1E2407

Roll No. _____

Total No. of Pages : 3

1E2407

B. Tech. I Semester (Main) Examination, Dec. - 2018

ESC

1FY3-07 Basic Mechanical Engineering

Time : 2 Hours **Maximum Marks : 80**

Instructions to Candidates :

*Attempt all **five** questions from **Part A**, selecting **four** questions from **Part B** and **two** from **Part C**. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Part - A

(All questions compulsory)

Short answer questions (up to 25 words) **(5×2=10)**

1. Differentiate between Boyle's law and Charle's law.
2. Describe second law of Thermodynamics.
3. Define the properties of Lubricating oil or Lubricant.
4. Write the comparison between hot working and cold working processes.
5. What do you understand by the following?
   i) Chamfering ii) Baring

Part - B

(Attempt any four questions)

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

1. a) A V-belt of 6.4 Cm^3 cross-section has a groove angle 30^0 and the angle of lop of 165^0. The frictional co-efficient is 0.1. The weight of the V-belt is 1.4 Kg/ meter run. The maximum safe stress is 3 N/mm^2. Calculate the power transmitted at the velocity of 20 meter/sec. **(5)**

   b) Explain clearly what is meant by 'entropy' of a gas show on the FS diagram isothermal and adiabatic processes. **(5)**

2. a) Why is cooling of I.C. engines done? Describe briefly the various cooling methods used in I. C. engines. (5)

b) Explain the working of surface condenser. (5)

3. a) Write short note on Comfort air Conditioning. (5)

b) What are the advantages and disadvantages of Chain drive over belt drive? (5)

4. a) Differentiate between Homogeneous & Heterogeneous systems. (4)

b) Differentiate between welding, brazing and soldering processes. (6)

5. a) What are the advantages of artificial draught system over natural draught system? (5)

b) Derive expression of indicated power for a single stage reciprocating air compressor. (5)

6. a) Explain the various pattern allowances used in foundry. (5)

b) Explain the various engineering materials properties. (5)

Part - C

(Attempt any two)

Descriptive / Analytical / Problem solving / Design question

(2×15=30)

1. a) A four cylinder petrol engine of 250mm bore and 375 mm stroke works on Otto cycle. The clearance volume is 0.01052m^3. The initial pressure and temperature are 1 bar and 47°C. If the maximum pressure is limited to 25 bar, find the following.

i. The air standard efficiency of the cycle.

ii. The mean effective pressure for the cycle. (10)

b) The distance between two bearing of a shaft which transmits 200 h. p. at 250 rpm is 250 cm. It is subjected to torsion only. Determine the diameter of the shaft for steady loading if the safe shear stress is 400 Kg/cm^2. (5)

2. a) Describe the procedure for making green sand mould with the help of a sketch. (7)

b) A Fluid system under goes a non- flow frictionless process from $V_1 = 0.12m^3$ to $V_2 = 0.04\ m^3$ in accordance with $V = 4.5/p - 2$ where p is in bar and V is in m^3. During the process, the fluid system rejects 40kJ of heat. Determine change in enthalpy and internal energy. (8)

(5)

3. a) Define steam boiler & write different types of Boiler

b) 2 kw of power is transmitted by an open belt drive. The linear velocity of belt is 2 m/s. The angle of lop on the smaller pulley is 160^0. The coefficient of friction is 0.25. Determine the effect on power transimission in the following cases:

i. Initial tension in the belt is increased by 8%

ii. Initial tension in the belt is decreased by 8%

iii. Angle of lop is increased by 8% by the use of an idles pulley, for the same speed and the tension on the tight side.

iv. Coefficient of friction is increased by 8% by suitable dressing to the friction surface of the belt. **(10)**
