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**University Examinations 2016/2017**

SECOND YEAR, FIRST SEMESTER EXAMINATION FOR THE DIPLOMA IN CIVIL ENGINEERING

**ECV 2200: THEORY OF STRUCTURES II**

**DATE: DECEMBER, 2016 TIME: 11/2 HOURS**

**INSTRUCTIONS: -** *Answer question* ***one*** *and any other* ***two*** *questions*

**QUESTION ONE (30 MARKS)**

1. A truss of span 5m is loaded as shown below. Find;
2. Reactions in the member of the truss (7 Marks)
3. Forces in the members of the truss using the method of joints (8 Marks)
4. A beam 6m long, simply supported at its ends is carrying a point load of 50kN at its centre.

The moment of inertia of the beam (EI) is given as equal to . If E for the material of the beam , calculate;

1. Deflection at the centre of the beam (4 Marks)
2. Slope at the supports. (4 Marks)
3. A cantilever of length 2m carries a point load 20kN at the free end and another of 20kN at the centre. If and I = for the cantilever, then determine by moment of area method, the slope of the cantilever at the free end. (7 Marks)

**QUESTION TWO (15 MARKS)**

A simply supported beam AB of length L and carrying a uniformly distributed load of w per unit length over the entire length is as shown below. Find;

1. The slope at the ends (7 Marks)
2. The maximum deflection of the beam (8 Marks)

**QUESTION THREE (15 MARKS)**

A simply supported bean of length 4m is subjected to a uniformly distributed load of 30kN/m over the whole span and deflects 15mm at the centre. Determine the crippling load if the beam is used as a column with the following conditions;

1. One end fixed and another end hinged. (8 Marks)
2. Both ends pin jointed. (7 Marks)

**QUESTION FOUR (15 MARKS)**

A cantilever 120mm and 200mm deep is 2.5m long. Determine;

1. The reactions and the bending moments of the cantilever. (7 Marks)
2. The uniformly distributed load the beam can carry in order to produce a deflection of 5mm at the free end. Take E = 200 GN/ (8 Marks)