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Question Paper Code: U7702S

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

Seventh Semester

Mechanical Engineering

21UME702 - MECHATRONICS AND IOT

(Regulations 2021)

Duration: Three hours Maximum: 100 Marks

PART A - (10 x 1 = 10 Marks)

1. Material used in K Type Thermocouple are CO2-App

   (a) Chromel/aluminum (b) Iron / Constantan

   (c) Chromel/Constantan (d) Copper / Constantan

2. Thermocouple works on which Principle? CO1-U

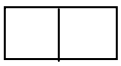
   (a) Peltier Effect (b) First Law of Thermodynamics

   (c) None (d) See beck Effect

3. Which element is used to converts hydraulic power into Mechanical Power? CO1-U

   (a) Compressor (b) Pump (c) Actuator (d) Convertors

4. Which symbol denotes a switching position of valves? CO1-U

   (a)  (b)  (c)  (d) 

5. Which language is a typical Arduino code based on CO1-U

   (a) Assembly Code (b) Python (c) Java (d) C/C++

6. What is the full form of EEPROM in computer CO1-U

   (a) Electrically Encoded Programmable Read Only Memory

   (b) Encrypted Electronic Programmable Read Only Memory

   (c) Electrically Erasable Programmable Read Only Memory

   (d) Electronic Embedded Programmable Read Only Memory

7. The PLC is used in _____. CO1-U

(a) Machine tools (b) automated assembly equipment

(c) Moulding and extrusion machines (d) all of the above

8. The acronym PLC stands for: CO1-U

(a) Pressure Load Control

(b) Programmable Logic Controller

(c) Pneumatic Logic Capstan

(d) Pressure Loss Chamber

9. Which is the first aspect which needs to be considered in the Mechatronics design process? CO1-U

(a) Hardware integration and simulation (b) Conceptual design

(c) Mathematical modeling (d) Modeling and simulation

10. Select a suitable sensor that used in an engine management system to CO2 -App

(a) Oxygen sensor (b) Temperature sensor

(c) Speed sensor (d) Hall effect sensor

PART – B (5 x 2= 10Marks)

11. Summarize the Emerging Areas of Mechatronics field. CO1 -U

12. Illustrate stepper motor & Specify its types. CO2 -App

13. Identify an example of a sensor commonly used with Arduino. CO1 -U

14. Outline the Block diagram of PLC. CO1 -U

15. Outline the function of Oxygen sensor in Engine Management system. CO2 -App

PART – C (5 x 16= 80Marks)

16. (a) Implement the building blocks and various modules of a Mechatronic system in a practical application. CO2 -App (16)

Or

(b) Apply the open loop and closed loop control systems in any real-world example for each and explain its operation in these scenarios. CO2 -App (16)

17.	(a)	Compare the 8085 microprocessor and the 8051 microcontroller, highlighting their differences and similarities.	CO2 -App	(16)
		Or		
	(b)	Develop a program to interface with an ADC using the 8255 PPI and explain its working.	CO2 -App	(16)
18.	(a)	Distinguish between a microcontroller and a microprocessor in the context of Arduino Uno.	CO3 -App	(16)
		Or		
	(b)	Choose the role of accessories like sensors, motors (Stepper, Servo, DC), and the breadboard in Arduino prototyping.	CO3 -App	(16)
19.	(a)	Construct the architecture of PLC to control an automated processes & explain the function of each component of PLC	CO2 -App	(16)
		Or		
	(b)	Develop a PLC ladder logic diagram for the application stated below. There are three mixing devices on a processing line A, B, C after the process begins. Mixer A is to start, after 7 sec is elapsed, next Mixer B is to start, 3.6 sec after A. Mixer C is to start 5sec after B all remains ON until a Master enable switch is turned OFF.	CO4 -App	(16)
20.	(a)	Organize a mechatronics system design like a Fuel Flow Metering and Control System.	CO2 -App	(16)
		Or		
	(b)	Investigate a conceptual framework for a pick-and-place robot and analyze to a traditional robotic design methodology by how each stage incorporates Mechatronics principles.	CO5 -App	(16)