

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- May 2018

B. Tech. - II Semester

COURSE CODE: 10B11CE211  
COURSE NAME: ENGINEERING MECHANICS  
COURSE CREDITS: 04

MAX. MARKS: 35

MAX. TIME: 2:00 Hrs

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Assume any missing data suitably.

- 1. Draw shear force and bending moment diagram for a cantilever beam of span 5 m loaded at tip by a point load of 15 kN downward and a moment of 15 kN-m in the clockwise direction. Also find the maximum shear force and bending moment in the beam. [5] CO-1
- 2. Write the different type of trusses. Explain with neat sketch. [5] CO-2
- 3. Write the assumption of the simple bending theory. A circular steel rod of length 50 mm with 10 mm diameter is stretched by 20 kN load. Find the final diameter of the rod after stretching. Assume  $E_{steel} = 2 \times 10^5 \text{ N/mm}^2$  and Poisson's ratio = 0.3. [5] CO-2
- 4. Write the law of parallelogram and hence proof the Lami's theorem. [5] CO-3
- 5. The cable and boom shown in Figure 1 support a load of 600 N. Determine the tensile force T in the cable and the compressive for C in the boom. [5] CO-3
- 6. A canvas ball is thrown in the air at an angle  $35^\circ$  from the vertical with speed 10 m/s. Find the total vertical and horizontal distances traveled by the ball during flight. Also find the velocity of the ball when it will strike to the ground. Assume  $g = 10 \text{ m/s}^2$ . [5] CO-4
- 7. A car starts with an acceleration  $2.5 \text{ m/s}^2$  and traveled for 10 seconds and maintained its constant speed for next 7.5 seconds and finally apply break to stop in next 250 m. Find the average speed of the car during journey. [5] CO-4

Figure 1.

