

**GANPAT UNIVERSITY**  
**B. TECH SEM-II (ME-INT/Civil-INT/CE/BM/EC/IT/Marine)**  
**CBCS REGULAR EXAMINATION April - June 2015**  
**2ME101 ELEMENTS OF MECHANICAL ENGINEERING**

MAX. TIME: 3 HRS

MAX. MARKS: 60

- Instructions:** (1) This Question paper has two sections. Attempt each section in separate answer book.  
(2) Figures on right indicates full marks.  
(3) Be precise and to the point in answering the descriptive questions.  
(4) Assume suitable data if necessary.

**SECTION: I**

- Q.1** (a) Explain the working of Internal expanding shoe brake. (5x2=10)  
(b) Compare Belt drive, Chain drive and Gear drive.

**OR**

- Q.1** (a) Discuss the working of 2-stroke Diesel Engine with neat sketch. (5x2=10)  
(b) Give the classification of I.C Engines in detail.

- Q.2** (a) Define a) Elasticity b) Hardness c) Resilience d) Toughness e) Stiffness (5x2=10)  
(b) Explain working of VAR cycle with the help of neat sketch.

**OR**

- Q.2** (a) What is Pump? Explain the working of Hand pump with neat sketch. (5x2=10)  
(b) Define the terms : 1) High grade energy 2) Extensive Property 3) Intensive Property  
4) Second law of Thermodynamics 5) Temperature

- Q.3** (a) Explain any one water-tube boiler with neat sketch. (5x2=10)  
(b) Discuss about the main components of boilers in detail and explain their function.

SECTION: II

- Q.4 (a) Derive an equation for the air standard efficiency of C.I engine. (5x2=10)  
(b) Derive the equation for work done in a reciprocating air compressor with clearance.

OR

- Q.4 (a) Explain the working of Spring Loaded Governor with neat sketch. (5x2=10)  
(b) In an Otto cycle the maximum temperature and minimum temperature are 1673 K and 228 K. The heat supplied per kg of air is 800 kJ. Calculate a) Compression ratio and b) Efficiency of the cycle. Take  $\gamma = 1.4$

- Q.5 (a) Prove that  $C_v = R/\gamma - 1$ . (5x2=10)  
(b) Discuss in detail about Throttling Calorimeter with neat sketch. How the dryness fraction is measured in case of it?

OR

- Q.5 (a) Define the terms : 1) Enthalpy of evaporation 2) Enthalpy of liquid 3) Amount of Superheat 4) Dry Steam 5) Wet Steam (5x2=10)  
(b) Explain the terms: 1) Adiabatic Index 2) Scavenging 3) Critical Point 4) Quantity governing 5) Air conditioning.

- Q.6 (a) The following results refer to a test on C.I engine. (5x2=10)  
I.P = 37 kW, F.P = 6 kW, Bsf<sub>c</sub> = 0.28 kg/kWh and C.V = 44300 kJ/kg.  
Calculate a) Mechanical efficiency b) Brake thermal efficiency. c) Indicated thermal efficiency.  
(b) An ideal gas is heated from 25°C to 145°C. The mass of gas is 2 kg.  
Determine a)  $C_p$  and  $C_v$  b)  $\Delta U$  c)  $\Delta H$ . Take  $R = 287 \text{ J/kg K}$  and  $\gamma = 1.4$  for gas.

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