17540

14115

3 Hours / 100 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.

Marks

1. a) **Attempt any <u>THREE</u> of the following :** **12**

(i) Draw a generalised block diagram of process control system and define the terms –

(1) Manipulated variable

(2) Controlled variable

(ii) State the need for signal transmission. Write the standard electronic and pneumatic transmission signal ranges.

(iii) Explain pressure to current converter with neat labelled diagram.

(iv) Differentiate between DAS and Data logger. (Any four points)

b) **Attempt any <u>ONE</u> of the following :** **6**

(i) Draw a block diagram of data logger and explain its working.

(ii) Explain with neat circuit diagram grounded load type V to I converter.

Marks

2. Attempt any <u>TWO</u> of the following : **16**

a) Draw a general layout of control room. Discuss any six ergonomic considerations of it.

b) State any eight features of SMART transmitter.

c) Construct a zener barrier circuit to make thermocouple intrinsically safe and explain it.

3. Attempt any <u>FOUR</u> of the following : **16**

a) List different process instruments used as feedback and final control element (four each)

b) Draw a block diagram of X-Y chart recorder.

c) Explain the documents needed to design the control panel.

d) Describe a single channel DAS with a neat diagram.

e) Explain working of Alarm Annunciator with a neat sketch.

4. a) **Attempt any <u>THREE</u> of the following :** **12**

(i) Describe the operational sequence of Alarm Annunciator.

(ii) Illustrate the calibration procedure of pressure transmitter.

(iii) Interpret the NEMA ratings –

(1) NEMA 12

(2) NEMA 67

(iv) Discuss the need of converters.

b) **Attempt any <u>ONE</u> of the following :** **6**

(i) Draw a block diagram of X-t chart recorder. Describe its working.

(ii) Draw and explain an architecture of foundation fieldbus.

Marks

5. Attempt any <u>TWO</u> of the following : **16**

a) Give classification of hazardous area locations.

b) Illustrate the design considerations of control panels. (Any Four)

c) Explain force balance pressure transmitter with neat sketch.

6. Attempt any <u>FOUR</u> of the following : **16**

a) List different types of process dynamics. Explain any one.

b) State different process characteristics. Define any two.

c) Describe working of I to V converter with a neat circuit.

d) Draw and explain flapper nozzle assembly.

e) Explain applications of data logger (Any four)

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