

السبت : ١٧ / ٥ / ٢٠١٤ م
المستوى: الثاني
برنامج: الهندسة الزراعية والنظم الحيوية
الفترة : من ١٠ - ١٢

بسم الله الرحمن الرحيم
إمتحان مقرر
تحليل الإجهادات
للطلاب المستجدين

جامعة المنصورة
كلية الزراعة
قسم الهندسة
الزراعية

All the following questions may be attempted

First question (20 marks)

A steel tube, 50 mm outside diameter, 24 mm inside diameter, and 500 mm long, carries an axial tensile load of 105.8 kN. Determine the stress set up in the tube and its change in length when the load is applied. What further increase in load is possible if the stress in the tube material limited to 120 MN/m²? If the Young's modulus is 200 GN/m², and the lateral strain is 1.05×10^{-4} mm/mm, determine the Poisson's ratio and the shear modulus of the steel tube.

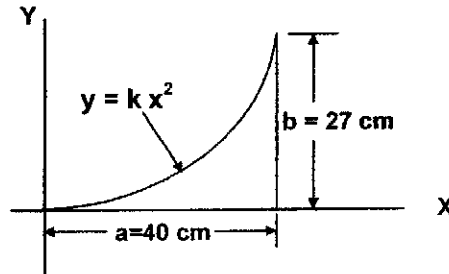
Second question (20-mark)

Decide the dimensions of a hollow steel shaft with a diameter ratio of 3:4 which is required to transmit 110.55 hp at a speed of 210.1 rpm. The maximum shear stress in the shaft is limited to 70.755 MN/m² and the angle of twist to 3.8° in a length of 4 m. The modulus of rigidity for the shaft material is 80 GN/m².

Third question (20-mark)

A parabolic segment shown in the following figure, determine:

- (a) The entire area,
- (b) The centroid,
- (c) The moment of inertia with respect to the X and Y-axes of the parabolic segment, and
- (d) The radius of gyration.



With my best wishes
Prof. Dr. Salah Mostafa Abdellatif