USN 1 RV 21 AI 084

RV COLLEGE OF ENGINEERING®

(An Autonomous Institution Affiliated to VTU)

III Semester B. E. Examinations April/May-2023

Artificial Intelligence and Machine Learning

FOUNDATIONS OF CYBER PHYSICAL SYSTEM

Time: 03 Hours *Maximum Marks: 100*

Instructions to candidates:

1. Answer all questions from Part A. Part A questions should be answered in first three pages of the answer book only.
2. Answer FIVE full questions from Part B. In Part B question number 2 is compulsory. Answer any one full question from 3 and 4, 5 and 6, 7 and 8, 9 and 10.

PART-A

1	1.1	How registers are useful in a processor?	01
	1.2	Data Management Module is a bridge between and	01
	1.3	What is Firmware?	01
	1.4	is the fastest form of *RAM* available.	01
	1.5	Write the significance of Decision Support System in *CPS* applications.	01
	1.6	List the key requirements of the environmental *CPS*.	02
	1.7	Define a System Bus.	01
	1.8	Static *RAM* (*SRAM*) uses to hold information.	01
	1.9	How Smart Sensors are different from Sensors?	01
	1.10	Differentiate memory mapped *IO* and port *IO*.	01
	1.11	How data is erased from the Erasable Programmable Read-Only Memory (*EPROM*)?	01
	1.12	What are the common short-range communication technologies used in Smart Homes?	01
	1.13	List the advantages of Compressive Sensing.	01
	1.14	Write the examples for parallel architectures.	01
	1.15	List the application classification of Cognitive Radio Sensing Networks.	01
	1.16	Highlight the primary design considerations of WSNs.	02
	1.17	Name the *CPU* used by the Stero Vision Tracking Systems.	01
	1.18	Give the example for low-speed serial communication used in Embedded Systems.	01

PART-B

2	a	Discuss three-tier Cyber Physical System (*CPS*) architecture and advance *CPS* architecture in detail.	08
	b	Illustrate the conceptual overview of the Health and Medical Sciences *CPS*.	08
3	a	Compare Desktop, Complex Embedded and Simple Embedded software layers.	08
	b	Summarize parallel architectures by highlighting the salient features.	08

OR

4	a	Differentiate VonNeumann machine architecture and Harvard architecture.	08
	b	Describe embedded computer architecture in detail.	08
5	a	List and discuss various sub-systems in Stereovision Tracking System.	08
	b	Compare *VME* and *PCI* 2.*x* buses.	08
		OR	
6	a	Discuss the hardware components used in Stereovision Tracking System.	08
	b	With a neat sketch, discuss the memory sub-system.	08
7	a	Discuss *OODA* architecture by considering agriculture *CPS*.	08
	b	Summarize the characteristics and applications of Cognitive Radios (*CR*). Also analyze how *CR's* are useful in smart cities.	08
		OR	
8	a	Discuss the sensor classification in *CPS*.	08
	b	Compare Mobile Ad-hoc Networks, Mobile Sensing Network and *CPS*.	08
9	a	Illustrate a Teleoperated and Fully Autonomous Robotic Task Control Loops.	08
	b	Discuss the structure of the Planar *LED* along with the applications.	08
		OR	
10	a	Illustrate Electrostatic Actuators by considering Electrostatic Stepper Motor.	08
	b	Summarize the concept of Basic Feedback Control Arm Positioning in a Robotic System.	08