University of Mumbai

Examination 2020 under cluster RAIT

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: **Instrumentation Engineering**

Curriculum Scheme: Rev 2016

Examination: BE Semester VII

Course Code: ISC 703 and Course Name: Industrial Automation

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Automation Means
Option A:	A system manages, commands, directs, or regulates the behavior of other devices or systems using control loops.
Option B:	Microprocessor- or microcontroller-based system of hardware and software designed to perform dedicated functions within a larger mechanical or electrical system
Option C:	When most or all of the machines/processes run with little or no human control; to perform work without the aid of people.
Option D:	Embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet.
2.	Bottle filling plant is example of
Option A:	Batch Process
Option B:	Sequential Process
Option C:	Continues control
Option D:	Embedded system
3.	Level Transmitter should be connected to which module into PLC
Option A:	Analog Input
Option B:	Analog Output
Option C:	Digital Input
Option D:	Digital Output
4.	PLC was developed to replace
Option A:	Analog Controllers
Option B:	Relays
Option C:	DDC
Option D:	Supervisory control
5.	What is the maximum I/O count in Micro type of PLC
Option A:	16
Option B:	32
Option C:	64
Option D:	8

6.	Delta V is the model of
Option A:	PLC
Option B:	SCADA
Option C:	DCS
Option D:	Processor
7.	Which Automation tool has highest communication capability
Option A:	PLC
Option B:	DCS
Option C:	SCADA
Option D:	Robotic
8.	This is the type of software that organizations use to manage day-to-day business activities such as accounting, procurement, project management, risk management and compliance, and supply chain operations.
Option A:	MIS
Option B:	ERP
Option C:	Database
Option D:	Alarm Management
9.	This is a measure of safety system performance, or probability of failure on demand (PFD) for safety instrumentation system
Option A:	SIS
Option B:	SIL
Option C:	SIF
Option D:	PHA
10.	In discrete AC output modules _____ is used as a switching device to switch heavy loads.
Option A:	Power Transistor
Option B:	Diode
Option C:	Triac
Option D:	SCR
11.	An optical isolator is used _____
Option A:	to process the digital signal to the processor.
Option B:	to provide isolation between the HMI and network switch
Option C:	to provide isolation between the I/O module and PLC memory
Option D:	to provide electrical isolation between the field wiring and the PLC backplane internal circuitry.
12.	In a TON timer if the instructions preceding it on the rung are true and if accumulator value is greater than preset then the status bits are
Option A:	EN = 0, TT = 1, DN = 1
Option B:	EN = 1, TT = 0, DN = 1
Option C:	EN = 1, TT = 0, DN = 0
Option D:	EN = 1, TT = 1, DN = 1
13.	SCADA systems encompass the transfer of data between a central host computer and a number of _____, and the central host and the operator terminals.

Option A:	Routers
Option B:	Remote operator stations
Option C:	Remote terminal units
Option D:	Input Output Modules
14.	How many number of maximum RTU's can be connected with a single MTU in SCADA system?
Option A:	254
Option B:	225
Option C:	252
Option D:	258
15.	What is the correct order of various phases in alarm management lifecycle.
Option A:	1. Philosophy 2. Identification 3. Rationalization 4. Detailed Design 5. Implementation
Option B:	1. Philosophy 2. Implementation 3. Detailed Design 4. Rationalization 5. Identification
Option C:	1. Identification 2. Philosophy 3. Detailed Design 4. Rationalization 5. Implementation
Option D:	1. Philosophy 2. Identification 3. Detailed Design 4. Implementation 5. Rationalization
16.	Alarm shelving _____
Option A:	minimizes the risk that operators will respond slowly or incorrectly during an alarm flood,
Option B:	enables the operator to access Alarm Help with a single mouse-click to view presupplied alarm response instructions
Option C:	is intended to temporarily hide alarms that the operator feels are irrelevant or distracting, thus enabling them to maintain focus on alarms that require their attention.
Option D:	to Custom alarm and alert lists to match the needs of the operator or other specialized operations
17.	The engineering analysis of alarm set points be coordinated with-
Option A:	HAZOP studies
Option B:	SIL studies
Option C:	LOPA studies
Option D:	PID studies
18.	A SIS is composed of any combination of …….for the purpose of taking a process to a safe state when predetermined conditions are violated.
Option A:	sensors and final control elements
Option B:	logic solvers and final control elements
Option C:	sensors and logic solvers
Option D:	sensors, logic solvers and final control elements
19.	As the SIL level increases-
Option A:	The cost and complexity of the system increase.
Option B:	The cost and complexity of the system decrease
Option C:	Only the cost of the system increase
Option D:	Only the complexity of the system decreases

20.	To trigger the counting action, counters usually use
Option A:	Low to High transition from an Input
Option B:	High to Low transmission from an input
Option C:	Low to high transition from Done bit
Option D:	High to Low transition from output

Subjective/descriptive questions

Q2	**Solve any Two Questions out of Three. (10 Marks Each)**
A.	What do you understand by automaton & explain the benefits of automation.
B.	Explain sinking and sourcing output modules of PLC with neat diagram
C.	Write short note on alarm lifecycle model.
Q3	**Solve any Two Questions out of Three. (10 Marks Each)**
A.	What are DCS displays? Explain any 2 in detail.
B.	What is scan interval of SCADA? Give the factors that affect scan interval.
C.	Explain how SIS is developed using safety life cycle approach

NOTE: 3 option given below for subjective/descriptive questions

Option 1

Q2 and Q3. **(20 Marks Each)**	**Solve any Four out of Six**	**5 marks each**
A		
B		
C		
D		
E		
F		

Option 2

Q2 and Q3. **(20 Marks Each)**	**Solve any Two Questions out of Three**	**10 marks each**
A		
B		
C		

Option 3

Q2 and Q3. **(20 Marks Each)**		
A	**Solve any Two**	**5 marks each**
i.		
ii.		
iii.		
B	**Solve any One** **each**	**10 marks**
i.		
ii.		