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

(An Autonomous Institution affiliated to VTU, Belagavi)

Second Semester, B.E. - Semester End Examination; August - 2023

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 a Maximum of **18 marks** from each unit.*

Q. No.	Questions	Marks	BLs	COs	POs
	I : PART - A	**10**			
1 a.	Define dryness fraction.	2	L1	CO1	PO1,2
b.	List two differences between petrol and diesel engines.	2	L1	CO2	PO1
c.	List two properties of refrigerants.	2	L1	CO3	PO1
d.	List the drilling operations.	2	L1	CO4	PO1
e.	List the types of flame.	2	L1	CO5	PO1
	II : PART - B	**90**			
	UNIT - I	**18**			
2 a.	Explain the formation of steam at constant pressure with neat diagram.	9	L2	CO1	PO2
b.	List the differences between impulse and reaction turbines.	9	L2	CO1	PO1
c.	With neat sketches, explain the working principle of open and closed cycle gas turbine.	9	L2	CO1	PO2
	UNIT - II	**18**			
3 a.	Give a detailed classification of IC engine.	9	L1	CO2	PO2
b.	With a sketch and P-V diagram, explain the working of four stroke petrol engine.	9	L2	CO2	PO2
c.	The following observations were recorded during a test on a 4-Stroke engine: Bore = 25 cm, Stroke = 40 cm, Crank speed = 250 rpm, Net load on brake drum = 700 N, Diameter of brake drum = 2 m, Indicated M.E.P = 6 bar, Fuel consumption = 0.0013 kg/s, Sp. Gravity of fuel = 0.78 and C. V of fuel = 43900 kJ/kg.	9	L3	CO2	PO2

Contd... 2

Determine;

i) BP

ii) IP

iii) FP

iv) Mechanical Efficiency

v) Indicated thermal efficiency

	UNIT - III	**18**				
4 a.	With neat diagram, explain the working principle of single acting reciprocating pump.	9	L2	CO3	PO2	
b.	With a neat sketch, explain the working principle of centrifugal pump.	9	L2	CO3	PO2	
c.	With a neat sketch, explain the working principle of room air conditioner.	9	L2	CO3	PO2	
	UNIT - IV	**18**				
5 a.	With neat sketches, explain the following lathe operations: i) Thread cutting ii) Taper turning	9	L2	CO4	PO2	
b.	Explain up-milling and down-milling with neat diagrams.	9	L2	CO4	PO2	
c.	With a neat sketch, explain center-less grinding machine.	9	L2	CO4	PO2	
	UNIT - V	**18**				
6 a.	Explain the principle of welding, brazing and soldering.	9	L2	CO5	PO2	
b.	With a neat sketch, explain the working process of electric arc welding operation.	9	L2	CO5	PO2	
c.	Explain open and crossed belt drive with neat diagrams.	9	L2	CO5	PO2	

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