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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; April - 2021

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	POs
	I : PART - A	**10**			
I a.	Define the following: i) Saturated vapour ii) Dryness fraction	2			
b.	Define; i) Mean effective pressure ii) Atomisation	2			
c.	Explain briefly; i) Dynamic pump ii) Positive displacement pump	2			
d.	Explain the difference between Drilling and Boring.	2			
e.	List two primary functions of the flux in soldering.	2			
	II : PART - B	**90**			
	UNIT - I	**18**			
1 a.	With the help of temperature-volume diagram, explain stream formation clearly showing the salient features.	9			
b.	Explain the principle of reaction turbine. With a neat sketch, explain the construction and working of parson's turbine.	9			
c.	With a neat block diagram, explain the working principle of open cycle and closed cycle gas turbine. Also mention the advantages of each.	9			

Contd… 2

UNIT - II **18**

2 a. With sketches and P-V diagram, explain the working of a two stroke petrol engine. 9

b. Draw a neat schematic diagram of IC engine and explain the parts. 9

c. A four stroke cycle oil engine has the following data:
Mean effective pressure = 550 kPa, Swept volume = 15 liters, Speed of the engine 6 rpm, Effective brake load = 80 kg, Effective brake radius = 1 m, fuel consumption = 8 kg/h, Calorific value of fuel = 40 MJ/kg. Determine; 9
i) IP ii) BP
iii) mechanical efficiency iv) Indicated thermal efficiency

UNIT - III **18**

3 a. What is the function of a pump? With a neat sketch, explain the construction and working of a double acting piston type reciprocating pump. 9

b. Give an account important properties of refrigerant and list the commonly used refrigerant. 9

c. With a neat sketch, explain vapour absorption refrigeration system. 9

UNIT - IV **18**

4 a. Explain the principle of working of centre lathe. Write a note on centre lathe specification. 9

b. With a neat sketch, explain the construction and working of radial drilling machine. 9

c. Explain; 9
i) Up milling ii) Down milling iii) Centre less grinding

UNIT - V **18**

5 a. With a neat sketch, explain the working of electric arc welding. Mention its applications. 9

b. Explain the different Oxy-acetylene gas flames with sketches and mention the applications of each. 9

c. Write a note on slip and velocity ratio of belt drives. A belt runs over a pulley of 800 mm diameter at a speed of 180 rpm. The angle of lap is 165° and the maximum tension in the belt is 2 kN. Determine the power transmitted, if the friction between belt and pulley is 0.3 9

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