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INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous) Dundigal, Hyderabad-500043

MECHANICAL ENGINEERING

TUTORIAL QUESTION BANK

Course Title	INSTRU	INSTRUMENTATION AND CONTROL SYSTEMS					
Course Code	AME019	AME019					
Programme	B. Tech.	B. Tech.					
Semester	VII N	VII ME					
Course Type	Core						
Regulation	IARE - I	R16					
			Theory		Practio	cal	
Course Structure	Lecture	es	Tutorials	Credits	Laboratory	Credits	
	3		1	4	2	1	
Chief Coordinator	Mr. M V	Adit	tya Nag, Assista	ant Professor, N	И Е		
Course Faculty		Dr. Paidi Raghavulu, Professor, ME Mr. M V Aditya Nag, Assistant Professor, ME					

COURSE OBJECTIVES:

The co	ourse should enable the students to:
I	Visualize the concepts of measurement and dynamic performance characteristics of measuring instruments.
II	Understand the measurement of typical physical quantities like displacement, temperature, pressure.
III	Applying techniques for measurement of Level, Flow, Speed, Acceleration and Vibration.
IV	Visualize the measurement of Stress, Strain, Humidity, Force, Torque and Power.
V	Understand the control systems for instrumentation and develop Temperature, Speed and Position control systems.

COURSE OUTCOMES (COs):

CO 1	Ability to describe the static and dynamic characteristics, identify functional elements of generalized
	measuring system and error control.
CO 2	Ability to analyze and design the measuring system for the measurement of displacement,
	temperature and Pressure
CO 3	Ability to analyze and design the measuring system for the measurement of Flow and liquid level.
CO 4	Ability to analyze and design the measuring system for the measurement of stress, strain, humidity,
	force and torque.
CO 5	Ability to analyze & design the control system for control of position, temperature, acceleration &
	process control.

COURSE LEARNING OUTCOMES (CLOs):

AME019.01	Understand the basic principles and measurement system.
AME019.02	Comprehend generalized configuration and functional description of measuring instruments.
AME019.03	Visualize static and dynamic performance characteristics.
AME019.04	Understand the sources of various errors and its elimination.
AME019.05	Apply the working principles and identify the measurands for displacement.
AME019.06	Evaluate temperature measuring methods in various equipments.
AME019.07	Understand the fluid pressure, its importance and measurement techniques.
AME019.08	Comprehend the level measuring devices for ascertaining liquid level.
AME019.09	Visualize the importance of flow measurement and know various flow measuring devices
AME019.10	Evaluate the measurement of speed in engineering applications and importance of speed measurement in instrumentation.
AME019.11	Comprehend the importance of acceleration and vibration measurement with various techniques.
AME019.12	Visualize the stress and strain experienced by various elements and understand the importance of strain measurement with various techniques.
AME019.13	Understand the concept of humidity in atmosphere as well as the storage applications and maintenance of humidity by measurement.
AME019.14	Apply the basic principles of instrumentation for force measurement in various fields of engineering.
AME019.15	Apply the basic principles and characteristics for torque measurement.
AME019.16	Comprehend the instrumentation techniques in solving the engineering measuring applications of torque and power.
AME019.17	Understand the control systems for instrumentation in various practical applications.
AME019.18	Classify the control systems, advantages, limitations and control system terminology.
AME019.19	Comprehend servo mechanism, process control and regulators for process and position control.
AME019.20	Apply control system for control of position, temperature and acceleration.

TUTORIAL QUESTION BANK

UNIT- I PRINCIPLES OF MEASUREMENT						
Part - A (Short Answer Questions)						
S No	QUESTIONS	Blooms Taxonomy Level	Course Outcomes	Course Learning Outcomes (CLOs)		
1	What is meant by measurement?	Remember	CO 1	AME019.01		
2	State the two conditions to be satisfied for the result of measurement to be meaningful.	Understand	CO 1	AME019.0		
3	Give two examples for primary measurement.	Understand	CO 1	AME019.0		
4	What is secondary measurement?	Understand	CO 1	AME019.0		
5	What is a primary sensing element?	Understand	CO 1	AME019.0		
6	Define the term 'STANDARD'.	Remember	CO 1	AME019.0		
7	Define a measuring instrument.	Remember	CO 1	AME019.0		
8	What is null type instrument?	Remember	CO 1	AME019.0		
9	What are analog and digital instruments?	Remember	CO 1	AME019.0		
10	Give examples for automated and manually operated instruments.	Remember	CO 1	AME019.0		
11	Give two examples for non-contacting instruments.	Understand	CO 1	AME019.0		
12	What are intelligent instruments?	Remember	CO 1	AME019.0		
13	Differentiate the terms 'accuracy' and 'precision'.	Remember	CO 1	AME019.0		
14	Define the term calibration.	Understand	CO 1	AME019.0		
15	Why instruments are to be calibrated?	Remember	CO 1	AME019.0		
16	What is meant by primary calibration?	Remember	CO 1	AME019.0		
17	What is secondary calibration?	Remember	CO 1	AME019.0		
18	What are mechanical instruments?	Remember	CO 1	AME019.0		
19	List two deflection type instruments.	Understand	CO 1	AME019.0		
20	What is a power operated instrument?	Understand	CO 1	AME019.0		
	Part - B (Long Answer Questions)					
1	Classify the methods of measurement. Explain each one of them in detail considering their applications and limitations.	Remember	CO 1	AME019.0		
2	Draw the block diagram of a generalized measurement system and explain its various elements.	Remember	CO 1	AME019.0		
3	With the help of an example, explain the generalized measurement system.	Understand	CO 1	AME019.0		
4	Broadly classify the measuring instruments and explain the applications of measuring instruments in detail.	Understand	CO 1	AME019.0		
5	List the various types of measuring instruments and explain each one of them.	Understand	CO 1	AME019.0		
6	What are the static characteristics of measurement systems? Explain the various static characteristics of a measurement system involving their importance in instrumentation.	Understand	CO 1	AME019.0		
7	Explain the various elements of generalized measurement system with a neat sketch.	Understand	CO 1	AME019.0		
8	Explain the dynamic performance characteristics of measuring instruments.	Understand	CO 1	AME019.0		
9	Why is calibration of instruments needed? Elaborate on the procedure adopted for calibrating instruments.	Remember	CO 1	AME019.0		
10	With suitable examples, explain how flow measuring instruments are calibrated by the primary and secondary calibration methods.	Remember	CO 1	AME019.0		
11	Briefly discuss on calibration of temperature measuring devices with suitable examples.	Remember	CO 1	AME019.0		
12	Discuss the importance and procedure for calibration of strain gauges in various applications.	Remember	CO 1	AME019.0		
13	What is the importance of calibration, error and correction curves in instrumentation? Discuss their usage in various applications.	Understand	CO 1	AME019.0		
14	a) Define measurement and explain its significance in our day-to-day life. b) What are different sources of errors in measuring instruments? Suggest and	Remember	CO 1	AME019.0		

15				
1 15	explain the methods for elimination or minimization of the errors.		~~ .	17.577010.01
13	What is an error? Classify various errors and explain them in detail considering the importance of them in practical applications.	Understand	CO 1	AME019.04
16	Discuss the following transducers with respect to their construction, working	Understand	CO 1	AME019.04
	and characteristics:			
	a) Piezo-electric			
	b) Capacitance			
	c) Ionization			
17	What is the application of inductive transducer? Explain the calibration procedure for inductive transducer.	Remember	CO 1	AME019.04
18	Explain how a resistance potentiometer is used to measure displacement,	Understand	CO 1	AME019.04
19	with its advantages and limitations. Briefly discuss on a differential transformer being used for measuring	Understand	CO 1	AME019.04
20	displacement. a) List electrical transducers for measurement of linear and angular	Understand	CO 1	AME019.04
20	displacement.	Chacistana	CO 1	7 HVILOT7.04
	b) Explain the construction and working of a photo-electric transducer.			
	Part - C (Problem Solving and Critical Thinking Q			13.55040.05
1	a) Distinguish between direct and indirect methods of measurement with suitable examples.	Remember	CO 1	AME019.05
	b) Discuss propagation of uncertainties in measurement systems.	I I adamstand	GO 1	ANGE 010.05
2	With the help of a suitable example, explain the functional description of various elements of a generalized measuring system.	Understand	CO 1	AME019.05
3	Classify measuring instruments. Explain them in detail with neat sketches.	Understand	CO 1	AME019.05
4	Explain the dynamic response characteristics of first order instruments to step, ramp and sinusoidal inputs.	Understand	CO 1	AME019.05
5	a) Differentiate between accuracy and precision.b) How do second order instruments respond to ramp input?	Remember	CO 1	AME019.05
6	Elaborate on the procedure adopted for calibrating instruments and its	Understand	CO 1	AME019.06
7	importance. With suitable examples, explain how flow measuring instruments are	Understand	CO 1	AME019.06
	calibrated by the primary and secondary calibration methods.			
8	Briefly discuss on calibration of temperature measuring devices with suitable examples.	Understand	CO 1	AME019.06
9	What is meant by statistical analysis of random errors? Explain the terms involved in it.	Remember	CO 1	AME019.06
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Clight dependent resistor) as sensor.	E019.06 E019.06 E019.06 E019.06 E019.06 E019.06 E019.06
2 Explain the principle of working of a pyrometer. With the help of a neat sketch, explain a pyrometer and state its advantages of the same. 3 a) Explain the temperature measurement by thermocouples. b) Explain the temperature measurement by resistance thermometers. 4 Explain the use of thermocouples for the measurement of average temperature of a room. 5 a) Distinguish between RTD and Thermistor. b) State the laws of thermocouples. How are the laws useful in construction of thermocouple thermometers? 6 a) Differentiate between rare metal thermocouples and base metal thermocouples. b) Why protection is needed for a sensing element? 7 What is a bimetallic strip? Explain the working of a helix and spiral bimetallic thermometer. 8 What are RTDs? On what basic principle do they work? Explain with diagram one of the RTDs. 9 What is a thermistor? How is it used for temperature measurement? Give its applications, advantages and limitations. 10 a) Explain the working principle, construction and characteristics of Linear Variable Differential Transformer (LVDT). b) A platinum resistance thermometer has a resistance becomes 305.3Ω whenit is in contact with a hot gas, determine the temperature of gas. Take the temperature coefficient of platinum as 0.0039°C¹. 11 With the help of line diagrams, explain the construction, working and advantages of thermal conductivity gauges. 12 With the help of a suitable diagram, explain the construction, working and principle features of bourdon tube pressure gauge. 13 a) Explain the working principle of diaphragm gauge with a neat diagram. Understand CO 2 AMI	E019.06 E019.06 E019.06 E019.06 E019.06 E019.06 E019.06
3 a) Explain the temperature measurement by thermocouples. Remember CO 2 AMI 4 Explain the use of thermocouples for the measurement of average temperature of a room. Remember CO 2 AMI 5 a) Distinguish between RTD and Thermistor. Remember CO 2 AMI 6 a) Differentiate between rare metal thermocouples and base metal thermocouples. Understand CO 2 AMI 6 a) Differentiate between rare metal thermocouples and base metal thermocouples. Understand CO 2 AMI 7 What is a bimetallic strip? Explain the working of a helix and spiral bimetallic thermometer. Remember CO 2 AMI 8 What are RTDs? On what basic principle do they work? Explain with diagram one of the RTDs. Understand CO 2 AMI 9 What is a thermistor? How is it used for temperature measurement? Give its applications, advantages and limitations. Understand CO 2 AMI 10 a) Explain the working principle, construction and characteristics of Linear Variable Differential Transformer (LVDT). Understand CO 2 AMI b) A platinum resistance thermometer has a resistance becomes 305.3Ω whenit is in contact with a hot gas, determine the temperature of gas. Take the temperature coefficient of platinum as 0.0039°C ⁻¹ .	E019.06 E019.06 E019.06 E019.06 E019.06
4 Explain the use of thermocouples for the measurement of average temperature of a room. 5 a) Distinguish between RTD and Thermistor. b) State the laws of thermocouples. How are the laws useful in construction of thermocouple thermometers? 6 a) Differentiate between rare metal thermocouples and base metal thermocouples. b) Why protection is needed for a sensing element? 7 What is a bimetallic strip? Explain the working of a helix and spiral bimetallic thermometer. 8 What are RTDs? On what basic principle do they work? Explain with diagram one of the RTDs. 9 What is a thermistor? How is it used for temperature measurement? Give its applications, advantages and limitations. 10 a) Explain the working principle, construction and characteristics of Linear Variable Differential Transformer (LVDT). b) A platinum resistance thermometer has a resistance of 140.5 Ω and 100.0 Ω at 100° and 0° respectively. If its resistance becomes 305.3Ω whenit is in contact with a hot gas, determine the temperature of gas. Take the temperature coefficient of platinum as 0.0039°C.¹. 11 With the help of line diagrams, explain the construction, working and advantages of thermal conductivity gauges. 12 With the help of a suitable diagram, explain the construction, working and principle features of bourdon tube pressure gauge. 13 a) Explain the working principle of diaphragm gauge with a neat diagram. Understand CO 2 AMI	E019.06 E019.06 E019.06 E019.06
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b) State the advantages and disadvantages of diaphragm gauge.	E019.07
	E019.07
b)List out various types of manometers used for pressure measurement and discuss their specific characteristics.	
*	E019.07
a) What is the basic principle in thermal conductivity gauge? Explain the working principle of thermal couple type conductivity gauge.	E019.07
b) A McLeod gauge having V = 200 cm ³ and a capillary diameter of 2 mm is used to measure the gas pressure. What will be the pressure of the	
gas corresponding to a capillary of 4 cm? 17 Explain the construction and working principle of Ionization pressure gauge. Remember CO 2 AMI	E019.07
	E019.07
gauge and a diaphragm gauge for pressure measurement.	
	E019.07
20 Explain the construction, working principle and features of Pirani thermal conductivity gauge. CO 2 AMI	E019.07
Part - C (Problem Solving and Critical Thinking Questions)	
used to measure temperature.	E019.06
practical applications in engineering.	E019.06
applications, advantages and limitations.	E019.06
4 What are the various pyrometers available for measuring temperature? Understand CO 2 AMI	

	Discuss in detail about optical pyrometer.			
5	What is a dead weight tester? How is a dead weight tester used to	Understand	CO 2	AME019.07
Ü	calibrate pressure measuring devices?		002	
6	Give the classification of manometers in brief. Explain how a manometer	Understand	CO 2	AME019.07
	is used to measure pressure.	D 1	GO 4	A MEO 10.07
7	Explain the working of a bourdon tube pressure gauge. What are its advantages and limitations?	Remember	CO 2	AME019.07
8	State the principle of diaphragm gauges. How an elastic diaphragm gauge	Remember	CO 2	AME019.07
O	is used to measure pressure?	remember	CO 2	THILDISION
9	What are bellows gauges? Explain the bellows gauge used to measure	Remember	CO 2	AME019.07
	gauge pressure.	_		
10	Explain the bellows arrangement used to measure differential pressure.	Remember	CO 2	AME019.07
	Give their advantages and limitations. UNIT -III			
	MEASUREMENT OF DISPLACEMENT, TEMPERATU	RE. PRESSUR	E	
	Part - A (Short Answer Questions)	ite, i itesse it		
1	What is liquid level?	Remember	CO 3	AME019.08
2	What is the difference between direct and indirect liquid level measuring	Understand	CO 3	AME019.08
	devices?			
3	Explain the basic principle behind electric liquid level sensors.	Understand	CO 3	AME019.08
4	Why flow measurement is important?	Understand	CO 3	AME019.09
5	What are secondary or rate meters?	Understand	CO 3	AME019.09
6	On what basic principle does an obstruction meter work?	Understand	CO 3	AME019.09
7	Where are magnetic flow meters used? What is an ultrasonic flow meter?	Remember Remember	CO 3	AME019.09 AME019.09
<u>8</u> 9	Discuss about velocity and its concept.	Understand	CO 3	AME019.09 AME019.10
10	Write the two kinds of velocity	Remember	CO 3	AME019.10 AME019.10
10	Write the two kinds of velocity	Remember	CO 3	THVILOT9.10
11	State any one linear velocity transducer	Understand	CO 3	AME019.10
12	State any three mechanical tachometers used to measure angular velocity	Understand	CO 3	AME019.10
13	State the basic principle behind tacho-generators	Remember	CO 3	AME019.10
14	Write the list of various contactless electrical tachometers	Understand	CO 3	AME019.10
15	Write about vibration and its characteristics.	Remember	CO 3	AME019.11
16	What is piezo – electric effect?	Remember	CO 3	AME019.11
17	State the basic principle on which a seismic displacement sensing	Remember	CO 3	AME019.11
10	accelerometer works	D1	GO 1	AMEQ1011
18	State the basic principle on which a strain gauge accelerometer works Write various instruments which are used for measuring vibrations	Remember	CO 3	AME01911
19 20	Write any three measurement devices for measurement of linear velocity	Remember Remember	CO 3	AME019.11 AME019.11
20	Part – B (Long Answer Questions)	Remember	CO 3	AMEO19.11
1	Describe in detail with neat sketches:	Understand	CO 3	AME019.08
•	a) Hook level indicator	Charama	003	111111111111111111111111111111111111111
	b) Float operated potentiometer level indicator			
	c) Cryogenic fuel method			
2	Explain in detail with neat sketches:	Understand	CO 3	AME019.08
	a) Bubbler level indicator			
	b) Ultrasonic level method c) Capacitive level method			
3	Distinguish between the direct and indirect modes of level measurement.	Remember	CO 3	AME019.08
3	Discuss in brief about the methods.	remember	003	THVILLOT9.00
4	Give the classification of float gauges in brief. Explain any one float	Remember	CO 3	AME019.08
	operated liquid level gauge in detail.			
5	Discuss about purge system for liquid level measurement. Explain any	Understand	CO 3	AME019.08
-	one purge system to measure liquid level in detail.	Understand	CO 2	AME019.09
6	What is the principle of working of a magnetic flow meter? What are its advantages over other types of flow meters?	Understand	CO 3	AMEU19.09
7	a) Describe the construction of bubbler level indicator.	Remember	CO 3	AME019.09
,	b) Explain the use of rotameter for flow measurement.			
8	a) Explain the working principle of ultrasonic flow meter.	Remember	CO 3	AME019.09
	b) Explain the construction and working principle of turbine flow meter with			
	a neat sketch. State its advantages and limitations.	î l		i .

moving coil type velocity transducer 2	9	With the help of a neat diagram, explain the construction, working and	Understand	CO 3	AME019.09
Ilinitations of rotameter.	- 10		XX 1 . 1	~~.	A 1 (F) 10 00
b) List out the advantages and disadvantages, applications of hot wire anemometer. 11 Discuss with neat sketch the working of moving magnet type and moving coil type velocity transducer 12 Explain with neat sketch the working of slipping clutch and centrifugal lackometer 13 Explain with neat sketch the working of vibration measurement using stroboscope stroboscop	10		Understand	CO 3	AME019.09
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Explain with neat sketch the working of linear and rotational seismic displacement sensing accelerometer Part - C (Problem Solving and Critical Thinking)	19		Understand	CO 3	AME019.11
Part - C (Problem Solving and Critical Thinking)	20		Understand		AME019.11
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	and disadvantages of unbounded strain gauges.			
5	Differentiate the n – type and p – type sensing elements of a semi –	Understand	CO 4	AME019.12
3	conductor strain gauge.	Chacistana	CO 4	74412019.12
6	Give the importance of measurement of humidity in engineering applications. Give various instruments for humidity measurement.	Remember	CO 4	AME019.13
7	Explain the importance of measurement of strain in engineering applications. What is the purpose of providing backing for bonded strain gauges?	Remember	CO 4	AME019.13
8	Explain the importance of measurement of strain in engineering applications. What is temperature compensation with respect to strain gauges?	Remember	CO 4	AME019.13
9	Give the various engineering applications where force is to be measured. What is a proving ring? How is it used to measure force?	Remember	CO 4	AME019.16
10	Give the importance of dynamometers in measuring instruments. Explain driving and transmission dynamometers.	Understand	CO 4	AME019.16
	UNIT -V			
	ELEMENTS OF CONTROL SYSTEMS			
	Part - A (Short Answer Questions)	ъ .		13.65010.45
1	Define a system and a control system.	Remember	CO 5	AME019.17
2	Write about control system and its uses.	Remember	CO 5	AME019.17
3	Write the elements of a control system.	Remember	CO 5	AME019.18
4	Define actuating signal in the concept of instrumentation. Define disturbance in the concept of instrumentation.	Remember	CO 5	AME019.18
<u>5</u>	Write the classification of control systems	Remember Understand	CO 5	AME019.18 AME019.18
7	Define open-loop control system.	Remember	CO 5	AME019.18
8	Write the elements of open-loop control system	Remember	CO 5	AME019.18
9	Sketch the open-loop control system.	Remember	CO 5	AME019.18
10	Write the advantages of open-loop control system	Understand	CO 5	AME019.18
11	Write the limitations of open-loop control system	Understand	CO 5	AME019.18
12	Write two examples for open-loop control system	Understand	CO 5	AME019.18
13	Define closed-loop control system.	Understand	CO 5	AME019.18
14	Write the elements of closed-loop control system	Remember	CO 5	AME019.18
15	Sketch the closed-loop control system.	Remember	CO 5	AME019.18
16	Write the advantages of closed-loop control system	Remember	CO 5	AME019.18
17	Write the limitations of closed-loop control system	Remember	CO 5	AME019.18
18	Write two examples for closed-loop control system	Remember	CO 5	AME019.18
19	Define a controlled variable.	Remember	CO 5	AME019.19
20	Define an indirectly controlled variable	Remember	CO 5	AME019.19
	Part - B (Long Answer Questions)			
1	What is a control system? Explain the various elements of control system in detail.	Understand	CO 5	AME019.17
2	What is the role of control system in engineering applications? Explain four examples of control system applications.	Remember	CO 5	AME019.17
3	Give the importance and classification of control systems in engineering. Enumerate the applications of control system in various areas of engineering.	Understand	CO 5	AME019.18
4	Explain open-loop control system with neat sketch. Give the applications of open-loop control system.	Understand	CO 5	AME019.18
5	Discuss the advantages and limitations of open-loop control system. Explain briefly two examples of open-loop control systems.	Understand	CO 5	AME019.18
6	Explain closed-loop control system with neat sketch. Give the applications of closed-loop control system.	Understand	CO 5	AME019.18
7	Discuss the advantages and limitations of closed-loop control system. Explain briefly an example of closed-loop control systems	Remember	CO 5	AME019.18
8	Give the major classification of control systems. Explain advantages and disadvantages of open-loop control system	Remember	CO 5	AME019.18
9	Give the classification of control systems in application point of view. Explain advantages and disadvantages of closed-loop control system	Remember	CO 5	AME019.18
10	What is the role of feedback in control systems? Explain the characteristics of feedback.	Remember	CO 5	AME019.19

11	Give the importance of automation in control systems. Explain automatic control system.	Remember	CO 5	AME019.19
12	Explain the advantages and limitations of automatic control system along with its applications.	Understand	CO 5	AME019.19
13	Define block diagram and Explain the steps in developing a block diagram for an engineering problem.	Remember	CO 5	AME019.19
14	Give the comparison for pneumatic and hydraulic control systems. Explain with neat sketch the working of pneumatic control systems	Understand	CO 5	AME019.20
15	Give the comparison for pneumatic and hydraulic control systems. Explain with neat sketch the working of hydraulic control systems.	Remember	CO 5	AME019.20
16	Explain in detail about system error in the concept of instrumentation.	Understand	CO 5	AME019.20
17	Discuss about reference input in the concept of instrumentation.	Remember	CO 5	AME019.20
18	Explain in detail about Block diagram in the concept of instrumentation.	Understand	CO 5	AME019.20
19	Explain in detail about Stability in the concept of instrumentation.	Remember	CO 5	AME019.20
20	Explain in detail about system error in the concept of instrumentation.	Understand	CO 5	AME019.20
	Part – C (Problem Solving and Critical Thinki	ng)		
1	Discussing the importance of control systems and briefly explain the advantages and disadvantages of pneumatic control systems	Understand	CO 5	AME019.17
2	Discussing the importance of control systems and briefly explain the advantages and disadvantages of hydraulic control systems	Understand	CO 5	AME019.18
3	Explain the applications of pneumatic control systems in engineering. Enumerate their limitations.	Understand	CO 5	AME019.19
4	Explain the applications of hydraulic control systems in engineering. Enumerate their limitations.	Understand	CO 5	AME019.19
5	Discuss the advantages of control systems in engineering. Explain the requirements of control systems.	Understand	CO 5	AME019.19
6	What are the applications of servo systems in engineering. Explain the features of servo-mechanism.	Remember	CO 5	AME019.19
7	Explain with block diagrams any one position control system.	Remember	CO 5	AME019.19
8	Explain with block diagrams any one temperature control system.	Remember	CO 5	AME019.20
9	Explain with block diagrams any one speed control system.	Remember	CO 5	AME019.20
10	Enumerate the various engineering applications where measuring systems are involved with instruments. Explain the functions of instruments and	Understand	CO 5	AME019.20
	measuring systems.			

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