

الأحد : ٢٨ / ٥ / ٢٠١٧ م
المستوى: الثاني
برنامج: الهندسة الزراعية والنظم الحيوية
الفترة : من ١٠ - ١٢

بسم الله الرحمن الرحيم
إمتحان مقرر
تحليل الإجهادات
للطلاب المستجدين والممتحنين
من الخارج

جامعة المنصورة
كلية الزراعة
قسم الهندسة
الزراعية

All the questions may be attempted:

First question (15-mark)

A compound bar consists of four brass wires of **2.5 mm** diameter and one steel wire of **1.5 mm** diameter. Determine the stress in each of the wires when the bar supports a load of **3.5 kN**. Calculate the total extension of each wire if it is initially **1.95 m** long. The Young's modulus for brass is **100 GN/m²** and for steel is **200 GN/m²**

Second question (15-mark)

A circular bar **ABC**, **3.5 m** long, is rigidly fixed at its two ends **A** and **C**. The portion **AB** is **2.0 m** long and of **50 mm** diameter and **BC** is **1.5 m** long and of **25 mm** diameter. If a twisting moment of **754 N. m** is applied at **B** and the shear modulus of the shaft material is **80 GN/m²**, calculate the values of the resting moment at **A** and **C**, the maximum stress in each section of the shaft and the angle of twist in each portion.

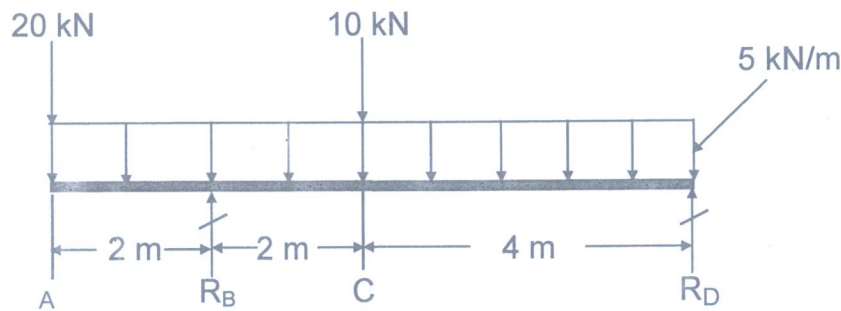
Third question (15-mark)

A parabolic segment has a curve equation of **dy = 2 k x dx**, its base length is **a = 40 cm**, and its height length is **b = 30 cm**, compute the following:

- The entire area of the parabolic segment. (3-degree)
- Locate the centroid with respect to x and y-axes. (6-degree)
- The moment of inertia with respect to x-axis. (4-degree)
- The radius of gyration. (2-degree)

Fourth question (15-mark)

Compute the maximum shear force and the maximum bending moment for the overhanging beam shown in the following figure.



With my best wishes

Prof. Dr. Salah, M. ABDELLATIF