Set -03

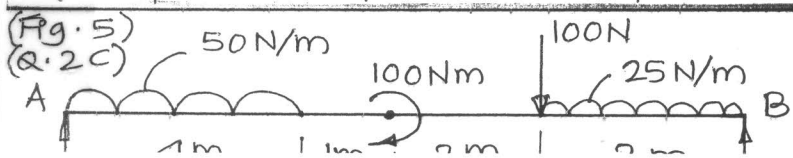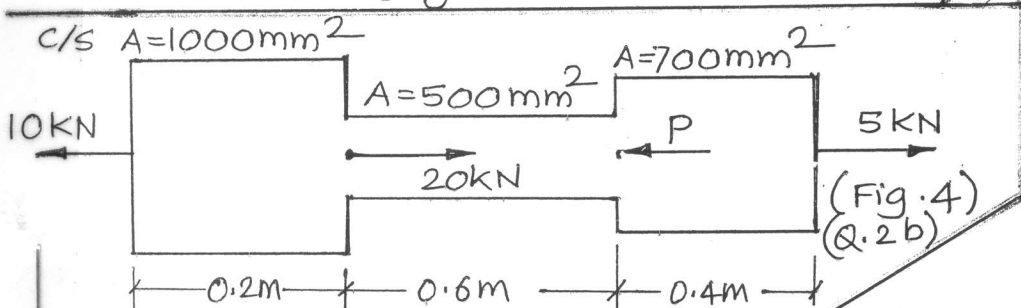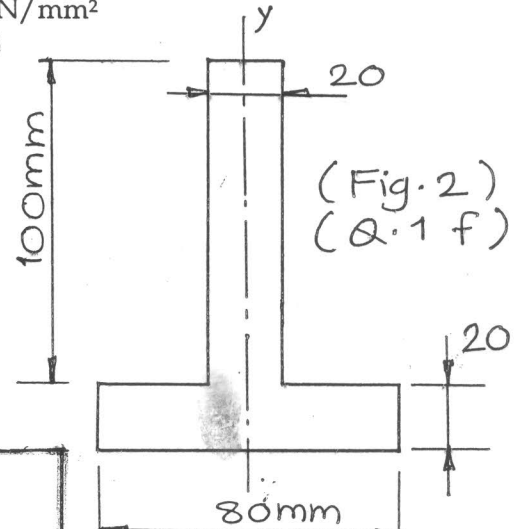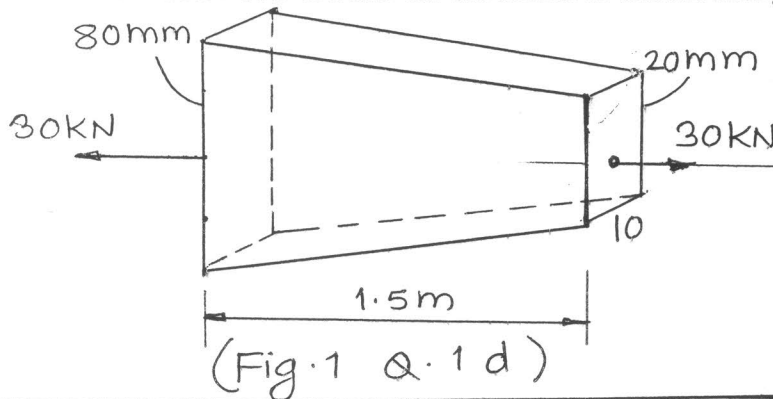|	
Subject: Strength of Materials	Date: 06.08.2013
Marks: 20	Duration: 01Hr
Class: SE-ME (Sem III) Unit Test - I	Branch: Mechanical Engg. (2013-14)

Instructions: 1. All questions are compulsory.
2. Figures to the right indicate maximum Marks.
3. Use of non-programmable calculator is permitted.

1. Attempt Any Four. (12)
   a. Explain different types of stresses & strains.
   b. Draw & explain Stress-Strain Curve for Ductile & Brittle Material
   c. Define: Young's Modulus, Modulus of Rigidity & Bulk Modulus
   d. A straight steel bar of 1.5m long has a rectangular section varying from 80mm x 10mm at one end to 20mm x 10mm at the other as shown in fig.1. Find the change in its length if it is subjected to 30 KN. Take, E= 200x 10^3 N/mm^2
   e. A 3 m long steel rod is at 40^{0}C. What is the free expansion when it is heated to 120^{0}C. If the expansion is prevented fully, what is the stress developed.
   Take, E= 220x 10^3 N/mm^2, α = 12 x 10^{-6} /^{0}C
   f. Find M.I. of a section shown in fig.2 about its centroidal y-axis

2. Attempt Any Two. (08)
   a. A rectangular block is loaded as shown in fig.3. Find the change in dimensions and also change in its volume. Take, E= 200x 10^3 N/mm^2, Poisson's Ratio = 0.25
   b. A member with varying circular cross section is subjected to axial loads at different locations as shown in fig.4. Find force P for equilibrium of the member & total change in length of the member, take, E= 200x 10^3 N/mm^2
   c. Draw SFD & BMD for the beams as shown in Fig.5
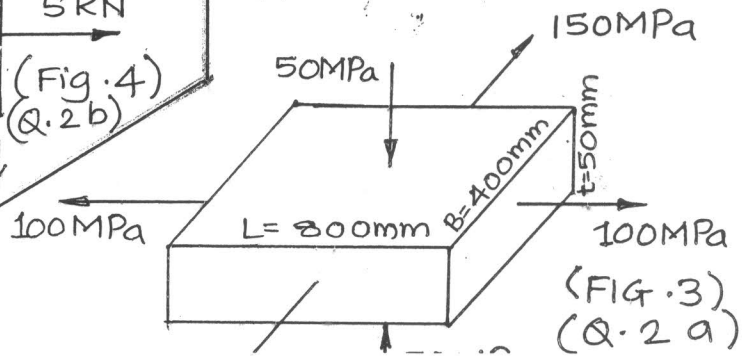
(Fig.1 Q.1 d)

(Fig.2) (Q.1 f)

c/s A=1000mm^2 A=500mm^2 A=700mm^2
10KN 20kN P 5 KN
0.2m 0.6m 0.4m
(Fig.4) (Q.2 b)

(Fig.5) (Q.2c)
50 N/m 100N 100Nm 25 N/m
A B
1m 1m 2m

50MPa 150MPa
100MPa L= 800mm B=400mm t=50mm 100MPa
(FIG.3) (Q.2 a)

Symbol of Secularism
& National Integration

Subject: ___THERMODYNAMICS_____		Date: Sept. 2013
Marks: 30		Duration: 1 Hr 00 Minutes
Class: S. E. (SEM -III) Unit Test I		Branch: MECHANICAL(2013-14)

Instructions: i) Both questions are compulsory   ii) Each question carries 15 Marks

Q. 1   Attempt any five (out of 8)   [5X3 = 15 Marks]

1. Write a note on 'Heat, Work and Internal energy'
2. State the 'Zeroth law' of thermodynamics. What is its significance?
3. What is 'Joule-Thomson' co-efficient? What is its significance?
4. State the First law of thermodynamics. Discuss its application to the 'closed system undergoing a cycle'.
5. Explain Perpetual Motion Machine of First kind and Second kind (PPM-I & PPM-II)
6. Show that the COP of heat pump is equal to One plus COP of refrigerator, when working between same two reservoirs.
7. Explain the term 'irreversibility' as applied to a thermodynamic process. Discuss the factors causing it.
8. Explain Carnot theorem and Carnot principle.
   OR
   Explain 'Clausius inequality'.

Q. 2   Attempt any Three (out of 5)   [3X5= 15 Marks]

1. 0.22 kg of air at 999°C expands from initial volume of 0.11 m3 to final volume of 0.55 m3. Determine the work done during the process, a) Isothermal b) Isobaric. Also find final pressure and temperature. Take R= 0.286 kJ/kg K.

2. Air flows through a gas turbine system at a rate of 5 kg/s. It enters with a velocity of 150 m/s and an enthalpy of 1000 kJ/kg. The velocity at exit is 120 m/s and enthalpy

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Subject : Production Processes-I   Marks: 20   (Sept. 13)
Test : Unit Test I   Duration: 1 Hr
Class : S.E. (Sem III) Unit Test I   Branch : Mechanical (2013-14)

Instructions:
1. Support answers with a neat sketch wherever possible/necessary.
2. Both questions are compulsory. However internal options are there.

Q.1. Attempt any six of the following questions (2 marks x 6 =12 marks).
   a. What is the difference between a pattern and a casting?
   b. Draw a sketch of a gating system and label its components.
   c. List the types of patterns used in foundry.
   d. What are the advantages of using a metal pattern?
   e. What are the functions of a core?
   f. Classify the various applications areas of Powder Metallurgy giving an example of each.
   g. State the various allowances kept on a pattern.

Q.2. Attempt any two of the following questions (4 marks x 2 = 8 marks).
   a. State the functions of a riser.
   b. What are the functions of a gating system?
   c. State the advantages and limitations of Powder Metallurgy?