University of Mumbai
Examination 2020

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **Electronics Engineering**

Curriculum Scheme: **Rev2016**

Examination: **BE Semester VII**

Course Code: **ELX 701** and Course Name: **Instrumentation System Design**

Time: 2 hour Max. Marks: 80

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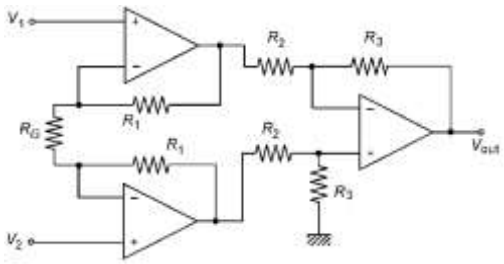
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Which of the following can be the output of PLC? 1. Relay coils 2. Solenoids 3. Indicators 4. Motors 5. Lamps 6. Alarms
Option A:	Only (1), (2), (3) and (4)
Option B:	Only (3), (4), (5) and (6)
Option C:	Only (1), (2), (3) and (5)
Option D:	All the (1), (2), (3), (4), (5), and (6)
2.	DCS is a _____
Option A:	Distributed Control System
Option B:	Data Control System
Option C:	Data Column System
Option D:	Distributed Column System
3.	Given a DC voltmeter has a sensitivity of 500ohm/V. For a full scale reading in 100V range, what will be the current through voltmeter?
Option A:	500mA
Option B:	200mA
Option C:	250mA
Option D:	300mA
4.	The voltage gain magnitude of all-pass filter is
Option A:	Zero
Option B:	One
Option C:	Infinity
Option D:	hundred
5.	Why starters are required in a DC motor?
Option A:	Back emf of these motors is zero initially
Option B:	These motors are not self-starting
Option C:	These motors have high starting torque
Option D:	To restrict armature current as there is no back emf at starting

6.	The control in SCADA is _____
Option A:	Online control
Option B:	Direct control
Option C:	Supervisory control
Option D:	Automatic control
7.	In a measurement, what is the term used to specify the closeness of two or more measurements?
Option A:	Precision
Option B:	Accuracy
Option C:	Fidelity
Option D:	Threshold
8.	What do the high pass filters generally comprise of? 1. Capacitive series arm 2. Capacitive shunt arm 3. Inductive series arm 4. Inductive shunt arm
Option A:	1 & 4
Option B:	1 & 3
Option C:	2 & 3
Option D:	2 & 4
9.	How many levels are present in a complex SCADA system?
Option A:	3 – levels
Option B:	5 – levels
Option C:	4 – levels
Option D:	6 – levels
10.	How is the noise immunity of PLCs to electrical noises as compared to that of conventional relay controllers?
Option A:	poor
Option B:	excellent
Option C:	as good as noise immunity of conventional relay controllers
Option D:	unpredictable
11.	Which of the following is used for centralized network databases?
Option A:	RAID 2
Option B:	RAID 5
Option C:	RAID 1
Option D:	RAID 2
12.	Four-point starter is used when _____
Option A:	Motor field current is varied in narrow range
Option B:	Motor speed is varied in small range
Option C:	Motor field current is varied over wide range
Option D:	Can be used anywhere
13.	Use _____ within the LabVIEW environment to see a quick description of any object on the block diagram or front panel.

Option A:	NI Example Finder
Option B:	LabVIEW Manual
Option C:	LabVIEW Context Help
Option D:	LabVIEW Detailed Help
14.	A stepping motor is a _____ device.
Option A:	Mechanical
Option B:	Electrical
Option C:	Analogue
Option D:	Incremental
15.	Due to presence of a capacitor in feedback path, the output of an integrator varies _____
Option A:	Gradually
Option B:	Instantaneously
Option C:	Intermittently
Option D:	All of the above
16.	Check valve is a type of
Option A:	pressure reducing valve
Option B:	pressure relief valve
Option C:	directional control valve
Option D:	Flow control valve
17.	Which of the following statements is correct?
Option A:	Ladder logic is a PLC graphical programming technique introduced in the last 10 years.
Option B:	A ladder logic program is hard to analyze because it is totally different when compared with the equivalent relay logic solution.
Option C:	The number of ladder logic virtual relays and input and output instructions is limited only by memory size
Option D:	Which of the following statements is correct?
18.	_____ may employ one or more workstations and can be configured at the workstation or by an off-line personal computer.
Option A:	Router
Option B:	RTU
Option C:	Gateway
Option D:	DCS
19.	What is the difference between pressure relief valve and pressure reducing valve?
Option A:	pressure reducing valve is connected between pump and tank line while pressure relief valve is connected between DCV and branch circuit
Option B:	pressure relief valve is always normally opened
Option C:	pressure reducing valve is connected between DCV and branch circuit while pressure relief valve is connected between pump and tank
Option D:	pressure relief valve is always normally closed
20.	As the frequency increases, input impedance of differentiator _____
Option A:	Increases

Option B:	Decreases
Option C:	Remains constant
Option D:	Becomes infinite

Q2 (20 Marks)	**Solve any Four out of six 5 marks each**
A	Consider the instrumentation amplifier shown in figure below. Derive the expression for V_{out} and compute the resistors for the gain of 101. 
B	What are the criteria for selecting controller mode for a given process? Describe the ratio controller with clearly specifying the types of processes for which it is used.
C	Distinguish between linear valve and equal percentage valve.
D	Draw circuit diagram of a basic RC band-pass filter. Sketch its frequency response clearly showing the expressions for cut-off frequencies
E	Describe any two discontinuous controller modes.
F	What are two PLC operation modes? Describe both modes in brief.

Q3. (20 Marks)	**Solve any Two Questions out of Three 10 marks each**
A	Write a short note on SCADA.
B	Illustrate the working of V-to-I and I-to-V converters with neat circuit diagrams.
C	List any five SAMA symbols. Draw clear symbol with brief description.