Name:

Enrolment No:

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UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2020

Course: Telemetry & SCADA system **Semester: III**
Program: M.Tech. PLE **Time 03 hrs.**
Course Code: CHPL 8003 **Max. Marks: 100**

Instructions: 1. Attempt Section A by typing in your answers in the relevant text box
2. Attempt section B and Section C on A4 size blank sheets.
3. Answer should be neat and clean. Draw a free hand sketch for circuits/tables/schematics wherever required.

SECTION A [Type the answer] 30 Marks

S. No.		Marks	CO
Q1	What is the significance of **trending** in a SCADA system?	**5**	**CO1**
Q2	Elucidate the significance of **PLC** in SCADA.	**5**	**CO1**
Q3	Explain the term: **external leak detection**.	**5**	**CO1**
Q4	Explain the significance of **telemetry** in pipeline monitoring.	**5**	**CO3**
Q5	Comment on **ASM (Abnormal Situation Management)** design of HMIs.	**5**	**CO1**
Q6	What are the impacts of **Internet of Things** on SCADA system.	**5**	**CO3**
	SECTION B [Scan and upload] 50 Marks		
Q7	Highlight the differences between **IoT**, **SCADA** and **DCS**	**10**	**CO3**
Q8	Develop a **ladder logic** program to implement the following Boolean logic: $y = A.B + \bar{A}.B.C + \bar{B}.C$	**10**	**CO2**
Q9	An indicating light is to go ON when a count reaches 15. The light is then go off when the count reaches a value of 25. Design a PLC **ladder logic** program for this process	**10**	**CO2**
Q10	PLC has numerous advantages over Relay logic, one of them is availability of **timers**. Explain with the help of example working of **TON timer**.	**10**	**CO2**
Q11	An inherent feature of SCADA is efficient leak detection. Differentiate between internal and external leak detection methods. Explain any **external leak detection** method with working principle, advantages and limitations.	**10**	**CO1**
	SECTION C [Scan and upload] 20 Marks		
Q12	Describe a recent **SCADA attack**. Identify the key vulnerable points for the exploited by the attacker. Suggest security measures to prevent the attack. **OR** Design a PLC **ladder diagram** to construct an alarm system which operates as follows a) If one level sensor is high nothing happens b) If any two level sensors are high, a red light goes ON c) If any three level sensors are high, an alarm sirens sound and a discharge pump is switched ON. d) The discharge pump shall remain on until only one level sensor remains high.	**20**	**CO2**