Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

III SEMESTER B.TECH. (INDUSTRIAL PRODUCTION AND MECHANICAL ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2016

SUBJECT: STRENGTH OF MATERIALS [MME 2103]

REVISED CREDIT SYSTEM
(30/11/2016)

Time: 3 Hours MAX. MARKS: 50

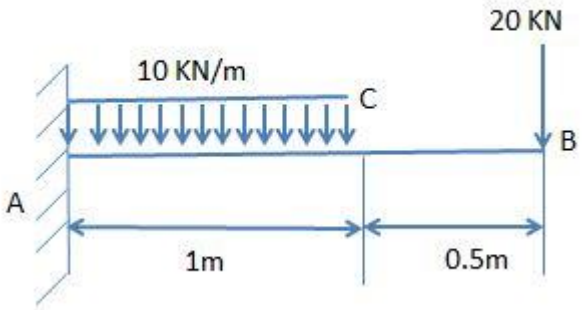
Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.

1A. Briefly discuss about Rigid body and Deformable body. **2M**

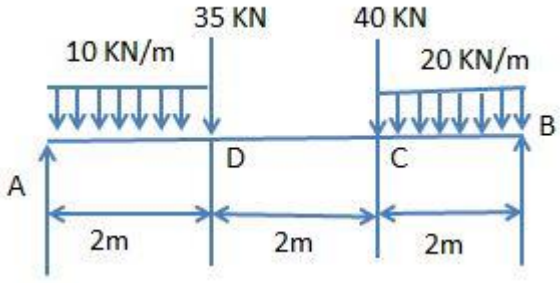
1B. Derive an expression for deformation of a simple bar due to axial load. **3M**

1C. Draw the shear force and bending moment diagrams for a cantilever beam as shown in figure. **5M**



2A. Draw the shear force and bending moment diagram for a simply supported beam subjected to a uniformly distributed load. **5M**

2B. Draw the bending moment and shear force diagrams for a simply supported beam as shown in figure. **5M**



3A. Derive an expression for bending equation. **5M**

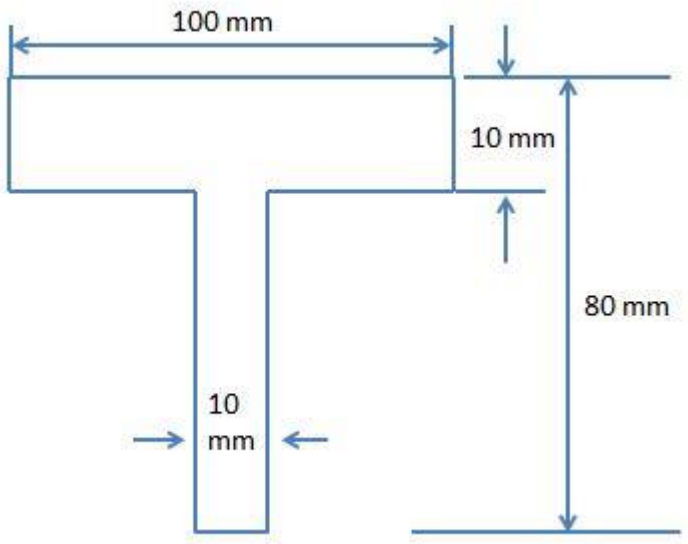
3B. Draw the shear stress variation for an I section of top flange 40 mmx10 mm, bottom flange 80 mmx10 mm and the thickness of the web is 10 mm and height is 100 mm. The shear force acting on the I section is 20 KN. **5M**

4A. Derive an expression for differential equation of deflection. **5M**

4B. A beam AB of span 8 meters is simply supported at the ends. It carries a uniformly distributed load of 30 KN/m over its entire length and a concentrated load of 60 KN at 3 meters from support A. Determine the maximum deflection in the beam using Macaulay's method. **5M**

5A. Show that a solid circular shaft has torsional strength equal to (15/16) times of that of hollow circular shaft whose inner diameters is half the outer diameter. The diameter of the solid shaft is same as the outer diameter of the hollow shaft. **3M**

5B. Determine the Euler's buckling load for a strut of T section as shown in figure. The length of the strut is 3m and hinged at both ends, **3M**
Take $E=200x10^3$ N/mm^2



5C. A pipe of 100 mm external diameter and 20 mm thick carries water at a pressure of 20 MPa. Determine the maximum hoop stress in the section of the pipe by using Lame's equation. **4M**