GANPAT UNIVERSITY
B.TECH SEM. II (CE/IT/EC/BM&I/Marine)
CBCS Regular Examination May-June 2014
2ME 101 ELEMENTS OF MECHANICAL ENGINEERING

TIME:-3 Hours   TOTAL MARKS-70

Instructions : -   (1) Attempt all questions.

(2) Assume suitable data if necessary.

(3) Figures to the right indicate full marks.

Section-I

Que.-1 (a) Draw the general layout of I.C. engine and explain different components of I.C. engine.   06

(b) Give the comparison between S.I. engine and C.I. engine.   06

OR

Que.-1 (a) Explain with neat sketch working of Two stroke Petrol engine.   06

(b) A four cylinder Diesel engine of a truck has bore 0.1 m and stroke 0.13 m. The standard design data is given as, piston speed = 10.5 m/s, engine power = 20 kW per liter of cylinder volume, brake thermal efficiency = 35 %, calorific value of fuel = 42 MJ/kg, specific gravity of fuel = 0.84. Determine (i) Engine speed in rpm (ii) Brake power (iii) Fuel consumption in liters per hr.   06

Que.-2 (a) Draw the p-V diagram for single stage reciprocating air compressor without clearance and drive work done an equation for same.   05

(b) What is priming? Why priming is required in centrifugal pump but not in reciprocating pumps? Also write the method of priming and explain any one of them.   06

OR

Que.-2 (a) List the application of the pump. Draw and explain with main components of centrifugal pump.   05

(b) A single stage air compressor is required to compress 90 m³ air per minute from 1 bar and 27°C to 10 bar. Find the temperature at the end of compression, work done, power required and heat rejected during each of following process (i) isothermal (ii) adiabatic. Assume no clearance.   06

Que.-3   **Attempt any three:**   12

(a) Briefly explain about brakes, clutches and couplings.

(b) With a neat sketch describe vapour compression refrigeration.

(c) With neat sketch define velocity ratio, tight and slack side in open as well as in cross belt drive.

(d) Differentiate between Flywheel and Governor.

Section - II

Que. – 4 **a)** Define Prime movers and give its classification according to sources of energy used by them. **6**

b) Define : a)Enthalpy b) Entropy c) Temperature d) Absolute pressure e) High grade energy f) Low grade energy **6**

OR

Que. – 4 **a)** State and explain second law of thermodynamics and define intensive and extensive properties with example. **6**

b) Define : a) Heat b) Triple point c) Calorific value d) Latent heat e) Specific heat f) Critical point **6**

Que. – 5 **a)** Define the term dryness fraction & explain various types of steam and give dryness fraction for each type. **5**

b) 5 kg of air is heated from 25° C to 150° C. Determine a) specific heats b) change in internal energy c) change in enthalpy d) heat supplied. Assume R = 0.287 kJ/kg K and γ = 1.4 and work done = 500 kJ **6**

OR

Que. – 5 **a)** Derive the equation for the air standard efficiency for C I engine. **6**

b) Prove that Cp – Cv = R **5**

Que. – 6 Answer the followings

a) What are fire tube boilers? Explain any one fire tube boiler with neat sketch. **6**

b) Define boiler mountings and accessories. Enlist various mountings and accessories. Write the functions of any two mountings & accessories. **6**

END OF PAPER