



17641

16172

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) *Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.*

Marks

1. Attempt any five :

20

- a) Draw the symbol and state the applications of
 - 1) Push button switch
 - 2) Selector switch
 - 3) Solenoid valve
 - 4) Limit switch
- b) Describe the operation of solid state relay.
- c) Draw power and control circuit for simple plugging of induction motor.
- d) Explain the working of inductive proximity sensor. State any two applications.
- e) Explain ON delay timer and OFF delay timer of PLC.
- f) Explain why derivative control action is not used alone.
- g) Explain the integral control action in detail.

2. Attempt any two :

16

- a) Describe the power and control circuit for automatic Star-Delta starter for 3-phase induction motor.
- b) Draw a neat labelled diagram of PLC. Explain the function of each block.
- c) Draw ladder diagram for two motor system having following condition.
 - 1) Starting push button, start motor-1.
 - 2) After 20 second, motor-2 is ON.
 - 3) Stopping the switch, stops motor 1 and 2.(Time base = 1 Sec.)

P.T.O.

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

- a) Describe the construction and working of AC servo motor.
- b) Draw the power and control circuit diagram for forward – stop – Reverse type DOL starter for 3 phase induction motor.
- c) Define opto-isolator. Explain the role of opto-isolator in PLC.
- d) Describe capacitive type proximity switch with neat diagram.
- e) Develop a ladder diagram for Direct On Line (DOL) starter.
- f) Explain the proportional control action in detail.

4. Attempt any four :**16**

- a) Explain the operation of pneumatic cylinder with neat diagram.
- b) Draw the power and control circuit for motors using autotransformer type starter.
- c) Explain the role of watch dog timer in programmable logic controller.
- d) List typical inputs and outputs for PLC (four input and any four output).
- e) Draw the ladder diagram for
 - 1) AND gate
 - 2) OR gate
- f) Describe the working of Proportional-Integral-Derivative (PID) controller.

5. Attempt any two :**16**

- a) Draw a ladder diagram for following condition.
 - i) Start push button starts motor M1 and motor M2.
 - ii) Stop push button stop motor M1 first and after 15 sec. motor M2.
- b) Draw and explain the power and control of circuit for current limit acceleration starter for slip ring induction motor.
- c) Explain how a Programmable Logic Controller (PLC) is different from an ordinary personal computer. Also write the advantages and disadvantages of PLC.

6. Attempt any four :**16**

- a) Explain working of pressure switch with suitable diagram. State the function of differential setting in pressure switch.
 - b) Describe the construction and working of DC servomotor.
 - c) Draw the block diagram for PLC power supply and explain the function of each block.
 - d) Draw labelled diagram for automatic star-delta starter.
 - e) Explain the offset in proportional controller.
 - f) Draw and explain working of (PI) Proportional-Integral controller.
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