



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

(An Autonomous Institution affiliated to VTU, Belagavi)

First Semester, B.E. - Semester End Examination; Dec - 2017/Jan - 2018

Elements of Mechanical Engineering

(Common to All Branches)

Time: 3 hrs

Max. Marks: 100

*Note: i) Answer FIVE full questions, selecting ONE full question from each unit
ii) Assume suitably missing data if any.*

UNIT - I

- 1 a. Give a brief classification of steam boilers. 10
- b. With a TH diagram, explain the following terms : 10
 - (i) Wet steam (ii) Dry saturated steam (iii) Super heated steam
 - (iv) Enthalpy (v) Latent Heat.
- 2 a. Mention and describe any five uses of steam and list out the advantages of steam turbines over other prime mover. 10
- b. With a neat schematic diagram, explain the working of an open cycle gas turbine and mention its applications. 10

UNIT - II

- 3 a. With neat sketches showing all the four strokes, explain the working of a 4-stroke compression ignition engine. Show all the 4-stroke on a TS diagram. 10
- b. Give a detailed classification of IC Engines. 10
- 4 a. Define the following terms with respect to an IC engine : 10
 - (i) Compression ratio (ii) Indicated power (iii) Brake power
 - (iv) Indicated thermal efficiency (v) Brake thermal efficiency.
- b. During a test on 4-stroke petrol engine, the following data was available : 10
 Speed of engine = 1000 rpm, Net brake Torque = 70 Nm, Indicated Mean Effective pressure (imep) 10 bar, Stroke = 150 mm, Bore = 100 mm, Rate of fuel consumption = 2.57 kg/hr, Calorific value of petrol = 4100 kJ/kg. Calculate the indicated thermal efficiency, brake thermal efficiency and mechanical efficiency.

UNIT - III

- 5 a. Give a brief classification of hydraulic pumps and indicate their applications. 10
- b. Bring out the advantages and disadvantages of centrifugal pumps. Mention any three important differences between reciprocating and centrifugal pumps. 10
- 6 a. Explain the principle of refrigeration and list any ten properties of refrigerants. 10
- b. With a neat sketch, explain the working of a room air conditioner. 10

UNIT - IV

- 7 a. With a neat line diagram, show how you would specify an engine lathe? 4
b. With a neat diagram, explain briefly the working of a horizontal milling machine. 8
c. With line sketches, briefly explain any four lathe tool operations. 8
- 8 a. Differentiate (with line sketches) up-milling and down-milling (showing rotation of the cutter and movement of the job). 6
b. Describe any three operations that you can perform on the milling machine. 6
c. Briefly explain the working principle of a centre less grinding machine with a simple sketch. 8

UNIT - V

- 9 a. List out and define metal joining processes that are available to you to bring about a permanent joint and explain any one of them. 12
b. Explain the action of flux in arc welding and list the functions of flux. 8
- 10 a. Distinguish between open belt drive and crossed belt drive and mention their advantages and disadvantages. 10
b. The diameter of driver is 150 mm and the driven pulley is 600 mm. 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

* * *