Course Code: 20ME0353 **R20**

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY :: PUTTUR

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QUESTION BANK

Subject with Code: Thermal Fluid Engineering (20ME0353 Course & Branch: B. Tech – EEE
Year/ Sem : I-B.Tech & I-Sem **Regulation: R20**

UNIT –I

POWER PLANTS AND BASIC CONCEPTS

1		Draw a neat sketch of a Thermal Power Plant and Explain the each component in the thermal power plant?	**L1**	**CO1**	12M
2		Explain briefly about cooling towers and Coal handling with neat diagram	**L2**	**CO1**	12M
3		What is need of Chimney in thermal power plant and explain their types?	**L1**	**CO1**	12M
4		Write short notes on any five thermal power plants in India?	**L2**	**CO1**	12M
5		Explain the various elements of hydroelectric power station with a neat sketch?	**L2**	**CO1**	12M
6	(a)	Explain the concept of pumped storage power plants.	**L2**	**CO1**	6M
	(b)	Write short notes on any two hydroelectric power plants in India	**L2**	**CO1**	6M
7	(a)	Definitions of system, boundary, surrounding and control volume	**L1**	**CO1**	6M
	(b)	Explain different types of thermodynamic systems?	**L2**	**CO2**	6M
8	(a) (b) (c) (d) (e) (f)	Define the following properties of the system with units? Pressure Internal energy Temperature Density Enthalpy Volume	**L1**	**CO2**	12M
9	(a)	Define property? Distinguish between intensive property and extensive property with example?	**L1 & L2**	**CO2**	7M
	(b)	Explain following terms state, path, process and cycle?	**L2**	**CO2**	5M
10	(a)	Describe in detail about Quasi Static Process with schematic diagram?	**L1**	**CO2**	6M
10	(b)	What is thermodynamic equilibrium? Explain it in detail?	**L1**	**CO2**	6M

UNIT-II

PURE SUBSTANCES, BOILERS, BOILER MOUNTINGS AND BOILER ACCESSORIES

1		Draw and explain a P.V, P-T and T-S diagram for a pure substance	**L2**	**CO2**	12M
2		Write short notes on Mollier Diagram and Dryness Fraction			12M
3	(a) (b) (c) (d) (e) (f)	Explain the following terms relating to steam formation : Enthalpy of wet steam Entropy of Steam Sensible heat of water Latent heat of steam Dryness fraction of steam Superheated steam	**L2**	**CO2**	 2M 2M 2M 2M 2M 2M
4		What is a boiler? How is it classified?	**L1**	**CO3**	12M
5		Compare water tube boilers and fire tube boilers	**L2**	**CO3**	12M
6		Explain Cochran boiler with neat sketch.	**L2**	**CO3**	12M
7		Explain Lamont boiler with neat sketch	**L2**	**CO3**	12M
		Write short notes on a) Pressure gauge. b) Water level indicator	**L2**	**CO3**	12M
8	(a)	What is fusible plug? Draw the sketch and explain	**L1**	**CO2**	6M
	(b)	What is Blow down cock? Explain its purpose	**L2**	**CO2**	6M
9		Short notes on a) Stop valve. b) safety valve	**L1**	**CO2**	 6M 6M
10	(a)	Explain the feed pump and economizer.	**L2**	**CO2**	6M
	(b)	What is the difference between super heater and air pre heater? Explain in detail with diagrams	**L2**	**CO2**	6M

UNIT – III

FLUID PROPERTIES AND FLUID STATICS

1	(a) (b) (c) (d) (e) (f)	Define the following fluid properties: Density Specific Weight Specific volume Specific gravity of a fluid. Viscosity Compressibility	**L1**	**CO4**	12M
2	(a)	Write a short note on Vapour Pressure, surface tension and capillarity.	**L2**	**CO5**	6M
	(b)	Define Atmospheric pressure, gauge pressure and absolute pressures	**L1**	**CO5**	6M
3	(a)	Define compressibility and specific weight and write their units.	**L1**	**CO4**	6M
		Write a short note on Piezometer with neat sketch?	**L1**	**CO5**	6M
4		Explain U-tube manometer and inverted U- tube manometer with schematic diagram?	**L2**	**CO5**	12M
5		What is manometer and classify it.? Explain U tube manometer with neat diagram	**L1**	**CO5**	12M
6		Define pressure? List out instruments used to measure pressure and explain any two of the instruments with a neat sketch.	**L2**	**CO5**	12M
7	(a)	Derive an expression for surface tension inside the liquid droplet	**L3**	**CO5**	6M
	(b)	The surface tension of water in contact with air at 20^0C is 0.0725 N/m. the pressure inside a droplet of water is to be 0.02N/cm^2 greater than the outside pressure. Calculate the diameter of droplet of water.	**L5**	**CO5**	6M
8	(a)	Derive an expression for capillary rise and fall in a glass tube	**L3**	**CO4**	6M
	(b)	The capillary rise in the glass tube is not to exceed 0.2mm of water. Determine its minimum size, given that surface tension for water in contact with air = 0.0725 N/m	**L5**	**CO5**	6M
9		Write the advantages and disadvantages of manometers	**L2**	**CO5**	12M
10		Explain with neat sketch Bourdon tube pressure gauge	**L2**	**CO5**	12M

UNIT – IV

FLUID DYNAMICS AND PIPE FLOW

1		List out types of flows and explain it?	**L1**	**CO4**	12M
2		Derive Continuity equation in one dimensional form Euler's equation of motion and Bernoulli's energy equation?	**L3**	**CO4**	12M
3		Formulate an expression for discharge measurement by Venturimeter	**L6**	**CO4**	12M
4		Develop an expression for Discharge measurement by orifice meter?	**L3**	**CO5**	12M
5		Discuss the impulse momentum equation? Derive an expression for force exerted by a fluid flow on bend pipe?	**L2**	**CO5**	12M
6		Explain about Energy gradient line and Hydraulic gradient line?	**L2**	**CO6**	12M
7		Derive an expression for the loss of head due to sudden enlargement of a pipe.	**L3**	**CO5**	12M
8		Derive an equation for Darcy Weisbach equation?	**L3**	**CO5**	12M
9		Enlist the major and minor loses in pipes. Derive the expression for loss of head due to sudden contraction	**L3**	**CO5**	12M
10		Write a short note on Pipes in Series and Pipes in Parallel and derive expression for it?	**L2**	**CO5**	12M

UNIT – V

IMPACT OF JETS AND HYDRAULIC TURBINES

1	(a)	Define the terms a) Fluid jet b) Impact of jets	**L1**	**CO5**	6M
	(b)	Derive an expression for the force exerted by a jet of water on an inclined fixed plate in the direction of the jet.	**L3**	**CO5**	6M
2	(a)	Find the force exerted by a jet of water of diameter 75 mm on a stationary flat plate, when the jet strikes the plate normally with velocity of 20 m/s.	**L5**	**CO5**	6M
	(b)	Derive an expression for the hydraulic efficiency when a liquid jet strikes a single fixed curved vane	**L3**	**CO5**	6M
3	(a)	A jet of water of diameter 7.5cm moving with a velocity of 25 m/s, strikes a fixed plate in such a way that the angle between the jet and plate is $60^{o.}$ Find the force extracted by Jet a) in the direction normal to the plate. b) in the direction of jet.	**L5**	**CO5**	6M
	(b)	A jet of 50 mm diameter delivers a stream of water at 20 m/s perpendicular to a plate that moves away from the jet 5 m/s. Find the force on the plate, work done and efficiency of jet.	**L5**	**CO5**	6M
4	(a)	Derive an expression for the force exerted by a jet on fixed vertical flat plate.	**L3**	**CO5**	6M
	(b)	A jet of water 50mm strikes a flat stationary plate normally with a velocity of 30 m/s.Find the force experienced by the plate.	**L5**	**CO6**	6M
5		A jet of water of diameter 50mm moving with a velocity of 25 m/s impinges on a fixed curved plate tangentially at one end at an angle of 30° to the horizontal. Calculate the resultant force of the jet on the plate if the jet is reflected through an angle of 50°. Take $g = 10\ m/s^2$	**L5**	**CO6**	12M
6		Explain the working of a Pelton wheel with a neat sketch .	**L2**	**CO6**	12M
7		Draw the neat sketch of Modern Francis turbine and explain its working?	**L1**	**CO6**	12M
8		State the differences between Pelton wheel and Francis turbine	**L1**	**CO6**	12M

9		Draw the neat sketch of Kaplan turbine and explain its working.	**L1**	**CO6**	12M
10		State the differences between Kaplan turbine and Francis turbine	**L1**	**CO6**	12M

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