17540

16172

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

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****.*

Marks

1. A) Attempt **any three** of the following : **12**

a) Define the Process Control System (PCS). Give the classification of process variables involved in PCS.

b) Draw and explain the flapper-nozzle system.

c) State the need of converters in process instrumentation. List the four examples of converters.

d) State the need of Data Acquisition System (DAS). State its four industrial applications.

B) Attempt **any one** of the following : **6**

a) Draw and explain the construction and working of current (I) to pressure (P) converter. State its industrial usage.

b) Draw the block diagram of data logger, explain its working and state its two applications.

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

a) Draw the block diagram of SMART transmitter and explain its four salient features.

b) Name the different types of control panels. Explain in detail any two control panels.

c) Define Hazardous area. Explain in detail classification of hazardous area according to material classification as per NEC standard.

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

a) Draw the block diagram of feedback control system for a process system and explain in brief.

b) Explain the documents required for designing the control panel.

c) Draw and explain the block diagram and working of single channel DAS.

d) Draw and explain the block diagram and working of strip chart recorder.

e) Draw and explain how explosion proof enclosures protect the instruments in hazardous area.

P.T.O.

Marks

4. A) Attempt **any three** of the following : **12**

a) Draw and explain the construction and working of electronic temperature transmitter.

b) Draw and explain the construction and working of pressure (P) to current (I) converter. State its two applications.

c) Explain in brief IP classification for enclosures.

d) Explain how zener diode based intrinsic safety barrier protects control room instruments in hazardous plant.

B) Attempt **any one** of the following : **6**

a) Explain in detail HART communication technique. Draw the superimposing digital signal over analog signal.

b) Draw and explain the block diagram and working of X-Y recorder. Name its 2 applications.

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

a) State the need of calibration. Explain the calibration procedure for pressure gauges using Dead Weight Tester (DWT).

b) Draw the control room layout. Describe any six ergonomic considerations for designing control room.

c) Name the different types of alarm annunciator. Draw the schematic of typical alarm annunciator and explain its operational sequence.

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

a) List the different process characteristics (any four). Explain any one of process characteristics in brief with neat diagram.

b) Define process dynamics and explain.

c) State the need of foundation field bus. Name its types and give their specifications.

d) Draw and explain working of voltage to current converter.

e) Compare between any two types of DAS (4 points).
