INSTITUTE OF AERONAUTICAL ENGINEERING



(Autonomous) Dundigal, Hyderabad -500 043

CIVIL ENGINEERING

TUTORIAL QUESTION BANK

Course Name	ELEMENTS OF MECHANICAL ENGINEERING			
Course Code	AME551			
Class	VI Semester			
Branch	Civil Engineering			
Year	2019–2020			
Course Coordinator	Mr. G. Sarat Raju, Assistant Professor, Department of Mechanical Engineering.			
Course Faculty	Mr. M. Sunil Kumar, Assistant Professor, Mr. G. Sarat Raju, Assistant Professor.			

COURSE OBJECTIVES:

The course should enable the students:

Ι	Familiarize with fundamentals of mechanical systems.
Π	Understand and appreciate the significance of mechanical engineering in different fields of engineering.
III	Understanding of application and usage of various engineering materials.

COURSE OUTCOMES:

- CO 1: Understand the laws of thermodynamics and determine thermodynamic properties, gas laws.
- CO 2: Visualize the basics of thermodynamics and components of a thermal power plant.
- CO 3: Understand the working related to 2S and 4S and injection systems for SI and CI engines.
- CO 4: Understand the concepts various metals cutting machines like lathe describe various driving mechanisms of lathe.
- CO 5: Identify engineering materials, their properties, manufacturing methods encountered in engineering practice

COURSE LEARNING OUTCOMES:

Students, who complete the course, will have demonstrated the ability to do the following:

AME551.01	Understand prime movers and concept of force, pressure, energy, work, power, system,
	heat, temperature, specific heat capacity.
AME551.02	Explain change of state, path, process, cycle, internal energy, enthalpy, statement of
	zeroth law and first law.
AME551.03	Understand the application, different types of energy sources.
AME551.04	Knowledge of Gas laws, Boyle's law, Charle's law, gas constant, relation between
	Cp and Cv, various non-flow processes like constant volume processes, constant
	pressure process, isothermal process, adiabatic process, poly-tropic process.
AME551.05	Demonstrate knowledge of formation of steam and use of steam table for identifying
	the various parameters at given conditions.
AME551.06	Derive the efficiency of various heat engines and problem solving.
AME551.07	Knowledge of different types of steam boilers and its mountings.
AME551.08	Explain the working principle of Internal combustion engines classification.
AME551.09	Demonstrate the working of pumps and air compressors.
AME551.10	Explain the refrigeration and air conditioning and their types.
AME551.11	Knowledge of various machining process of lathe, drilling and milling Machine tools
AME551.12	Explain the fundamentals of robotic and automation based on the coordinate systems.
AME551.13	Understand the concepts about flexible automation, NC/CNC machines.
AME551.14	Knowledge of Engineering materials and joining processes.
AME551.15	Understand the applications of ferrous metals, non-ferrous metals, alloys,
AME551.16	Knowledge of Composites and their applications in the aircraft and automobiles.

UNIT – I

INTRODUCTION TO ENERGY SYSTEMS Part - A (Short Answer Questions)

C N		DI	COIC	C		
S NO	QUESTION	Blooms	CO'S	Course		
		I axonomy L ovol		Outcomes		
1	Define System, Surroundings and Boundary.	Understand	CO 1	AME551.02		
2	Classify the properties of system.	Remember	CO 1	AME551.01		
3	State the closed system and give an example.	Understand	CO 1	AME551.04		
4	Define Specific heat capacity at constant volume	Remember	CO 1	AME551.03		
5	Define Specific heat capacity at constant pressure.	Understand	CO 1	AME551.04		
6	Differentiate closed and open system.	Remember	CO 1	AME551.02		
7	Define equilibrium of a system.	Understand	CO 1	AME551.02		
8	What are the Intensive properties and give an example.	Remember	CO 1	AME551.01		
9	Define the state and path with the help of example	Understand	CO 1	AME551.04		
10	What is the purpose prime movers and list out types of	Remember	CO 1	AME551.03		
	prime movers.					
11	Define force and pressure.	Understand	CO 1	AME551.04		
12	Define work and power.	Remember	CO 1	AME551.02		
13	Define the Extensive properties and give an example.	Understand	CO 1	AME551.01		
14	State Boyle's law.	Remember	CO 1	AME551.04		
15	State Charle's law.	Understand	CO 1	AME551.01		
16	Write down the relation between the Cp and Cv.	Understand	CO 1	AME551.04		
17	What meant by bio fuel.	Remember	CO 1	AME551.03		
18	Define Specific heat capacity at constant pressure.	Understand	CO 1	AME551.04		
19	Define Specific heat capacity at constant volume.	Remember	CO 1	AME551.02		
20	What is meant by surroundings?	Understand	CO 1	AME551.01		
	Part - B (Long Answer Questions)					
1	Compare and contrast extensive properties and intensive properties with suitable examples.	Understand	CO 1	AME551.01		
2	Justify the statement that work and heat are not properties.	Remember	CO 1	AME551.02		
3	What is meant by thermodynamic system? How do you classify it?	Understand	CO 1	AME551.02		
4	How do you classify the property and explain property?	Remember	CO 1	AME551.03		
5	What is meant by Point and Path function and explain Point	Understand	CO 1	AME551.02		
6	Explain briefly zeroth law of thermodynamics	Remember	CO 1	AME551.02		
7	Explain briefly first law of thermodynamics.	Understand	CO 1	AME551.03		
8	Explain reversible and irreversible processes.	Remember	CO 1	AME551.04		
9	What is meant by thermodynamic system? How do you	Understand	CO 1	AME551.03		
10	Classify it? What are bio-fuels, how they are generated?	Remember	CO 1	AME551.01		
10	Explain with a next sketch horizontal axis wind turbine	Understand	COI	AME551.01		
12	Explain with a neat sketch vertical axis wind turbine.	Remember	COI	AME551.03		
12	Explain briefly global warming and ozone depletion layer	Understand	COI	AME551.03		
14	Explain fossil fuels with examples	Remember	COI	AME551.04		
15	Explain the state properties process and cycle	Understand	CO I	AME551.02		
13	With a post diagram avalain system have down and	Demorsher		AME551.01		
10	surrounding.	Kemember	01	AIVIE331.04		
17	Define various non-flow process and explain them.	Understand	CO 1	AME551.01		
18	Write and explain the gases laws.	Remember	CO 1	AME551.04		

19	Explain solar flat plate collectors and write applications solar energy.	Remember	CO 1	AME551.03
20	State first law of thermodynamics and derive the internal energy	Remember	CO 1	AME551.04
	Part - C (Problem Solving and Critical Thinking Ouestions)			
1	Explain with a neat sketch the principle and working of a win mill	d Understand	CO 1	AME551.01
2	What are the various renewable energy sources available an	d Remember	CO 1	AME551.04
	show how wind turbine can be used for electrical power	er		
2	generation with a schematic diagram.	f Understand	CO 1	AME551.02
5	energy with suitable examples.			AME331.03
4	What are bio-fuels? Compare them with petroleum based fuels.	Remember	CO 1	AME551.04
5	What are nuclear fuels, explain the working of nuclear reactors.	Understand	CO 1	AME551.02
6	Explain different thermodynamic processes, draw P-V diagram.	Remember	CO 1	AME551.01
1	How the solar power can generated explain different types of solar collector	Remember	CO 1	AME551.04
8	Explain zeroth law of thermodynamics, write down the assumptions.	Understand	CO 1	AME551.01
9	Explain first law of thermodynamics, write down the	Understand	CO 1	AME551.04
10	Explain briefly the principles of conversion of solar energy	Understand	CO 1	AME551.03
	directly into electrical energy in a solar cell.	, 		
	UNIT - II			
	STEAM ENGINES, HYDRAULIC MACH	IINES		
	Part – A (Short Answer Questions	()		
1	Define steam and list out properties of steam.	Remember	CO 2	AME551.05
2	List out the advantages of diesel cycle.	Understand	CO 2	AME551.06
3	Define Enthalpy of dry saturated steam.	Understand	CO 2	AME551.07
4	Classify heat engines.	Understand	CO 2	AME551.05
5	In what respect does the Rankine cycle differ from the Carnot	Remember	CO 2	AME551.06
6	Cycle? Define heat engine and list out the advantages of heat engine	Understand	CO^2	AME551.07
7	L ist out mountings of steam boilers	Understand	CO_2	AME551.07
8	Define the term dryness fraction of steam	Understand	CO_2	AME551.06
0	List out accessories used in steem boilers	Domombor	CO_2	AME551.00
9	List out accessories used in steam boners.	Ludenstend	CO_2	AME551.05
10	Define Rankine cycle draw the P-V diagram.	Devestand	CO_2	AME551.00
11	List out advantages of Rankine cycle.	Remember	CO 2	AME551.07
12	Define steam enthalpy.	Remember	CO 2	AME551.05
13	List different types of boiler mounting	Understand	CO 2	AME551.06
14	Compare between Otto cycle and diesel cycles.	Understand	CO 2	AME551.07
15	Define Otto cycle and draw the P-V diagram.	Understand	CO 2	AME551.05
16	Define wet steam and dry steam.	Remember	CO 2	AME551.05
17	List out limitations of Rankine cycle.	Remember	CO 2	AME551.06
18	Define Carnot cycle draw the P-V diagram.	Remember	CO 2	AME551.07
19	List any four differences between Rankine cycle and Carnot	Understand	CO 2	AME551.05
20	List out the advantages of Otto cycle.	Remember	CO 2	AME551.06
	Part - B (Long Answer Questions)	1	
1	Explain Wilcox boiler with a neat sketch and list out the	Understand	CO 2	AME551.05
	advantages of Wilcox boiler.			
2	Differentiate between Carnot cycle and Otto cycle.	Understand	CO 2	AME551.06
3	Explain Carnot cycle with a neat sketch.	Remember	CO 2	AME551.07
4	Explain Cochran boiler with a neat sketch and list out	Understand	CO 2	AME551.05
	the advantages of Cochran boiler.			

5	Differentiate between Rankine cycle and Otto cycle.	Understand	CO 2	AME551.05
6	Explain Lancashire boiler with a neat sketch and list out the	Remember	CO 2	AME551.06
	advantages of Lancashire boiler.			
7	Differentiate between Diesel cycle and Otto cycle.	Remember	CO 2	AME551.07
8	Discuss any four accessories used in steam boilers with a	Understand	CO 2	AME551.05
	neat sketch.	** 1 . 1	~~ •	A) (7551.05
9	Explain Rankine cycle with a neat sketch.	Understand	CO 2	AME551.06
10	Differentiate between Cochran and Wilcox boilers.	Understand	CO 2	AME551.07
11	Explain Babcock boiler with a neat sketch and list out the	Understand	CO 2	AME551.05
12	advantages of Babcock boller.	Remember	CO^{2}	AME551.06
12	Explain dryness fraction of steam with a neat sketch	Understand	CO_2	AME551.07
13	Discuss any four mountings used in steam boilers	Understand	CO_2	AME551.07
14	Explain Otto cycle with a next sketch	Understand	CO_2	AME551.05
15	Explain Otto Cycle with a heat Sketch.	Pomombor	CO_2	AME551.00
10	Explain steam formation and list out the properties of steam.	Demember	CO_2	AME551.07
17	Differentiate between Coenfan and Lancashire bollers.	Remember	CO 2	AME551.05
18	Explain diesel cycle with a neat sketch.	Remember	CO 2	AME551.06
19	Differentiate between Babcock and Wilcox boilers.	Understand	CO 2	AME551.07
20	Explain any four properties of steam.	Understand	CO 2	AME551.05
	Part - C (Problem Solving and Critical Thinking	g Question	s)	
1	How much heat must be supplied to 200 kgs of water at 20% to make steem at 850 kpc which is 870% dm ²	Understand	CO 2	AME551.05
2	Steam enters a turbine at 1100 kPa dry and saturated The steam	Understand	CO_2	AME551.06
_	is exhausted from the turbine at 361.3 kPa and is 15% wet.		002	111112001100
	Determine the quantity of heat used to do work in the turbine.			
3	At the beginning of compression in a diesel cycle $T = 300$ K, $P = 200$ kPa and after combustion (heat addition) is complete $T = -200$ kPa	Understand	CO 2	AME551.07
	1500 K and $P = 7.0 MPa$. Find the compression ratio, the thermal			
	efficiency and the mean effective pressure.			
4	Calculate the specific volume and the specific enthalpy of steam at 35% quality and pressure of 20kPa	Understand	CO 2	AME551.05
5	Steam at 550kPa and quality 92% occupies a rigid vessel of $0.4m^3$ Calculate the mass interval energy and enthelms	Understand	CO 2	AME551.06
6	$0.4m^{\circ}$. Calculate the mass, internal energy and enthalpy.	Remember	CO_2	AME551.07
	vapor) at 500kPa and quality of 50%.	Remember	02	11012331.07
7	Calculate the dryness fraction of steam which has 1.5 kg of water in suspension with 50 kg of steam.	Remember	CO 2	AME551.05
8	Find specific volume, enthalpy and internal energy of wet steam	Understand	CO 2	AME551.06
	at 18 bar, dryness fraction 0.9.			
9	Find the dryness fraction, specific volume and internal energy of the steam at 7 har and enthalpy 2600 kJ/kg	Understand	CO 2	AME551.07
10	$\frac{1}{1} = \frac{1}{1} = \frac{1}$			
1 10	Find the volume, enthalpy and internal energy of steam	Understand	CO 2	AME551.05
	Find the volume, enthalpy and internal energy of steam when the condition of steam is 1) 500 kPc and 0.7 dry	Understand	CO 2	AME551.05
	when the condition of steam is 1) 500 kPa and 0.7 dry 2)1 MPa and 425°C.	Understand	CO 2	AME551.05
	when the condition of steam is 1) 500 kPa and 0.7 dry 2)1 MPa and 425°C. UNIT-III	Understand	CO 2	AME551.05
	when the condition of steam is 1) 500 kPa and 0.7 dry 2)1 MPa and 425°C. UNIT-III INTERNAL COMBUSTION ENGINES, REFRIGE	Understand	CO 2	AMESSI.05
	when the condition of steam is 1) 500 kPa and 0.7 dry 2)1 MPa and 425°C. UNIT-III INTERNAL COMBUSTION ENGINES, REFRIGE CONDITIONING	Understand	CO 2	AME551.05
	Find the volume , enthalpy and internal energy of steam when the condition of steam is 1) 500 kPa and 0.7 dry 2)1 MPa and 425°C. UNIT-III INTERNAL COMBUSTION ENGINES, REFRIGE CONDITIONING Part - A (Short Answer Questions)	Understand	CO 2	AME551.05
1	Find the volume , enthalpy and internal energy of steam when the condition of steam is 1) 500 kPa and 0.7 dry 2)1 MPa and 425°C. UNIT-III INTERNAL COMBUSTION ENGINES, REFRIGE CONDITIONING Part - A (Short Answer Questions) Define internal combustion engine.	Understand	CO 2	AME551.05 AIR- AME551.09
1	Find the volume , enthalpy and internal energy of steam when the condition of steam is 1) 500 kPa and 0.7 dry 2)1 MPa and 425°C. UNIT-III INTERNAL COMBUSTION ENGINES, REFRIGE CONDITIONING Part - A (Short Answer Questions) Define internal combustion engine. List out the advantages of diesel engine.	Understand RATION A Understand Understand	CO 2 AND 2 CO 3 CO 3	AME551.05 AIR- AME551.09 AME551.08
1 1 2 3	Find the volume , enthalpy and internal energy of steam when the condition of steam is 1) 500 kPa and 0.7 dry 2)1 MPa and 425°C. UNIT-III INTERNAL COMBUSTION ENGINES, REFRIGE CONDITIONING Part - A (Short Answer Questions) Define internal combustion engine. List out the advantages of diesel engine. Define compression ratio in internal combustion engine.	Understand RATION Understand Understand Remember	CO 2 AND 2 CO 3 CO 3 CO 3	AME551.05 AME551.09 AME551.08 AME551.09
$ \begin{array}{c} 1\\ 1\\ 2\\ 3\\ 4 \end{array} $	Find the volume , enthalpy and internal energy of steam when the condition of steam is 1) 500 kPa and 0.7 dry 2)1 MPa and 425°C. UNIT-III INTERNAL COMBUSTION ENGINES, REFRIGE CONDITIONING Part - A (Short Answer Questions) Define internal combustion engine. List out the advantages of diesel engine. Define compression ratio in internal combustion engine. List out merits of four stroke in internal combustion engine.	Understand CRATION Understand Understand Remember Understand	CO 2 AND 2 CO 3 CO 3 CO 3 CO 3	AME551.05 AME551.09 AME551.09 AME551.10
$ \begin{array}{c} 1 \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \end{array} $	Find the volume , enthalpy and internal energy of steam when the condition of steam is 1) 500 kPa and 0.7 dry 2)1 MPa and 425°C. UNIT-III INTERNAL COMBUSTION ENGINES, REFRIGE CONDITIONING Part - A (Short Answer Questions) Define internal combustion engine. List out the advantages of diesel engine. Define compression ratio in internal combustion engine. List out merits of four stroke in internal combustion engine. Define indicated power in internal combustion engine.	Understand RATION Understand Understand Remember Understand Understand	CO 2 AND 4 CO 3 CO 3 CO 3 CO 3 CO 3	AME551.09 AME551.09 AME551.08 AME551.10 AME551.10
	Find the volume , enthalpy and internal energy of steam when the condition of steam is 1) 500 kPa and 0.7 dry 2)1 MPa and 425°C. UNIT-III INTERNAL COMBUSTION ENGINES, REFRIGE CONDITIONING Part - A (Short Answer Questions) Define internal combustion engine. List out the advantages of diesel engine. Define compression ratio in internal combustion engine. List out merits of four stroke in internal combustion engine. Define indicated power in internal combustion engine List out merits of two stroke in internal combustion engine	Understand CRATION Understand Understand Understand Understand Understand Remember	CO 2 AND 4 CO 3 CO 3 CO 3 CO 3 CO 3 CO 3	AME551.05 AME551.09 AME551.09 AME551.10 AME551.10 AME551.09

8	Define two stroke in internal combustion engine.	Understand	CO 3	AME551.10
9	List out the advantages of petrol engine.	Remember	CO 3	AME551.09
10	Differentiate between two stroke and four stroke in internal	Understand	CO 3	AME551.09
	combustion engine.			
11	State the significance of multi-stage air compressor	Understand	CO_3	AME551.09
12	Define reciprocating air compressor	Understand	CO_3	AME551.09
13	Define rotary air compressor	Remember	CO_3	AME551.00
14	Classify the air compressor	Understand	CO_3	AME551.09
15	List out the advantages of reciprocating air compressor	Remember	CO_3	AME551.10
15	Define refrigeration and air conditioning	Understand	CO_3	AME551.00
17	List out the advantages of rotary air compressor	Understand	CO_3	AME551.00
17	Define vapour compression refrigeration system	Understand	CO_3	AME551.09
10	List out the advantages of vanour compression refrigeration	Domombor	CO_3	AME551.00
19	system.	Keinenibei	05	AME551.09
20	Define vapour absorption refrigeration system.	Understand	CO 3	AME551.10
	Part - B (Long Answer Questions)			
1	Explain reciprocating pump with a neat sketch and list out	Understand	CO 3	AME551.09
2	the advantages of reciprocating pump.	Understand	CO^2	۵ME551 00
2	Evaluin rotary nump with a past skatch and list out the	Understand	CO_3	AME551.00
5	advantages of rotary pump.	Remember	0.5	AME551.09
4	Differentiate between rotary pump and reciprocating pump.	Understand	CO 3	AME551.10
5	Explain working of four stroke petrol engines with a neat sketch.	Understand	CO 3	AME551.10
6	Explain working of two stroke diesel engines with a neat sketch.	Remember	CO 3	AME551.09
7	Explain working of four stroke diesel engines with a neat sketch.	Remember	CO 3	AME551.09
8	Differentiate between rotary pump and centrifugal pump.	Understand	CO 3	AME551.08
9	Explain centrifugal pump with a neat sketch and list out the advantages of centrifugal pump.	Understand	CO 3	AME551.09
10	Explain working of two stroke petrol engine with a neat sketch.	Understand	CO 3	AME551.10
		L	1	
11	Explain operation of reciprocating air compressor with a neat sketch.	Remember	CO 3	AME551.09
12	Discuss vapor compression refrigeration system with a neat sketch.	Remember	CO 3	AME551.08
13	Explain operation of rotary air compressor with a neat sketch.	Understand	CO 3	AME551.09
14	Discuss vapor absorption refrigeration system with a neat sketch.	Remember	CO 3	AME551.10
15	Explain refrigeration system with a neat sketch and list out the advantages of vapor absorption refrigeration system.	Understand	CO 3	AME551.10
16	Discuss the working principle of split air conditioner with a neat sketch.	Remember	CO 3	AME551.09
17	Differentiate between window air conditioners and split conditioners.	Remember	CO 3	AME551.09
18	Classify refrigerants used in air conditioners.	Understand	CO 3	AME551.08
19	Differentiate between reciprocating air compressor and rotary air compressor.	Understand	CO 3	AME551.09
20	Classify air compressors and list out the advantages of air compressed air.	Understand	CO 3	AME551.09
	Part - C (Problem Solving and Critical Thinkin	g Question	s)	
1	A two-stroke cycle internal combustion engine has a mean effective pressure of 6 bar. The speed of the engine is 1000 r.p.m. If the diameter of piston and stroke are 110 mm and 140 mm respectively, find the indicated power developed.	Understand	CO 3	AME551.09
L		1	l	

2	A rope brake was used to measure the brake power of a single cylinder, four stroke cycle petrol engines. It was found that the torque due to brake load is 175 N-m and the engine makes 500 r. p.m. Determine the brake power developed by the engine.	Understand	CO 3	AME551.08
3	A single cylinder, four stroke cycle oil engine is fitted with a rope brake. The diameter of the brake wheel is 600 mm and the rope diameter is 26 mm. The dead load on the brake is 200 N and the spring balance reads 30 N. If the engine runs at 450 r.p.m. what will be the brake power of the engine?	Understand	CO 3	AME551.09
4	The engine of Fiat car has four cylinders of 68 mm bore and 75 mm stroke. The compression ratio is 8. Calculate the cubic capacity of the engine and the clearance volume of each cylinder.	Understand	CO 3	AME551.10
5	A six cylinder two-stroke engine produces a torque of 1100 Nm at a speed of 2100 rpm. It has a bore of 123mm and a stroke of 127 mm.What is it bmep and mean piston speed?	Understand	CO 3	AME551.10
				-
6	A single stage double acting air compressor of 150KW power takes air in at 16 bar & delivers at 6 bar. The compression follows the law PV1.35 = C. the compressor runs at 160rpm with average piston speed of 150 m/min. Determine the size of the cylinder.	Remember	CO 3	AME551.09
7	An air compressor takes in air at 1 bar and 20 °C and compresses	Remember	CO 3	AME551.08
	it according to law $pv^{1.2} = constant$. It is then delivered to a			
	receiver at constant pressure of 10 bar. R=0.287 KJ/Kg K.			
	Determine :			
	1) Temperature at the end of compression.			
	2) Work done and heat transferred during compression			
8	In a simple vapor compression cycle the piston displacement	Understand	CO 3	AME551.09
	volume for compressor is 1.5 litres per stroke and its volumetric	Chaoistana	000	
	efficiency is 80%. The Speed of compressor is 1600rpm. Find			
	the power rating of compressor and refrigerating effect.			
9	28 tonnes of ice from and at ⁰ C is produced per day in an	Understand	CO 3	AME551.10
	ammonia refrigerator. The temperature range in the compressor			
	is 25 0 C to -15 0 C. The vapour is dry and saturated at the end of			
	compression and an expansion valve is used. Assuming a co			
	efficient of performance of 62% of the theoretical, calculate the			
	power required to drive the compressor. Take latent heat of ice $\frac{1}{225}$ KL/ $\frac{1}{225}$			
10	A roots blower compresses 0.08 m of air from 1.0 her to 1.5 her			
10	per revolution .Calculate the compressor efficiency	Understand	CO 3	AME551.09
	UNIT-IV			
	MACHINE TOOLS AND AUTOMATIC)N		
	Part - A (Short Answer Questions)			
1	Define turning operation and list out its parameters.	Remember	CO 4	AME551.11
2	Differentiate between plane milling and end milling.	Remember	CO 4	AME551.12
3	List out the disadvantages of machine tools operation.	Remember	CO 4	AME551.13
4	Define facing operation and list out its parameters.	Understand	CO 4	AME551.11
5	Compare between end milling and slot milling.	Remember	CO 4	AME551.12
6	Differentiate between boring operation and reaming operation.	Understand	CO 4	AME551.13
7	Define knurling operation and list out its parameters.	Understand	CO 4	AME551.11
8	List out the advantages of machine tools operation.	Understand	CO 4	AME551.12
9	Define drilling operation with a neat sketch.	Remember	CO 4	AME551.13
10	List out the types of milling operations.	Remember	CO 4	AME551.11

11	Define a robot and list out the advantages of using robots in industries.	Understand	CO 4	AME551.11
12	State the three laws of robotics.	Understand	CO 4	AME551.12
13	Define fixed automation and list out the advantages of fixed automation.	Remember	CO 4	AME551.13
14	List out the disadvantages of robots using in industrial applications.	Understand	CO 4	AME551.11
15	Define flexible automation and list out the advantages of flexible automation.	Understand	CO 4	AME551.12
16	Define Numeric control with a neat sketch.	Understand	CO 4	AME551.13
17	List out the advantages of numeric control.	Remember	CO 4	AME551.11
18	Define programmable automation and list out the advantages of programmable automation.	Remember	CO 4	AME551.12
19	Define computer numeric control with a neat sketch.	Remember	CO 4	AME551.13
20	List out the advantages of computer numeric control.	Remember	CO 4	AME551.11
	Part – B (Long Answer Questions)	L		
1	Explain turning operation with a neat sketch.	Understand	CO 4	AME551.11
2	State the differences between counter sinking and counter boring	Understand	CO 4	AME551.12
3	Discuss taper turning by swiveling the compound rest with a neat sketch.	Remember	CO 4	AME551.13
4	Explain thread cutting operation with a neat sketch.	Remember	CO 4	AME551.11
5	Discuss plane milling with a neat sketch.	Understand	CO 4	AME551.12
6	Differentiate between end milling and slot milling.	Remember	CO 4	AME551.13
7	Explain knurling operation with a neat sketch.	Understand	CO 4	AME551.11
8	Discuss facing operation with a neat sketch.	Understand	CO 4	AME551 12
9	Differentiate between end milling and plane milling.	Understand	CO 4	AME551.13
10	Explain in detail about drilling operation with a neat sketch.	Remember	CO 4	AME551.11
11	Explain polar robot configuration with a neat sketch.	Understand	CO4	AME551.12
12	Discuss numeric control machine with a neat sketch and list out	Remember	CO 4	AME551.13
13	Explain cylindrical robot configuration with a neat sketch	Remember	CO 4	AME551.11
14	Discuss computer numeric control machine with a neat sketch	Understand	CO 4	AME551.12
15	and list out the advantages of computer numeric control.Explain cartesian coordinate robot configuration with a neat	Remember	CO 4	AME551.13
16	sketch.		CO 4	AME551.11
10	Cartesian robot configuration.	Understand	CU 4	ANIE331.11
17	Explain spherical robot configuration with a neat sketch.	Understand	CO 4	AME551.12
18	Differentiate between polar robot configuration and spherical robot configuration.	Remember	CO 4	AME551.13
19	Compare between numeric control machine and computer numeric control machine.	Understand	CO 4	AME551.11
20	Discuss the role of automation in industrial applications.	Understand	CO 4	AME551.11
	Part - C (Problem Solving and Critical Thinkin	g Question	s)	
1	Explain the following operations carried out on a lathe machine, turning, taper turning.	Remember	CO 4	AME551.13
2	Define automation, classify the automation of production system and explain in detail.	Understand	CO 4	AME551.11
3	Explain with neat sketches the operations performed on drilling machine, counter boring, counter sinking.	Remember	CO 4	AME551.12
4	Explain with neat sketches milling operations performed on vertical milling machine.	Understand	CO 4	AME551.13
5	Explain briefly the components of cnc machine with a neat block diagram.	Understand	CO 4	AME551.11
6	Illustrate the applications of robotics. Classify robot based on robot configuration.	Remember	CO 4	AME551.11
7	What is automation, enlist their application in bio-medical and military applications.	Remember	CO 4	AME551.13
8	Explain the taper turning by swiveling compound tool rest with a	Understand	CO 4	AME551.11

	neat sketch.			
9	Explain the following operations carried out on a lathe machine, thread cutting, knurling, reaming.	Remember	CO 4	AME551.12
10	Explain the basic elements of NC automation system with a block diagram	Understand	CO 4	AME551.13
	UNIT-V			
	ENGINEERING MATERIALS, JOINING PR Part - A (Short Answer Questions)	ROCESS		
1	List out the joining processes.	Understand	CO 5	AME551.14
2	Define welding and list out the advantages of welding.	Remember	CO 5	AME551.15
3	Define mechanical fastening and list out the merits of	Remember	CO 5	AME551.16
4	Differentiate between brazing and soldering.	Remember	CO 5	AME551 14
5	Define allows and list out the advantages of allows.	Understand	CO_{5}	AME551.15
6	List out the merits and demerits of ferrous metals.	Remember	CO_{5}	AME551.16
7	State the applications of ferrous metals.	Understand	CO_{5}	AME551 14
8	List out the merits and demerits of non-ferrous metals.	Understand	CO_{5}	AME551.15
9	State the applications of non-ferrous metals.	Understand	CO_{5}	AME551.14
10	Define a composite material and give one example.	Understand	CO_{5}	AME551 15
11	State any four applications of composites in aerospace industry.	Remember	CO_{5}	AME551.16
12	Define soldering operation.	Remember	CO_{5}	AME551.14
13	List out the disadvantages of welding.	Remember	CO_{5}	AME551.15
14	Define consumable electrodes that are used in arc welding.	Understand	CO_{5}	AME551.16
15	List out the materials that can be used for arc welding.	Understand	CO_{5}	AME551 14
16	State the power sources that can be used in arc welding	Understand	CO_{5}	AME551.15
17	List out the application of composite materials in	Remember	CO_{5}	AME551.16
17	automobile engineering.	Remember	05	11012331.10
18	State any four advantages of composite materials over metals using in aircrafts.	Understand	CO 5	AME551.14
19	List out the application of composite materials in aircrafts.	Understand	CO 5	AME551.15
20	Define brazing operation.	Understand	CO 5	AME551.16
	Part - B (Long Answer Questions)			
1	Classify the joining process and list out the merits of joining process.	Understand	CO 5	AME551.14
2	Differentiate between temporary joint and permanent joint.	Understand	CO 5	AME551.15
3	Explain arc welding with a neat sketch and list out the demerits of arc welding.	Understand	CO 5	AME551.16
4	Discuss plasma arc welding with a neat sketch.	Remember	CO 5	AME551.14
5	Explain resistance spot welding with a neat sketch.	Understand	CO 5	AME551.15
6	Differentiate between friction welding and friction stir welding.	Remember	CO 5	AME551.16
7	Discuss welding defects in detail.	Remember	CO 5	AME551.14
8	Explain brazing and list out the advantages of brazing.	Understand	CO 5	AME551.15
9	Discuss the filler materials used in brazing operation.	Understand	CO 5	AME551.16
10	Differentiate between fusion welding and solid state welding.	Understand	CO 5	AME551.14
11	Explain fusion welding with one example and draw a neat sketch of it.	Remember	CO 5	AME551.15
12	Differentiate arc welding with consumable electrodes and non- consumable electrodes.	Remember	CO 5	AME551.16
13	Discuss in detail about the applications of composite in automobiles.	Understand	CO 5	AME551.14
14	Explain composites and state few examples.	Remember	CO 5	AME551.15
15	Discuss in detail about the applications of composite in aircrafts.	Understand	CO 5	AME551.16
16	Classify the composites and list out the merits of composites.	Remember	CO 5	AME551.14
17	Discuss the importance of composites in automobiles.	Remember	CO 5	AME551.15

18	Explain polymer matrix composite.	Understand	CO 5	AME551.16
19	Discuss the importance of composites in aircrafts.	Understand	CO 5	AME551.14
20	Explain metal matrix composite with a neat sketch.	Understand	CO 5	AME551.15
	Part - C (Problem Solving and Critical Thinkin	g Question	s)	
1	Classify ferrous and non-ferrous metals, classify metal joining process, explain TIG with a neat sketch.	Understand	CO 5	AME551.16
2	Explain MIG with neat, explain its importance.	Remember	CO 5	AME551.14
3	What are the different flames in oxy acetylene gas welding, draw neat sketch, List out their applications.	Remember	CO 5	AME551.15
4	How are composite material classified ? Enlist their applications in automobile and aircraft.	Understand	CO 5	AME551.16
5	Explain different composites materials; explain briefly about shape memory alloys, piezo electrical materials.	Understand	CO 5	AME551.14
6	Differentiate between soldering, brazing and welding.	Understand	CO 5	AME551.15
7	Define composite material, state the applications, merits and demerits of composite material	Understand	CO 5	AME551.16
8	Explain arc welding principle with neat sketch, process, and applications.	Remember	CO 5	AME551.14
9	With a neat explain water plasma working principle, list out applications.	Remember	CO 5	AME551.15
10	Write briefly about aluminum alloys and its applications.	Understand	CO 5	AME551.16

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