# 313330

**24225**

**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 answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) 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) Define :

i) Accuracy

ii) Sensitivity

b) Static Error can be both positive and negative. Justify the statement?

c) Draw the block diagram of Signal Generator.

d) State the function of amplifier as signal conditioner.

e) Define Degree of freedom of a robot.

f) List any four types of automation systems.

g) List advantages of Industrial Automation.

P.T.O.

**Marks**

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

a) Define deadzone. State the factors responsible for dead zone.

b) Explain the measurement of linear displacement with the help of suitable circuit.

c) Draw the block diagram of digital Storage Oscilloscope and list its any two advantages.

d) Draw the block diagram of Multichannel DAS and explain the functions of various blocks.

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

a) Compare Analog and digital instrument w.r.t. following points

i) Accuracy

ii) Response Time

iii) Data Storage

iv) Resolution

b) Describe how a rotary encoder is used to measure angle of rotating device with suitable diagram?

c) Outline the block diagram of Single channel DAS and explain significance of signal conditioning in it.

d) Compare Cartesian and Cylindrical robot w.r.t. following points:

i) Degree of freedom

ii) Construction

iii) End effectors used

iv) Application

**Marks**

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

a) Draw the block diagram of Digital Multimeter. Explain how resistance is measured using Digital Multimeter.

b) Identify the system used in industrial automation from the options given below and explain it with suitable diagram.

i) Building Management Systems (BMS)

ii) Supervisory Control and Data Acquisition (SCADA)

iii) Automated Transportation Systems

iv) Manual filing System

c) Compare fixed and flexible automation types (any four points).

d) Sketch the block diagram of Robotics system. Explain Drive system and control system.

e) Explain the need factory automation with example.

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

a) Draw the block diagram of function generator and explain how triangle wave is generated.

b) Draw the functional block diagram of DC signal conditioning unit. Explain the function of Filter and Isolator.

c) Mention four application area where automation is used and explain significance of automation in any one application area mentioned above.

**Marks**

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

a) Compare Single Channel DAS and Multichannel DAS w.r.t. following points :-

i) Number of input channel

ii) No. of signal conditioning circuit can be used

iii) Data acquisition Speed

iv) Synchronization

v) Redundancy

vi) Scalability

b) Construct spherical robot and explain degree of freedom of spherical robot.

c) Draw five layer industrial automation hierarchy model and explain field and supervisory level of industrial automation hierarchy model.