

17528

11819

3 Hours / 100 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) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

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|-----------|---|--------------|
| <b>1.</b> | <b>(A) Attempt any THREE :</b>  | <b>12</b>    |
|           | (a) What is calibration of instruments ? Why is it required ?                           |              |
|           | (b) Define in following terms :   |              |
|           | (i) Range   |              |
|           | (ii) Hysteresis   |              |
|           | (iii) Drift   |              |
|           | (iv) Reproducibility  |              |
|           | (c) Explain construction & principle of working of LVDT with neat sketch.               |              |
|           | (d) Explain working principle of ionisation gauge with neat sketch.                     |              |
|           | <b>(B) Attempt any ONE :</b>  | <b>6</b>     |
|           | (a) Define measurement. State the significance of measurement & its basic requirements. |              |
|           | (b) With neat sketch, explain construction & working of McLeod gauge.                   |              |

- 2. Attempt any TWO :** **16**
- (a) (i) Explain principle of eddy current dynamometer with neat sketch.
  - (a) (ii) What are active and passive transducers ? Give two examples of each.
  - (b) Explain with neat sketch, construction & working principle of potentiometer. State advantages & disadvantages of potentiometer.
  - (c) Describe construction & working of optical pyrometer with neat sketch. State its advantages & disadvantages.
- 3. Attempt any FOUR :** **16**
- (a) Explain construction & working of encoders.
  - (b) Differentiate between accuracy & precision.
  - (c) State laws of intermediate temp. & intermediate metals with neat sketches.
  - (d) State and define four desirable and four undesirable characteristics of measuring instruments.
  - (e) A PT 100 thermometer has resistance  $100 \Omega$  at  $25^\circ\text{C}$ . Determine its resistance at  $65^\circ\text{C}$ . Also, determine its temperature if it had resistance  $150 \Omega$ . Assume its resistance temperature coefficient is  $0.00392^\circ/\text{C}$ .
- 4. (A) Attempt any THREE :** **12**
- (a) Explain the different sources of errors in measurements and measuring instruments.
  - (b) How flow is measured by hot wire anemometer ?
  - (c) Show that gauge factor of resistance strain gauge is  $F = 1 + 2\mu$ , where  $\mu$  is Poisson's ratio.
  - (d) Draw a neat sketch of eddy current or drag cup tachometer. Explain its working.
- (B) Attempt any ONE :** **6**
- (a) Compare Hydraulic, Pneumatic & Electronic control system.
  - (b) Explain servomotor mechanism with neat sketch.

**5. Attempt any FOUR :****16**

- (a) Define any four sound characteristics.
- (b) Draw neat sketch of bubbler or purge system for liquid level measurement & explain its working.
- (c) Differentiate between open & closed loop control system.
- (d) What is automatic control system ? Write two advantages & two applications of the same.
- (e) Draw & explain electronic PID controller.
- (f) State advantages & disadvantages of feed forward control system.

**6. Attempt any FOUR :****16**

- (a) Explain with neat sketch rotameter.
  - (b) With neat sketch, explain principle & working of electromagnetic flow meter.
  - (c) With neat sketch, explain principle & working of contact less tachometer.
  - (d) Explain the need & method of compensation of strain gauge.
  - (e) While measuring a speed of a rotating disc with stroboscope single line image were observed for stroboscope setting of 3000, 4000 & 5259 rpm. Calculate the speed of a rotating disc.
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