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BT-205

Roll No. 12176...

B. TECH (CS, IT & CE) & B. TECH (CS & CE) +
MBA DUAL DEGREE

SECOND SEMESTER END TERM EXAMINATION :
APRIL - 2013

ELEMENTS OF MECHANICAL ENGINEERING

Time : 3 Hrs.

Maximum Marks : 70

Note: Attempt questions from all sections as directed.

SECTION - A (30 Marks)

Attempt any 5 questions.

Each question carries 6 marks.

1. A heat engine draws in air at 1 bar and 300K. The maximum pressure and temperature values are 70 bar and 2000K respectively. Determine the air standard efficiency if the engine works on Diesel cycle.
2. Define following terms :

(i) Intensive and Extensive properties

(ii) Open system and closed system

P.T.O.

(iii) Thermodynamic equilibrium

3. A piston-cylinder device operates 1 kg of fluid at 20 atm. Pressure. The initial volume is 0.04 m^3 . The fluid is allowed to expand reversibly following a process $pV^{1.45} = \text{constant}$ so that the volume becomes double. The fluid is then cooled at constant pressure until the piston comes back to the original position. Keeping the piston unaltered, heat is added reversibly to restore it to the initial pressure. Calculate the work done in the cycle.
4. What is casting? Describe various pattern allowances in casting process.
5. Sketch the stress-strain diagram for mild steel and Explain the terms yield point and ultimate strength.
6. What is forging? Explain press forging with neat sketch

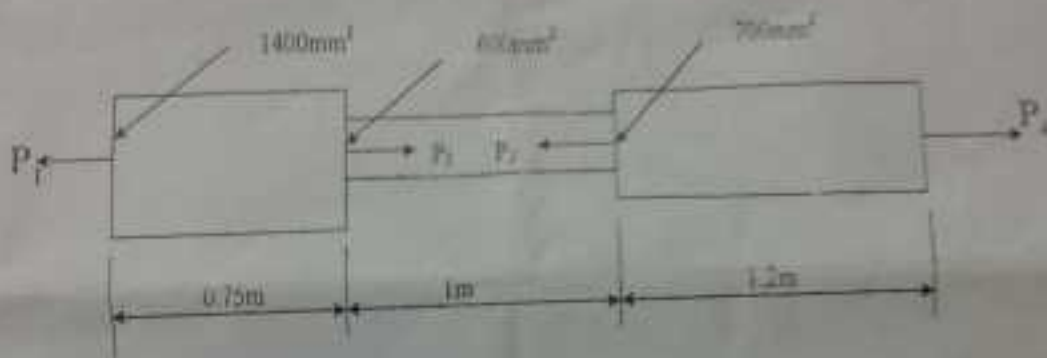
SECTION - B (20 Marks)

Attempt any two questions.

Each question carries 10 marks.

7. What is the steady flow process and control volume approach? Derive the steady flow energy equation (SFEE). Apply SFEE for nozzle and turbine?

8. What is welding? Classify the welding process. And explain the different types of flames used in oxyacetylene gas welding with the help of neat sketches. Also mention the temperatures of the different flames.
9. A member ABCD is subjected to point loads P_1 , P_2 , P_3 and P_4 as shown in the figure given below:



Calculate the force P_3 necessary for equilibrium if $P_1 = 120$ kN, $P_2 = 220$ kN, $P_4 = 160$ kN. Determine also the net change in length of the member. Take modulus of elasticity $E = 200$ GN/m².

SECTION - C (20 Marks)
(Compulsory)

10. (a) Define the following terms

- (i) Ductility (ii) Hardness
(iii) Stiffness (iv) Malleability
(v) Blanking

(5)

P.T.O.

(b) Differentiate between 2-stroke & 4-S engines. (7)

(c) State Second Law of thermodynamics & prove the equivalence of the two statements of Second Law. (8)