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Question Paper Code: U9376S

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2024

Open elective

21UEE976 - INDUSTRIAL AUTOMATION AND CONTROL

(Common to All branches)

(Regulations 2021)

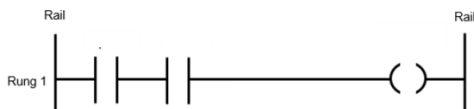
Duration: Three hours

Maximum: 100 Marks

Answer All Questions

PART A - (10 x 1 = 10 Marks)

1. The number of inputs in the following Ladder diagram is _____. CO1-U



- (a) 4 (b) 2 (c) 1 (d) 3
2. Using the state of an output device as input in the further stages of ladder logic program is called as _____. CO1 -U
- (a) Feedback (b) Latching (c) Breaking (d) Swapping
3. Which of the following is an active transducer? CO1 -U
- (a) LVDT (b) Potentiometer (c) RTD (d) Thermocouple
4. Resistive Temperature Detectors (RTD) have _____. CO1 -U
- (a) positive temperature coefficient (b) negative temperature coefficient
- (c) Zero temperature coefficient (d) None of these
5. In any computer-based measurement and control, the input of a computer has to be the output of _____. CO1 -U
- (a) Sensor (b) Controller
- (c) Analog to digital converter (d) Digital to analog converter

6. Digital computer control applications in the process industries that perform data acquisition/logging and also real time control are _____ applications. CO1 -U
- (a) Active (b) Passive (c) Hybrid (d) None of these
7. The main function of the CPU in a PLC is _____. CO1 -U
- (a) To provide power to the PLC
- (b) To store the program
- (c) To execute the program and control the input and output devices
- (d) To communicate with other PLCs
8. Role of PLC's communication interface is to _____. CO1 -U
- (a) communicate with other PLC
- (b) communicate with an HMI or SCADA system
- (c) communicate with other devices or system
- (d) All these
9. How does a DCS typically handle alarm management? CO1 -U
- (a) By ignoring minor alarms
- (b) By prioritizing and displaying alarms to operator
- (c) By storing alarms for later review
- (d) By automatically silencing all alarms
10. What role does a supervisory controller play in a DCS? CO1 -U
- (a) It controls individual devices
- (b) It coordinates the actions of multiple control loops
- (c) It monitors the health of the DCS network
- (d) It processes and archives historical data

PART – B (5 x 2= 10 Marks)

11. What is the role of PLC in industrial automation? State any two benefits of PLC in industrial automation. CO1 -U
12. State the principle of measurement of volumetric flowrate using Orifice plate. CO1 -U
13. What is Human Machine Interface? State its role in computer aided measurement and control. CO1 -U
14. Give an example of a process application for which PLC will be the best choice. Justify it. CO1 -U

15. List the DCS Supervisory Computer Tasks. CO1 -U
- PART – C (5 x 16= 80 Marks)
16. (a) Explain the role of PLC in industrial automation. Also explain the ladder logic programming of PLC with a simple example. CO1 -U (16)
- Or
- (b) With a neat sketch, explain the functional components of a typical SCADA and describe their role in detail. CO1 -U (16)
17. (a) Draw the structure of a typical control valve and explain its operation and various types of operation. CO1 -U (16)
- Or
- (b) Explain the working principle of induction type and optical type speed measurement sensors. CO1 -U (16)
18. (a) Give an example for a computer-based measurement and control system and explain its operation with the aid of neat block diagram. CO2 -App (16)
- Or
- (b) Explain in detail about Man-machine interface with necessary sketches. CO2 -App (16)
19. (a) Draw a ladder logic program and explain it in detail. List the advantages of Ladder logic program. CO1 -U (16)
- Or
- (b) Draw and explain the operation of a simple industrial mixer system and explain how it can be controlled using a PLC. CO1 -U (16)
20. (a) List the functional components of a DCS and explain their role in industrial automation. CO1 -U (16)
- Or
- (b) Give an example process that can be controlled using DCS and explain it. List the pros and cons of DCS in industrial automation. CO1 -U (16)

