



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

(An Autonomous Institution affiliated to VTU, Belgaum)

**First Semester, B.E. - Semester End Examination; Dec. - 2015**

**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 required.

### UNIT - I

- 1 a. Explain the following :
- (i) Wet Steam
  - (ii) Dry saturated Steam 10
  - (iii) Super heated steam
  - (iv) dryness fraction
  - (v) Saturated Temperature
- b. Explain the steam formation mechanism at constant pressure with temperature-enthalpy diagram. 10
- 2 a. With a neat sketch explain working of velocity compounding. 6
- b. Differentiate between Impulse and Reaction turbine. 4
- c. Explain the working of closed cycle gas turbine with a line diagram. 10

### UNIT - II

- 3 a. Explain the working principle of 4-stroke diesel engine with theoretical PV-diagram. 12
- b. List the major differences between SI-Engine and CI - engines. 8
- 4 a. Define the following :
- i) Swept volume
  - ii) Clearance volume 8
  - iii) Piston speed
  - iv) Compression ratio
- b. On a single cylinder four-stroke petrol engine the following readings were taken.  
Load on the brake drum = 40 kg , Spring balance reading = 5 kg, Diameter of the brake drum = 120 cm, Fuel consumption = 3kg/ hour, Calorific value of the fuel = 42000 kJ/kg, Engine speed= 500 rpm, Find the brake thermal efficiency. 12

### UNIT - III

- 5 a. What are the functions of a pump? Describe with a neat sketch working of centrifugal pump. 10
- b. With a neat sketch explain the working of double acting reciprocating pump. 10

- 6 a. What is refrigeration? Explain in brief properties of good refrigerants. 8  
b. Explain with a neat sketch, working of room air conditioner. 12

**UNIT - IV**

- 7 a. Name the major parts of lathe and state their functions. 8  
b. With neat sketches explain the following drilling operations:  
(i) Boring  
(ii) Reaming 12  
(iii) Tapping  
(iv) Spot facing
- 8 a. List out the various operations that can be performed on milling machine. 4  
b. With a neat sketch explain the working principle of Horizontal milling machine. 8  
c. With a neat sketch explain the principle of center less grinding process. 8

**UNIT - V**

- 9 a. Differentiate between soldering and brazing. 4  
b. What is welding? With a neat sketch explain the working of gas welding process. 10  
c. Sketch and explain the different types of flames used in gas welding. 6
- 10 a. List the advantages and disadvantages of belt drives. 8  
b. Derive an expression for the length of the open belt drive. 12

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