



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

(An Autonomous Institution affiliated to VTU, Belagavi)

Second Semester, B.E. - Semester End Examination; May / June - 2019

Elements of Mechanical Engineering

(Common to All Branches)

Time: 3 hrs

Max. Marks: 100

Note: Answer **FIVE** full questions, selecting **ONE** full question from each unit.

UNIT - I

- 1 a. Explain the following terms : 10
- i) Latent heat ii) Sensible heat iii) Dryness fraction iv) Super heated steam v) Internal energy
- b. Explain the formation of steam at constant pressure with P-T diagram. 10
- 2 a. Explain with neat sketch closed cycle gas turbine. 10
- b. Sketch and explain the working of reaction turbine with the help of pressure-velocity graph. 10

UNIT - II

- 3 a. Give a detailed classification of I.C. engine. 10
- b. With a neat sketch, explain the working principle of 4-stroke petrol engine with P-V diagram. 10
- 4 a. Explain with neat sketches, working principle of 2-stroke petrol engine. 10
- b. A 4-cylinder two stroke petrol engine develops 30 kW at 2500 rpm. The mean effective pressure on each piston is 8 bars and mechanical efficiency is 80%. Calculate the diameter and stroke of each cylinder, stroke to bore ratio 1:5. Also calculate the fuel consumption, if brake thermal efficiency is 28%. The C.V. value of the fuel is 43900 kJ/kg. 10

UNIT - III

- 5 a. With neat sketch, explain the parts of centrifugal pump and its application. 10
- b. Explain with neat sketches, the working of single acting and double acting reciprocating pumps. 10
- 6 a. List any ten properties of a good refrigerant. Explain COP. 10
- b. Explain with neat sketch vapour absorption refrigeration system. 10

UNIT - IV

- 7 a. Draw a neat sketch of centre lathe and label the parts. 10
- b. Explain with neat sketch Radial drilling machine. 10
- 8 a. Distinguish between Up-milling and Down-milling. 10
- b. With a neat sketch, explain the working of cylindrical grinding machine. 10

UNIT - V

- 9 a. Explain with neat sketch oxy-acetylene gas welding process. 10
- b. Distinguish between soldering and brazing and mention their applications. 10
- 10 a. Derive an expression for length of belt for closed belt drive. 10
- b. The diameter of driver pulley is 150 mm and the driven pulley is 600 rpm. If the driver is rotating at a speed of 3000 rpm, determine the speed of the driven pulley. Also determine the velocity ratio of this drive. 10