



# 17641

11718

3 Hours / 100 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) *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 :

20

- a) Explain the scan cycle for PLC.
- b) Write any four advantages of magnetic control.
- c) Explain the instruction 'Examine ON' and 'Examine Off' instruction w.r.t. PLC.
- d) List any four application of servomotor.
- e) Explain the function of push button, selector switch, limit switch, temperature switch in control circuit.
- f) Explain the role of input image table and output image table in PLC processor.
- g) Draw ladder diagram for AND and OR gate.

2. Attempt any two :

16

- a) Draw the power and control circuit diagram of current limit acceleration starter for slip ring induction motor and explain its working.
- b) Draw a neat labelled block diagram of PLC. Explain the function of each block.
- c) Explain the principle of dynamic braking of squirrel cage induction motor and draw power and control diagram for the same.

**P.T.O.**

**3. Attempt any four :****16**

- a) What is solenoid valve ? Explain it's working with the help of diagram.
- b) Draw power and control circuit for direct ON line starter for forward STOP and reverse operation of 3  $\phi$  IM.
- c) Differentiate between power and control wiring any four point.
- d) Describe the principle of integral control action. Write it's standard equation.
- e) Draw the typical AC input module for 8 input and also draw simplified AC input module circuit for one input terminal.
- f) Describe in detail the memory organisation list and explain types of memory.

**4. Attempt any four :****16**

- a) Draw star-delta starter control circuit for 3 phase induction motor using timer and explain its working.
- b) Compare integral controller with derivative controller.
- c) Draw ladder diagram for logic operation of (i) NOT (ii) EX-OR.
- d) Draw the block diagram of PLC power supply and explain function of each block.
- e) Draw and explain working of proportional integral.
- f) Explain proportional controller process control action.

**5. Attempt any two :****16**

- a) What do you mean by plug stopping of I.M. ? Draw power and control circuit for plugging a squirrel cage IM to STOP from either side using zero speed plugging switch and explain.
- b) Develop ladder for direct ON line starting of motor by wiring (i) NO STOP push button to PLC input (ii) NC STOP push button to PLC input. Which circuit will be more safe and why discuss.
- c) Draw the block diagram of AC discrete output module, draw simplified circuit for one terminal of an output module and explain.

**6. Attempt any four :****16**

- a) Explain working of integral controller.
  - b) Explain ON delay and Off delay timer of PLC.
  - c) Why derivative action is not used alone ?
  - d) Describe working of up/down counter.
  - e) Draw simple circuit of an electronic timer and discuss its principle of operation.
  - f) Explain ladder diagram for star-delta starter.
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