with justification. State advantages and disadvantages of capacitive type transducer for thickness measurement.

6. Attempt any TWO of the following : **2 × 6 = 12**

(a) Explain any six selection criteria of transducer.

(b) (i) Explain optical encoder with neat labelled diagram.

(ii) Compare contact type & non-contact type tachometer.

(c) Convert 200 °F into Celcius (°C), Kelvin (°k) and Rankine (°R).
