



# 17641

21718

**3 Hours / 100 Marks**

Seat No.

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- 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**.*
  - (5) *Use of Non-programmable Electronic Pocket Calculator is **permissible**.*
  - (6) *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 concept of NO/NC contacts.
  - b) Define and draw the symbols of the following :
    - a) Selector switch
    - b) Limit switch
  - c) State difference between two wire and three wire control.
  - d) Explain AC servomotor and give its applications.
  - e) Draw and explain digital input module.
  - f) Give the advantages of PLC (any four).
  - g) Explain P-I controller in brief.
2. Attempt **any two** of the following : **16**
  - a) Draw and explain the power and control circuit diagram of forward-stop-reverse type DOL starter for 3- $\phi$  I.M.
  - b) Draw and explain the power and control circuit diagram of 3 phase induction motor using autotransformer type starters.
  - c) Draw and explain the block diagram of PLC.
3. Attempt **any four** of the following : **16**
  - a) Draw star/delta starter circuit for 3- $\phi$  I.M. semi automatic type 4 explain.
  - b) Draw the ladder diagram along with the truth table of EX-OR and OR gate.
  - c) Explain ON Delay timer operation.
  - d) Compare P + D and PI controller (any four points).
  - e) Explain with the block diagram the analog module in PLC.
  - f) Draw and explain the function of opto isolater.

**P.T.O.**



- 4. Attempt any two of the following :** **16**
- a) Explain in detail the up and down counter of PLC.
  - b) Develop ladder diagram for following sequence of operation :
    - i) When start button is ON, the system starts.
    - ii) Lamp L1 start when the system is ON.
    - iii) Lamp L2 starts 10 sec. after L1 is ON.
    - iv) When stop button is ON Lamp L1 and L2 are OFF.
  - c) Draw and explain power and control circuit for definite time limit starter for slip-ring induction motor.
- 5. Attempt any two of the following :** **16**
- a) Draw the block diagram of digital output module and explain its working.
  - b) Explain the working of derivative controller. And explain why derivate mode is not used alone.
  - c) i) Explain the OFF delay timer of PLC with neat diagram.  
ii) Draw the ladder diagram for (i) AND gate (ii) NOT gate.
- 6. Attempt any four of the following :** **16**
- a) List any four input and output of PLC.
  - b) Explain the offset in proportional controller.
  - c) Describe the operation of pneumatic cylinder.
  - d) Draw the ladder diagram for star delta starter.
  - e) Draw the block diagram of PID controller and explain its working.
  - f) Explain its working of solenoid valve with the help of neat diagram.
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