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B.E. / B.TECH. DEGREE EXAMINATIONS, MAY 2023

First Semester

ME22152 – BASICS OF MECHANICAL ENGINEERING*(Common to Biotechnology & Chemical Engineering)***(Regulation 2022)****TIME: 3 HOURS****MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Understand the various energy resources and the principle of their operations.	2
CO 2	Identify the types of IC engines and will calculate the various parameters.	3
CO 3	Understand the principle of refrigeration and Air-conditioning.	2
CO 4	Learn the various Engineering Materials and the manufacturing processes.	2
CO 5	Know the recent trends in I.C. engines and manufacturing.	1

PART- A (20 x 2 = 40 Marks)

(Answer all Questions)

	CO	RBT LEVEL
1. Write down the functions of surge tank.	1	2
2. List down the advantages of solar power plant.	1	2
3. List the raw materials used for bio-mass power plant.	1	2
4. 1000 watts Iron Box used for 2 hours. What is the current consumption of electricity? Assume unit price is Rs 5/-.	1	2
5. What is the difference between petrol engine & diesel engine?	2	2
6. Identify the engine, which is using a spark plug.	2	2
7. List the applications of Electric Vehicles.	2	2
8. Identify the materials used for piston.	2	2
9. Write down the primary objective of a refrigerator.	3	2
10. List the function of a Compressor.	3	2
11. List the functions of primary and secondary Refrigerants.	3	2
12. List the need for insulation in refrigerators.	3	2
13. Identify the Zero Approach Manufacturing Process.	4	2
14. Identify the suitable alloys to improve the ductility property.	4	2
15. Identify the tool material used in lathe machine.	4	2
16. Differentiate between brazing and soldering.	4	2
17. Identify the liquid based Additive manufacturing technique.	5	1
18. Differentiate between prismatic joint and revolute joint in Robot.	5	1
19. Identify the robot, which is used for painting & Welding.	5	1
20. Define 2RP robot.	5	1

PART- B (5 x 10 = 50 Marks)

	Marks	CO	RBT LEVEL
21. (a) Illustrate Diesel power plant along with its merits & demerits.	(10)	1	2

(OR)

(b)	Illustrate Tidal power plant along with its merits & demerits.	(10)	1	2
22. (a)	Illustrate the working of 4-Stroke Diesel engines briefly.	(10)	2	2
	(OR)			
(b)	The following data were given for a single cylinder water cooled diesel engine having a rated power of 3.5 kW @ 2000 rpm. Assume that friction power is equal to 8% of the brake power. The engine is coupled with a mechanical type dynamometer having a mean radius of the brake drum as 0.26 m. The time taken for 10 CC of volume of the fuel consumed at full load is 35 seconds. Find the Maximum load, Total Fuel Consumption, Brake Thermal Efficiency, Mechanical Efficiency and Indicated Thermal Efficiency. (Calorific value of the diesel is 42,500 kJ/kg and density of the diesel is 900 kg/m ³).	(10)	2	2
23. (a)	Explain a vapour compressor refrigeration process with a neat sketch.	(10)	3	2
	(OR)			
(b)	A refrigeration system produces 30 kg/hr of ice at 0°C from water at 30°C. Find the refrigeration effect per hour and TR. If it consumes 1 kw of energy to produce the ice, find the COP. Assume latent heat of solidification of water at 0°C as 385 kJ/kg and specific heat of water 2.52 kJ/kg °C.	(10)	3	3
24. (a)	Discuss any one metal joining process with a neat sketch.	(10)	4	2
	(OR)			
(b)	Illustrate column & Knee type milling machine with its merits & demerits.	(10)	4	2
25. (a)	(i) Identify the suitable Additive manufacturing methods for metal.	(2)	5	1
	(ii) Illustrate any one Additive Manufacturing Methods.	(8)	5	1
	(OR)			
(b)	Identify the Robot for hotel industry. Explain with a neat sketch.	(10)	5	1

PART- C (1 x 10 = 10 Marks)

(Q.No.26 is compulsory)

		Marks	CO	RBT LEVEL
26.	Illustrate a fuel cell technology. How it is different from Battery and IC Engines.	(10)	4	2
