

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR (AUTONOMOUS)**

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**QUESTION BANK (DESCRIPTIVE)****Subject with Code:** Mechatronics & Robotics (19ME0337)**Course & Branch:** B.Tech & ME**Year & Sem:** IV & I**Regulation:** R19**UNIT I**

1		Define Mechatronics with elaborate definition. And give examples of mechatronics system.	[L1][CO1]	[12M]
2		Explain the various components in mechatronics system with neat sketch.	[L3][CO1]	[12M]
3	(a)	What is evaluation of mechatronics?	[L1][CO1]	[6M]
	(b)	List the various benefits and applications of mechatronics.	[L3][CO1]	[6M]
4	(a)	Define control system. Explain about control systems.	[L1][CO1]	[6M]
	(b)	Explain the open loop control system with neat sketch in detail.	[L3][CO1]	[6M]
5	(a)	Describe the closed loop control system with neat sketch.	[L3][CO1]	[6M]
	(b)	Differentiate between GPOS and RTOS.	[L1][CO1]	[6M]
6	(a)	How does a GUI work? And what are the benefits of GUI?	[L2][CO1]	[6M]
	(b)	List out components of real time operating system and explain them.	[L1][CO1]	[6M]
7		List out the displacement transducers. Explain with neat sketch any one of displacement transducer	[L3][CO1]	[12M]
8	(a)	Explain the functions of a strain gauge element with neat sketch.	[L3][CO1]	[6M]
	(b)	Describe pneumatic sensor with neat sketch.	[L3][CO1]	[6M]
9		List out thermal expansion methods and describe electrical resistance sensor of RTD with neat sketch.	[L1][CO1]	[12M]
10	(a)	What are the basic methods of force measurement? Elaborate elastic force devices with neat sketch.	[L1][CO1]	[6M]
	(b)	Discuss the selection criteria for sensor.	[L3][CO1]	[6M]

**UNIT II**

1		Define actuator. Actuators plays a primary role in mechatronics system explains it.	[L4][CO2]	[12M]
2		Illustrate the characteristics of actuator.	[L4][CO2]	[12M]
3	(a)	How do you classify the actuation system? Draw actuation system functional diagram?	[L3][CO2]	[6M]
	(b)	Mention the limitations of actuators.	[L5][CO2]	[6M]
4	(a)	Elaborate components of an hydraulic system with neat sketch.	[L3][CO2]	[6M]
	(b)	Describe the basic components of pneumatic system with neat diagram.	[L2][CO2]	[6M]
5	(a)	What are the mechanical actuation system functions?	[L1][CO2]	[6M]
	(b)	Describe working of timing belt. What happens if the timing belt breaks.	[L3][CO2]	[6M]
6	(a)	Explain signal conditioning? Categorize the various processes occur in signal conditioning.	[L3][CO2]	[6M]

	(b)	Write about electrical actuation system.	[L1][CO2]	[6M]
7	(a)	Write the function of resistors and draw symbol of fixed resistor with ANSI standard?	[L1][CO2]	[6M]
	(b)	Show protection circuit and explain it with few features.	[L4][CO2]	[6M]
8	(a)	How does work capacitor? With capacitor basic configuration?	[L2][CO2]	[6M]
	(b)	What is filter? Classify the filters in detail.	[L1][CO2]	[6M]
9		Explain analog to digital converter and digital to analog converter with neat diagrams.	[L3][CO2]	[12M]
10	(a)	What is coupling? Classify the couplings in detail.	[L2][CO2]	[6M]
	(b)	What is the function of protection scheme? Describe working principle of circuit breaker with neat sketch.	[L3][CO2]	[6M]

**UNIT III**

1	(a)	How does micro controller work?	[L2][CO3]	[6M]
	(b)	What are the elements of a microcontroller?	[L1][CO3]	[6M]
2		What are the supporting elements include in microcontrollers with block diagram?	[L3][CO3]	[12M]
3		Describe the different types of memory commonly available on a Microcontroller.	[L2][CO3]	[12M]
4		How does a programmable logic controller work? Draw basic structure of PLC and explain it.	[L3][CO3]	[12M]
5	(a)	Which type microcontroller is most commonly used? Discuss architecture of 8051 Microcontroller.	[L4][CO3]	[6M]
	(b)	What are the applications of 8051 microcontroller? List out the various functional blocks of 8051 micro-controller.	[L3][CO3]	[6M]
6	(a)	What aspects should be considered for the selection of a PLC for the application?	[L3][CO3]	[6M]
	(b)	Draw flip flop shift register and explain it.	[L3][CO3]	[6M]
7	(a)	Classify robots based on the configurations with neat diagrams.	[L3][CO4]	[6M]
	(b)	What is the role of robots in loading and unloading, discuss in detail?	[L2][CO4]	[6M]
8		Define robot. With neat sketch explain the robot anatomy.	[L3][CO4]	[12M]
9		List the different types of joints used in robots with neat sketch.	[L3][CO4]	[12M]
10	(a)	What is degree of freedom? Briefly explain it.	[L1][CO4]	[6M]
	(b)	Describe the factors to be considered in the design of grippers.	[L2][CO4]	[6M]

**UNIT IV**

1		With help of a suitable example, explain the operators: (a) Translation (b) Rotation (c) Transformation	[L2][CO5]	[12M]
2		Clearly explain with neat sketches the manipulator kinematics.	[L3][CO5]	[12M]
3		Briefly explain the D-H notation joint coordinates with diagram.	[L3][CO5]	[12M]
4		Write short notes on following: (a) Forward transformation (b) Reverse transformation	[L2][CO5]	[12M]
5		Differentiate between newton-Euler and Euler –Lagrangian formulations in find the dynamic equations of motion.	[L1][CO5]	[12M]
6		What is path planning? Explain the need for path planning.	[L1][CO5]	[12M]

7		Explain the steps involved in trajectory planning.	[L3][CO5]	[12M]
8		Explain path planning and avoidance of obstacles in robotics.	[L1][CO5]	[12M]
9		Define the following terms of trajectory planning (i) Trajectory (ii) Spline (iii) Joint space scheme (iv) Cartesian space scheme.	[L2][CO5]	[12M]
10		Illustrate straight line motion with neat sketch.	[L3][CO5]	[12M]

**UNIT V**

1		Explain detail manual lead through programming method in robot application.	[L3][CO6]	[12M]
2		Classify various programming languages used in computer controlled robots.	[L2][CO6]	[12M]
3		Write about robot software packages.	[L3][CO6]	[12M]
4		Define Robot program. What is the purpose of it and what are the various methods used for programming robots?	[L1][CO6]	[12M]
5		Illustrate the installation steps of robot programming.	[L2][CO6]	[12M]
6		Discuss the various applications of robot.	[L3][CO5]	[12M]
7		Briefly explain the use of robot in manufacturing.	[L2][CO5]	[12M]
8		Illustrate the robot application in assembly and Inspection.	[L2][CO5]	[12M]
9		Explain the various applications of robot in spot and continuous arc welding.	[L1][CO5]	[12M]
10		Illustrate the robot application in material transfer.	[L1][CO5]	[12M]

*Prepared By: Dr. P. RAMESH*