GURU NANAK INSTITUTE OF TECHNOLOGY
An Autonomous Institute under MAKAUT
2021
PLANT AUTOMATION
EI801A

TIME ALLOTTED: 3 Hrs.　　　　　　　　　　　　　　　　**FULL MARKS:70**

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable

GROUP – A
(Multiple Choice Type Questions)

Answer any *ten* from the following, choosing the correct alternative of each question: **10×1=10**

		Marks	CO No

1. (i) SCADA systems encompass the transfer of data between a central host computer and a number of _____and/or programmable logic controllers (PLC) and the central host and the operator terminals　　**1**　　**CO1**
    a. Remote Terminal Units
    b. DCS
    c. Microcontroller
    d. I/O devices

   (ii) OSI/ISO model contains the uppermost layer as　　**1**　　**CO2**
    a. Physical
    b. Network
    c. Data
    d. Application

   (iii) POC(process operator console) is　　**1**　　**CO1**
    a. an interface between controller & final control element
    b. an interface between man & machine
    c. an interface between transmitter & controller
    d. an interface between I/O and controller

   (iv) Which type of isolator is generally used in I/O module of PLC?　　**1**　　**CO1**
    a. Electrical isolator
    b. Optiical isolator
    c. Magnetic isolator
    d. Electronic isolator

   (v) DCS consists of　　**1**　　**CO1**
    a. local controllers
    b. interconnected digital data link
    c. co-ordinating controller
    d. all the above

(vi)	Standard port number for secure MQTT is: a. 1883 b. 8000 c. 8883 d. 8888	1	CO3
(vii)	ISA 95 is the standard in industrial level for a. safety features b. manufacturing operations management tool c. wireless network protocol d. OS used in SCADA system	1	CO1
(viii)	Power plant involves _____ different fans of types a. two b. five c. three d. four	1	CO4
(ix)	Internet provides _____ for remote login a. telnet b. http c. ftp d. RPC	1	CO2
(x)	SCADA system performs a. Data Acquisitions b. Data Communication c. Monitoring/Control d. All of these	1	CO1
(xi)	Modbus messaging protocol is a. An application layer protocol b. An network layer protocol c. An data link layer protocol d. An transport layer protocol	1	CO2
(xii)	CSMA/CD protocol is used in case of a. Ring topology b. Star topology c. Bus topology d. None of these	1	CO2

GROUP – B
(Short Answer Type Questions)
Answer any *three* from the following: **3×5=15**

		Marks	CO No
2.	What do you mean by protocol? What are the key functions of data link layer?	5	CO2
3.	Draw and explain the basic essential blocks of a PLC based control system.	5	CO1
4.	Explain briefly the automation in power plant.	5	CO4

5.	What are the protocols used for IIOT? Explain.	5	CO3
6.	Describe the scheme of measurement system of dust concentration in stack in power plant.	5	CO4

GROUP – C
(Long Answer Type Questions)
Answer any *three* from the following: **3×15=45**

		Marks	**CO No.**
7.a)	Explain basic structure of DCS.	5	CO1
b)	Write down the difference between DCS & SCADA technology.	5	CO1
c)	Briefly explain 4 types of different protocols used to set up a common network in SCADA system.	5	CO1
8. a)	What is a Smart Sensor? Write down different components of smart sensor and briefly describe its working principle.	6	CO3
b)	What are the advantages of Smart Sensor?	3	CO3
c)	What is Wireless sensor Network? Explain basic components of WSN.	6	CO3
9. a)	a) What do you mean by a PLC based system? What are basic components of PLC based system. Explain.	6	CO1
b)	How PLC Reads the Data from Field Transmitters?	3	CO1
c)	Explain the basic components used in SCADA system.	6	CO1
10.a)	What is TCP/IP protocol?	1	CO2
b)	Describe different network topology & its advantages, disadvantages.	6	CO2
c)	Explain briefly the 7 layer architecture of ISO-OSI model	8	CO2
11.	Write short notes on any three of the following:	5x3=15	
a)	HMI		CO2
b)	HField bus		CO2
c)	Application of IIOT		CO3
d)	OPC & OLE standard		CO2
e)	MES		CO2