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

(An Autonomous Institution affiliated to VTU, Belgaum)

First Semester, B.E. : Make – up Examination; Jan/Feb - 2016

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.	Write the broad classification of Boilers.	4
b.	Explain the working principle of De-laval Steam turbine with a neat sketch.	8
c.	With the help of a schematic diagram explain the working of an open - cycle gas turbine.	8
2 a.	With a neat sketch describe Pressure - Temperature diagram for steam formation.	8
b.	Explain the working principle of reaction steam turbine with a neat sketch.	8
c.	Explain following terms :	
	i) Enthalpy of steam	4
	ii) Latent heat of Evaporation.	

UNIT - II

3 a. With a neat sketch explain the working principle of 4-stroke diesel engine.   10

b. The following details are the result of a single cylinder, 4 Stroke IC engine, IP = 26 kW, BP = 22 kW, Engine speed = 40 rpm; Fuel/BP hour = 0.33 kg, C_V = 44,300 kJ/kg. Determine:
   i) Mechanical Efficiency   10
   ii) Indicated Thermal Efficiency
   iii) Brake Thermal Efficiency

4 a. Differentiate between petrol and diesel engines.   8

b. The following observations were recorded during a test on 4 Stroke engine. Bore = 25 cm, stroke = 40 cm, crank speed = 250 rpm, Net load on brake drum = 700 N, Diameter of brake drum = 2 m. Indicted MEP = 6 bar, Fuel consumption = 0.0013 kg/s. Specific gravity of fuel = 0.78, C_V = 43900 kJ/kg. Determine :
   (i) BP   (ii) IP   (iii) FP
   (iv) Mechanical efficiency   12
   (v) Indicated Thermal efficiency
   (vi) Brake Thermal Efficiency.

UNIT - III

5 a.	With neat sketch explain working of centrifugal pump and mention its applications.	10
b.	With suitable neat sketch explain working principle of vapour absorption refrigeration system.	10
6 a.	Sketch and explain working of Room air conditioner.	10
b.	Differentiate the reciprocating pump and centrifugal pump.	5
c.	Explain working of Double acting Reciprocating pump.	5

UNIT - IV

7 a.	Illustrate with sketch only the nomenclature of a twist drill.	7
b.	Sketch a neat diagram of a lathe and name its parts.	8
c.	Differentiate climb and conventional milling processes.	5
8 a.	With neat diagram explain vertical milling machine.	8
b.	Explain working principle of cylindrical grinding machine with neat sketch.	8
c.	Explain the following drilling operations :	
	i) Tapping	4
	ii) Reaming.	

UNIT - V

9 a.	A motor runs a lathe at 400 rpm. The diameters of the motor pulley and the lathe pulley are 0.2 m and 0.6 m respectively. Find the velocity ratio and speed of the motor.	4
b.	Explain principle and operation of Electric arc welding process.	10
c.	Explain different types of gas flames with a neat sketch.	6
10 a.	Derive the expression for length of cross belt drive.	10
b.	Differentiate between soldering and Brazing.	4
c.	Explain following terms :	
	i) Plastic welding	
	ii) Flux	6
	iii) Electrodes	

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