Ministry of Higher Education&
Scientific Research
University of Technology
Materials Engineering Department

Subject: Strength of Materials
Examiner: Assist. prof. Wafaa M.Salih
Allowed time: 3 hours

وزارة التعليم العالي والبحث العلمي
الجامعة التكنولوجية
قسم هندسة المواد

Class: 2nd
Signature :
Date: 30 / 5 / 2015

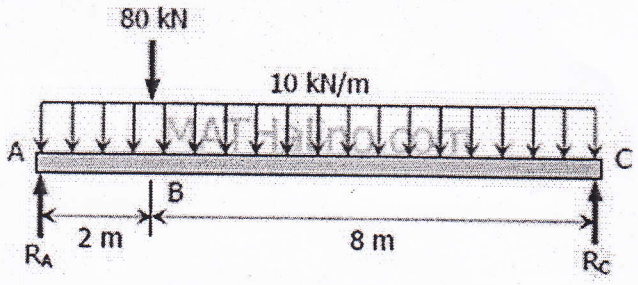
Final Exam/ First Attempt
(2014-2015)

Note :- Answer Four Questions only

Q1:- A T-section beam is (100 mm) wide and (200 mm) deep with a flange thickness of (25 mm) and a web thickness of (15 mm) , Determine the second moment of area of the cross section of the beam. (25 marks)

Q2:- At a temperature of (80°C), a steel tire (12 mm) thick and (90 mm) wide that is to be shrunk onto a locomotive driving wheel (2 m) in diameter just fits over the wheel, which is at a temperature of (25°C). Determine the contact pressure between the tire and wheel after the assembly cools to (25°C) . Neglect the deformation of the wheel caused by the pressure of the tire. Assume ($\alpha = 11.7\ \mu m/(m\cdot°C)$) and (E = 200 GPa) . (25 marks)

Q3:- Draw the S.F. and B.M. diagrams for figure below. (25 marks)



Q4:- Derive the polar second moment of area for 1- solid shaft 2- hollow shaft of internal radius (r) (25 marks)

Q5:- A circular aluminum rod 10 mm in diameter is loaded with an axial force of (2 kN), What is the decrease in diameter of the rod? Take (E=70 GN/m2) and (v = 0.33). (25 marks)

.....GOOD LUCK.....