Exam No: _____

GANPAT UNIVERSITY

B. TECH SEM 1st (ME/MC/CIVIL/EE) CBCS (NEW) REGULAR EXAMINATION DEC-2015

2 ME 101: Elements of Mechanical Engineering

TIME: 3 HRS

MAX. MARKS: 60

Instructions: (1) Use of steam table is permissible
(2) Figures on right indicate full marks.
(3) Be precise and to the point in answering the descriptive questions.
(4) Attempt all questions

SECTION: I

Q.1 a) What are anti-friction bearings? Give comparison between Individual drive and Group drive. (5)

b) What is Priming? Give comparison between Reciprocating and Centrifugal Pumps. (5)

OR

Q.1 a) Write short note on Internal expanding shoe brakes. (5)

b) Define the following terms: Resilience, Fatigue, Stiffness, Malleability and Creep (5)

Q.2 a) Differentiate between VCR cycle and VAR cycle. (5)

b) Define the terms: Gauge Pressure, Absolute Pressure, Absolute zero pressure, Specific heat capacity and Fuels. (5)

OR

Q.2 a) Explain working of Room air conditioner with neat sketch. (5)

b) Define the terms: Critical Point, Triple Point, Combustion, Third law of Thermodynamics and Calorific Value. (5)

Q.3 a) A cylinder contains 0.6 m^3 of gas at a pressure of 1 bar and 90^0C. The gas is compressed to a volume of 0.18m^3 according to the law $pV^n=C$. The final pressure is 5 bars. Assume R=0.287 kJ/kg K and adiabatic index = 1.4 for air. Calculate: The mass of gas, The value of index 'n' for compression and change of internal energy of gas. (6)

b) Find the enthalpy of 1 kg of steam at 12 bar when (i) steam is dry saturated (ii) steam is 22% wet and (iii) superheated to 250^0C. Use steam table and assume specific heat of the superheated steam as 2.1 kJ/kg K (4)

SECTION: II

Q.4 a) Differentiate between flywheel and governor. Draw turning moment diagram of flywheel. (5)

b) Derive the equation for work done in an air compressor with clearance. (5)

OR

Q.4 a) Explain the working of Spring loaded Governor with neat sketch. (5)

b) Give comparison between Reciprocating and Roto-dynamic compressors. (5)

Q.5 a) Explain with neat sketch about construction and working of Babcock and Wilcox boiler. (5)

b) Discuss in detail about Combined Calorimeter with neat sketch. (5)

OR

Q.5 a) What are boiler Mountings & accessories? Enlist and explain their functions. (5)

b) Derive Mayer's Equation. (5)

Q.6 a) An engine operating on Diesel cycle has maximum pressure and temperature of 45bar and 1500^0C. Pressure and temperature at the beginning of compression are 1 bar and 27^0C. Determine air standard efficiency of the cycle. Take adiabatic index = 1.4 for air. (5)

b) A two cylinder four stroke petrol engine has swept volume of 1.1×10^{-3} m^3. It runs at 950rpm and consumes 2.2 kg of petrol per hour having calorific value of 43000kJ/kg. The mean effective pressure in both cylinders is 7.5 bars. Determine indicted thermal efficiency and relative efficiency if clearance volume is 15% of swept volume. (5)

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