



**P.E.S. College of Engineering, Mandya - 571 401**  
*(An Autonomous Institution affiliated to VTU, Belagavi)*  
**First Semester, B.E. - Semester End Examination; Dec. - 2019**  
**Elements of Mechanical Engineering**  
**(Common to All Branches)**

Time: 3 hrs

Max. Marks: 100

**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
<b>I : PART - A</b>		<b>10</b>
I a.	List the advantages of renewable energy.	2
b.	Define the following terms with relevant expressions, i) Enthalpy of superheated steam                      ii) Enthalpy of dry saturated steam	2
c.	Explain the classification of Internal Combustion Engine.	2
d.	Explain slot milling process.	2
e.	List the advantages of brazing.	2
<b>II : PART - B</b>		<b>90</b>
<b>UNIT - I</b>		<b>18</b>
1 a.	With a neat sketch, explain the working principle of impulse steam turbines.	9
b.	What is compounding in turbines and what is the necessity of compounding?	9
c.	Explain closed cycle gas turbine with a neat sketch.	9
<b>UNIT - II</b>		<b>18</b>
2 a.	Explain working of 4 stroke CI engine with the help of diesel cycle.	9
b.	List out the differences between 2 stroke and 4 stroke engines.	9
c.	The following data were recorded during a test on Single Cylinder Four Stroke Engine: Bore = 150 mm Stroke = 300 mm Speed = 300 rpm Brake Torque = 200 N-m Indicated mean effective Pressure = 7 bar Fuel Consumption = 204 kg/hr Calorific value of Fuel = 42000 kJ / kg	9
	Determine the following:	
	i) Indicated power	
	ii) Brake power	
	iii) Mechanical efficiency	
	iv) Indicated thermal efficiency	
	v) Brake specific fuel consumption	

**UNIT - III****18**

- 3 a. Enumerate the advantages of rotary pumps over positive displacement pumps. 9
- b. Explain the working of room air conditioning with a neat sketch. 9
- c. With a neat sketch, explain how a vapor absorption refrigeration system works? 9

**UNIT - IV****18**

- 4 a. With a neat sketch, explain how taper turning is done by swiveling the compound tool rest. 9
- b. Explain centre less grinding with a neat sketch and write the difference between drilling, reaming and boring. 9
- c. What are the operations or processes carried on a milling machine? Explain slot milling process with a neat sketch. 9

**UNIT - V****18**

- 5 a. Discuss the advantages and disadvantages of welding and soldering. 9
- b. Write any three applications of belt drive and explain the phenomenon of slip and creep in belt drives. 9
- c. A shaft running at 160 rpm is to drive another shaft at 250 rpm by an open belt drive. The distance between the shafts is 2.75 m and the smaller pulley on driven shaft is 600 mm in diameter. Determine the length of belt. Also find the length of belt required to alter the direction of rotation of the driven shaft without changing that of driving shaft. 9

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