P.E.S. College of Engineering, Mandya - 571 401
(An Autonomous Institution affiliated to VTU, Belgaum)
Sixth Semester, B.E. – Electrical and Electronics Engineering
Semester End Examination; June/July - 2015
Programmable Logic Controller

Time: 3 hrs *Max. Marks: 100*

Note: *i) Answer any **FIVE** full questions, selecting atleast **TWO** full questions from each part.*
ii) Missing data may suitably assumed

PART-A

1 a.	What is PLC? Briefly explain the basic functional components of a PLC system with figure.	10
b.	Explain the following PLC I/O devices. i) Reed switch ii) Photoelectric sensors iii) Relay	10
2 a.	With diagrams explain the terms sourcing and sinking in a PLC system.	8
b.	Briefly explain the advantages and disadvantages of PLC.	6
c.	Explain the location of stop and emergency switches for safe operation of motors with necessary diagrams.	6
3 a.	What is ladder diagram? Explain the conventions adopted in drawing ladder diagram with an example.	10
b.	Write ladder diagram, functional block diagram and I/O timing diagram for OR and NOR logic.	6
c.	Draw the ladder diagram and functional block diagram for the given Boolean equation. $Y = A\bar{B} + \bar{A}B$	4
4 a.	Define sequential function charts (SFC) and structured text (ST). Part of the washing cycle of a domestic washing machine where the drum is to be filled with water and then when full, a heater has to be switched ON and remain ON until the temperature reaches the required level. Then the drum is to be rotated for a specific time. Draw the sequential function chart and ladder diagram for the above washing machine problem.	10
b.	Explain conditional statements and iteration statements used in structured text program with an example.	10

PART - B

5 a.	What are internal Relays? Illustrate the function of one-shot operation with an example.	10
b.	Write the importance of Master Control Relay (MCR) and explain with ladder diagram the master control relay.	10
6 a.	Devise a ladder diagram which can be used to maintain an o/p ON, even when the input ceases and when there is power failure. Explain the type of relay used.	10
b.	Name 3 different forms of timers. With timing diagram example ON-delay and pulse timers.	10

7 a. Show how a ON-delay timer can be used to produce on OFF – delay timer. With ladder diagram and timing diagram explain OFF – delay timer. 8

  b. Explain basic counter program with the help of ladder diagram and program instructions. 6

  c. Devise a ladder program for system that shows a red light when the count is less than 5 and a green light when it is equal to or greater than 5. 6

8 a. With ladder diagram explain 4-bit shift resister. 8

  b. What is drum sequencer? With timing diagram explain drum sequencer. 6

  c. Program the PLC to perform basic arithmetic operations. 6

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