Register Number:……..

KUMARAGURU college of technology
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B.E DEGREE EXAMINATIONS: NOV/DEC 2022

(Regulation 2018)

Fifth & Seventh Semester

MECHATRONICS ENGINEERING

U18MCR0003**:** Mechatronics in 3D Printing

COURSE OUTCOMES

CO1: Understand the fundamentals of mechatronics and its importance in 3D Printing
CO2: Describe the operating principles of 3D Printing actuators and Controllers
CO3: Describe the mechanical components in 3D Printing
CO4: Explain the different sensors used in 3D Printing
CO5: Classify the communication protocols.

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	Define the term mechatronics system.	CO1	[K_2]
2.	Compare repeatability and accuracy.	CO1	[K_2]
3.	List any three types of stepper motor.	CO2	[K_2]
4.	State the working principle of servo motor.	CO2	[K_2]
5.	What is the function of guideways?	CO3	[K_2]
6.	List any three types of bearings.	CO3	[K_2]
7.	Summarize the importance of bed leveling sensor.	CO4	[K_2]
8.	List any three types of temperature sensors.	CO4	[K_2]
9.	Define the term communication Protocol.	CO5	[K_2]
10.	Compare RS232 and RS485.	CO5	[K_2]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	Explain and sketch the various components of the mechatronics system with an example.	10	CO1	[K_2]
	b)	Discuss the three pillars of 3D Printing.	6	CO1	[K_2]
12.	a)	Explain the different types of stepper motors and their drive modes.	8	CO2	[K_3]

	b)	Describe the servomotor components and advantages of AC & DC servomotors.	8	CO2	[K_2]
13.	a)	Explain the principle and working of various proximity sensors used in 3D Printing.	8	CO4	[K_2]
	b)	Describe the working of encoders with a neat sketch.	8	CO4	[K_2]
14.	a)	Compare the features of RTD, Thermistor, and Thermocouple.	8	CO4	[K_2]
	b)	List the various types of bearings and mention their advantages.	8	CO3	[K_2]
15.	a)	Explain the functions of gears and list their types.	8	CO3	[K_2]
	b)	Compare the functions of lead screws and timing belt.	8	CO3	[K_2]
16.	a)	Illustrate the OSI model with a neat sketch and explain each layer with hierarchy levels.	8	CO5	[K_2]
	b)	Extend the special features of MODBUS protocol and its usage in industrial automation.	8	CO5	[K_2]

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