1E2407

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B. Tech. I - Sem. (Main/Back) Exam., Dec. 2019
1FY1 – 07 Basic Mechanical Engineering

Time: 2 Hours

Maximum Marks: 80
Min. Passing Marks: 28

Instructions to Candidates:

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[5×2=10]**

All questions are compulsory

Q.1 Define blade velocity co – efficient.

Q.2 What is the role of moderator in nuclear power plant?

Q.3 Why priming of a pump is required?

Q.4 Describe Zeroth law of thermodynamics.

Q.5 Differentiate between Joule's law and Gay – Lussac's law

PART – B

(Analytical/Problem solving questions) **[4×10=40]**

Attempt any four questions

Q.1 Write a short note on points given below-

(a) Power output of Parson's reaction turbine.

(b) Velocity diagram of Parson's reaction turbine

(c) Blade efficiency of Parson's reaction turbine.

(d) Stage efficiency of Parson's reaction turbine

(e) Nozzle efficiency of Parson's reaction turbine

Q.2 (a) Discuss various components of nuclear power plant.

(b) Differentiate between coal thermal power plant and Geo thermal power plant in brief.

Q.3 Explain working of a reciprocating pump along with their applications and neat diagram.

Q.4 Describe the following points –

(a) Case hardening

(b) Unit of Refrigeration

(c) Co – efficient of performance

(d) Cast Iron and types

(e) Cutting speed

Q.5 Explain Locomotive Boiler by using following points –

(a) Neat sketch

(b) Working principle

(c) Components / parts & their working

(d) Applications

Q.6 Explain the following processes-

(a) Soaking

(b) Brazing

(c) Soldering

(d) Drilling

(e) Extrusion

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[2×15=30]**

Attempt any two questions

Q.1 (a) Describe different types of belt drives.

(b) Derive an expression for the length of open belt drive.

(c) Ice is formed at 0°C from water at 20°C. The temperature of refrigerant is 10°C. Find the Ice formed per kWh. Assume latent heat of Ice is 334 kJ/kg. Assume working in perfect Carnot cycle.

Q.2 (a) Explain working of an I.C. Engine with their components.

(b) Derive the formula of mechanical efficiency and indicated power of an I.C. Engine.

Q.3 (a) Describes Electrolux refrigerator with neat sketch.

(b) Two parallel shafts 6m apart are to be connected by a belt running over pulleys of diameter 50 cm and 30 cm respectively. Determine the exact and approximate lengths of belt required.

(i) If the belt is open

(ii) If the belt is crossed

(c) What is centrifugal tension? Derive an expression for the same.
