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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 steam tables is permitted.

MODULE – I

1 a Classifydifferent sources of energy with suitable examples. **(04 Marks)**

b Find the enthalpy of 1kg of steam at 12 bar when (i) steam is dry saturated (ii) steam is 22% wet (iii) superheated to 250°C. Take the specific heat of superheated steam as 2.25kJ/kgK. **(06 Marks)**

c With the help of T-h diagram, explain the generation of steam at constant pressure. **(10 Marks)**

OR

2 a Write short note on (i) global warming (ii) Ozone depletion **(10 Marks)**

b State and Explain Zeroth law, first law and second law of thermodynamics. **(10 Marks)**

MODULE – II

3 a With a neat sketch, explain the working of water tube boiler. **(10 Marks)**

b Classify Hydraulic pumps and explain the working principle of centrifugalpump with a neat sketch. **(10 Marks)**

OR

4 a Classify hydraulic turbines and with a neat sketch explain the working of Francis turbine. **(10 Marks)**

b Explain the functions of (i) Water level indicator (ii) Safety valve (iii) Super heater (iv) Pressure gauge (v) Feed check valve **(10 Marks)**

MODULE – III

5 a With the help of P-V diagram, explain the operation of 4-Stroke Petrol engine **(10 Marks)**

b Following data are collected from a 4-stroke, single cylinder at full load. Bore = 200mm, stroke= 280mm, speed = 300 rpm, Indicated mean effective pressure = 5.6bar, Torque on the brake drum = 250 N-m, fuel consumed = 4.2kg/hour, and calorific value of fuel = 41000 KJ/kg.Determine (i) Brake power (ii) Mechanical Efficiency (iii) Indicated thermal efficiency (iv) Brake thermal efficiency **(10 Marks)**

OR

6 a Define the following refrigeration terms :
i) Refrigerant ii) Ton of refrigeration iii) COP iv) Relative COP v) Refrigerating effect **(05 Marks)**

b Define refrigeration. State the application of refrigeration **(05 Marks)**

c With the help of a flow diagram, explain the functioning of Vapor Compression refrigeration cycle. **(10 Marks)**

MODULE – IV

7 a Classify and explain various types of Steel (10 Marks)

b With a neat sketch explain the Arc welding method. (10 Marks)

OR

8 a Derive an expression for length of belt in open belt drive. (10 Marks)

b A shaft running at 100 rpm, is to drive a parallel shaft at 150 rpm. The pulley on the driving shaft is 350 mm in diameter. Find the diameter of the driven pulley. Calculate the linear velocity of the belt and the velocity ratio. (10Marks)

MODULE – V

9 a Explain the following machining operations on Lathe machine with suitable sketches (i) Turning (ii) Facing (iii) Thread cutting (iv) Knurling (10 Marks)

b With a neat sketch explain the working of vertical milling machine (10 Marks)

OR

10 a Explain the advantages and applications of robots in industries. (10Marks)

b Discuss the elements of a CNC system with a neat block diagram. (10 Marks)