

THIRD SEMESTER **B.TECH. [Civil Engineering]**
SUPPLYMENTARY EXAMINATION **(FEBRUARY 2019)**
CE 203: ENGINEERING MECHANICS

Time: 3 Hours

Max. Marks: 40

Note: Question 1 is compulsory. Answer any FIVE questions from the remaining. Assume suitable missing data, if any.

Q.1 Describe with example any five of the following (5×3=10)

- I. Polygon Law of Forces
- II. Parallelogram Law of Forces
- III. Varignon's Theorem
- IV. Parallel Axes Theorem
- V. Perpendicular Axes Theorem
- VI. Lami's Theorem.

Q.2 Determine the reactions at A for the cantilever beam shown in fig.q2. 6

Q.3 A 75 kg man stands on the middle rung of ladder AB of weight 25 kg, which is supported on smooth wall and smooth floor. A string OC holds the ladder in position preventing it from slipping (fig.q3). Determine the tension in the string and the reaction at the supports. 6

Q.4 Blocks A and B have masses 400kg and 200kg respectively and rest on 30° incline. Blocks are attached to a post by cords and the post is held fixed by action of force F (fig.q4). Assuming all contact surfaces smooth and cords parallel to incline, determine the value of force F. 6

Q.5 The rigid beam ABCD is supported and loaded as shown in fig.q5. If the spring constant is 20 N/mm for both the springs, determine the reaction at A and force in each spring. 6

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Q.6 Find the forces in the member FH, GH and GI in the truss as shown in fig.q6. 6

Q.7 In a simple machine, whose velocity ratio is 30 a load of 2400 N is lifted by an effort of 150 N and a load of 3000 N is lifted by an effort of 180 N. Find the law of machine and calculate the load that could be lifted by a force of 200 N. Also calculate:

- (1) Amount of effort wasted in overcoming the friction
- (2) Mechanical advantage
- (3) Efficiency

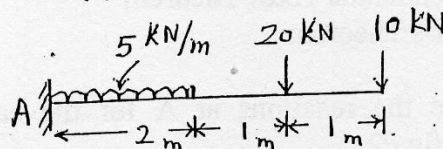


fig 92

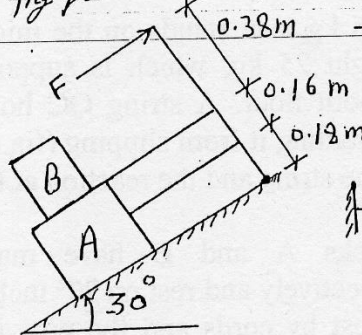


fig 94

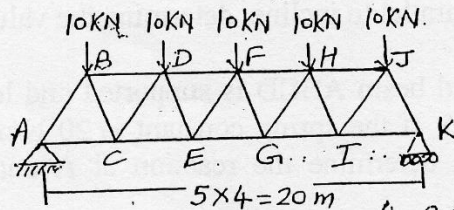


fig 96

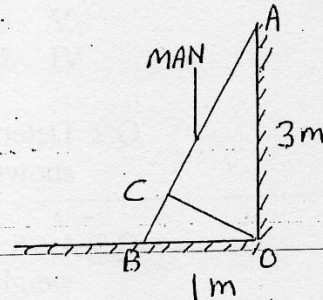


fig 93

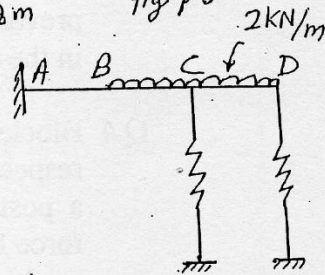


fig 95