

22542

**22232**

**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) 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) State any four benefits of process instrumentation.
- (b) State standard signals of electronics and pneumatic transmission system.
- (c) State the need of DAS.
- (d) State the need of control panels.
- (e) Give the meaning of IP65.
- (f) Draw a labelled block diagram of process control system.
- (g) Define Hazardous area.



**2. Attempt any THREE of the following : 12**

- (a) List any four process characteristics. Explain any one in brief.
- (b) State the need of signal transmission system.
- (c) Describe the working principle of potentiometric strip-chart recorder with neat schematic.
- (d) Electrical control signal is needed to convert into pneumatic control signal. Suggest correct device. Explain its working.

**3. Attempt any THREE of the following : 12**

- (a) Explain the working of pneumatic DP transmitter with a neat labelled diagram.
- (b) Draw a typical control room layout with neat labelling.
- (c) Describe any four ergonomic considerations of control room environment.
- (d) Give meaning of (i) NEMA 35, (ii) NEMA 6P.

**4. Attempt any THREE of the following : 12**

- (a) List any four process dynamics. Explain any one in brief.
- (b) Describe calibration process of temperature transmitter.
- (c) Explain live zero in transmission system.
- (d) List documents needed to design the control panel. Describe any one.
- (e) Describe with diagram the intrinsic safety technique using passive zener barrier circuit.

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

- (a) Draw the block diagram of SMART transmitter. Explain each block in brief.
- (b) Explain working of X-Y recorder with neat diagram. State its advantages over strip-chart recorder.
- (c) Classify Hazardous Areas according to the material.

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

- (a) Explain the working of force-balance pressure transmitter with neat sketch.
  - (b) Draw block diagram of data logger. Explain each block in brief. State its applications.
  - (c) Draw alarm annunciator showing main elements. Describe its operational sequence.
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