

313331

12526

3 Hours / 70 Marks

Seat No.

--	--	--	--	--	--	--	--

- Instructions* – (1) All Questions are *Compulsory*.
(2) Answer each next main Question on a new page.
(3) Illustrate your answer 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.

Marks

1. **Attempt any FIVE of the following:** **10**
- a) Construct a neat labelled diagram of a transducer.
 - b) Classify sensor on any two basis.
 - c) List different applications of Op-amp IC 741.
 - d) Compare mechanical and electromechanical sensors. (Any two points)
 - e) Classify following sensors into mechanical and electromechanical sensors :-
 - i) C shape bourdon tube
 - ii) Bellows
 - iii) Strain gauge
 - iv) Inductive proximity sensor.
 - f) Construct neat labelled diagram of magnetic biosensor.
 - g) Draw neat labelled diagram of potentiometric sensor.

P.T.O.

- 2. Attempt any THREE of the following: 12**
- a) Define sensor and actuator. State examples of each.
 - b) List applications of Timer TC-555 and draw its pin diagram.
 - c) Explain inverting amplifier with neat labelled diagram.
 - d) Explain working of venturi meter with neat labelled diagram.
- 3. Attempt any THREE of the following: 12**
- a) Compare active and passive transducers. (Any four points)
 - b) Choose appropriate sensor for following applications :-
 - i) Measure pressure in pipelines, tanks, boilers etc.
 - ii) Volume control in audio equipment.
 - iii) Temperature regulation in oven, refrigerator.
 - iv) Detect presence or position of object.
 - c) Explain color sensor with neat labelled diagram.
 - d) List advantages and disadvantages of MEMS sensor.
- 4. Attempt any THREE of the following: 12**
- a) Explain following characteristics of sensor :-
 - i) Range
 - ii) Error
 - iii) Backlash
 - iv) Dead band.
 - b) Explain various modes of op-amp IC 741.
 - c) Draw constructional details of C type bourdon tube and state its two applications.
 - d) Explain inertial sensor with neat labelled diagram.
 - e) Construct general structure of measurement system and state importance of signal conditioning in instrumentation system.

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

- a) Construct internal diagram of IC 555 with neat labels. State its applications.
- b)
 - i) List different materials and techniques used in manufacturing of semi-conductor sensors.
 - ii) What is hall effect sensor? Give its two applications.
- c) Explain capacitive type touch screen sensor with neat labelled diagram. State its advantages, disadvantages.

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

- a) What are electromechanical sensors? Give its two examples and state applications of each.
 - b) Construct ultrasonic flow sensor with neat labelled diagram and explain its working. Give its two applications.
 - c) Construct MEMS gyroscope with neat labelled diagram. State its advantages and disadvantages.
-