

Model Question Paper
First Semester B.E. Degree (CBCS) Examination
Elements of Mechanical Engineering

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing one full question from each module.

2. Use of Thermodynamic data hand book permitted.

MODULE – I

- 1 a Enumerate the method of extracting energy from wind with a neat sketch (08Marks)
 b Illustrate the formation of steam with relevant sketches. (08Marks)
 c What are the different states of steam? Explain them in brief. (04 Marks)

OR

- 2 a Explain Zeroth law of thermodynamics. List the similarities and dissimilarities between work and heat. (10 Marks)
 b A stationary mass of gas is compressed without friction from an initial stage of 0.3 m^3 and 0.105 MPa to a final state of 0.15 m^3 , the pressure remaining constant. There is a transfer of 37.6 kJ of heat from the gas during the process. How much does the internal energy of the gas change? (10Marks)

MODULE – II

- 3 a With a neat sketch, explain the working of Lancashire boiler. (10 Marks)
 b Explain the different boiler mountings and accessories. (10 Marks)

OR

- 4 a Classify Hydraulic turbines and with a neat sketch explain the working of a typical impulse turbine. (10 Marks)
 b Describe the working of a reciprocating pump. (10 Marks)

MODULE – III

- 5 a With the help of P-V diagram, explain the operation of 4-Stroke Diesel engine (10 Marks)
 b The following observations were recorded during a test on single cylinder diesel engine: Brake Power = 75 kW , Brake thermal efficiency = 35% , Mechanical efficiency = 90% , calorific value = 40000 kJ/kg . Determine i) IP ii) FP iii) fuel consumed per hour. (10 Marks)

OR

- 6 a Explain the ideal properties of refrigerant. (06 Marks)
 b With the help of a sketch, explain the functioning of Vapor Absorption System. (10 Marks)
 c List the most commonly used refrigerants. (04 Marks)

MODULE – IV

- 7 a Classify and explain various types of smart materials (10 Marks)
 b With a neat sketch explain TIG welding. (10 Marks)

OR

- 8 a Derive an expression for length of belt in cross belt drive. (10 Marks)
 b What are the advantages and disadvantages of gear drives over belt drives? (10Marks)

Important Note: 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
 2. Any revealing of identification, appeal to evaluator and/or equations written e.g., $38+2=40$, will be treated as malpractice.

MODULE - V

- 9 a What are the various methods of producing taper turning method? Explain taper turning by swiveling the compound method. (10Marks)
- b Explain the following machining operations on milling machine with suitable sketches (10 Marks)
- (i) Plane milling (ii) End milling (iii) Slot milling (iv) Form milling

OR

- 10 a Explain the components of a CNC with a block diagram (10Marks)
- b Elaborate the various robot configurations with simple sketches (10 Marks)