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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

First Semester, B.E. - Semester End Examination; May - 2022

Elements of Mechanical Engineering

(Common to all Branches)

Time: 3 hrs *Max. Marks: 100*

Course Outcomes

The Students will be able to:

CO1: Explain the formation of steam and working principle of steam and gas turbines.

CO2: Classify and Explain the working principles of different types of IC engines and calculate some of their performance parameters.

CO3: Classify different types of lathes and drilling machines and explain their working principles and different operations performed by them.

CO4: Classify different types of Milling and Grinding machines and explain their working principles and different operations performed by them.

CO5: Explain the working principles of different joining processes like welding, brazing and soldering. Identify different types of belt drives.

***Note**: I) **PART - A** is compulsory. **Two** marks for each question.*

*II) **PART - B**: Answer any **Two** sub questions (from a, b, c) for Maximum of **18 marks** from each unit.*

Q. No.		Questions	Marks	BLs	COs
		I : PART - A	**10**		
I	a.	Define Super heated steam.	2	L1	CO1
	b.	Define cranking process of IC engine.	2	L2	CO2
	c.	Explain priming of centrifugal pump.	2	L1	CO3
	d.	Explain Down milling process.	2	L1	CO4
	e.	List out the different types of flames used in gas welding.	2	L1	CO5
		II : PART - B	**90**		
		UNIT - I	**18**		
1	a.	Explain the different types of boiler with examples.	9	L2	CO1
	b.	Differentiate the impulse and reaction steam turbine.	9	L4	CO1
	c.	With a neat sketch, explain open cycle gas turbine.	9	L2	CO1
		UNIT - II	**18**		
2	a.	Discuss on working principle of 2-stroke petrol engine with a schematic diagram.	9	L2	CO2
	b.	Differentiate the constructional and working features of petrol and diesel engine.	9	L4	CO2
	c.	The following details are the test result of a single cylinder, 4-stroke IC engine: IP = 26 kW; BP = 22 kW; Engine Speed = 400 rpm; Fuel/BP hour = 0.33 kg; Calorific value of fuel = 44300 kJ/kg Determine: i) Mechanical efficiency ii) Indicated thermal efficiency iii) Brake thermal efficiency	9	L3	CO2

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	UNIT - III	**18**		
3 a.	Classify the hydraulic pumps and explain the working principle of double acting reciprocating pump.	9		CO2
b.	Define refrigerant and explain the different types and properties of refrigerants used for refrigeration.	9		CO3
c.	With a neat sketch, explain the working of room air conditioner.	9		CO3
	UNIT - IV	**18**		
4 a.	Sketch and explain the parts of center lathe.	9	L2	CO4
b.	Discuss on the different types of abrasives and bonding materials used in grinding process.	9	L2	CO4
c.	With a neat sketch, explain radial drilling machine.	9	L2	CO4
	UNIT - V	**18**		
5 a.	Write a short note on following terms: i) Electrodes ii) Spelters iii) Creep in belt drives	9	L2	CO5
b.	Elaborate the working principle of Gas welding process.	9	L5	CO5
c.	Derive an expression for the length of cross belt drive.	9	L3	CO5

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