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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST-1, February 2016
B.Tech. (Civil Engineering) 2nd Semester

Course Code: **10B11CE211** MAX. MARKS: 15
COURSE NAME: Engineering Mechanics MAX. TIME: 1 HR.
COURSE CREDITS: 04

NOTE: All questions are compulsory. Marks are indicated against questions.
Carrying of mobile phone during examinations will be treated as case of unfair means.

Q.1. (i) Can you apply principle of transmissibility of forces on a non-rigid body? [0.5]

(ii) Is it possible to convert a system of non-concurrent coplanar forces to a force-and-couple system? [0.5]

(iii) State and prove Varignon's theorem of moments. [2]

Q.2. A system of coplanar forces is acting on a rectangular plate, as shown in **Fig. 1**. Determine the magnitude and direction of the resultant force. [3]

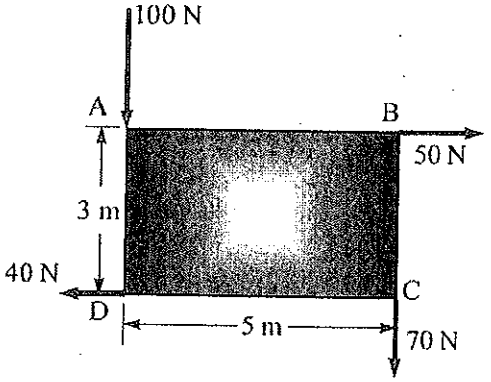

Fig. 1

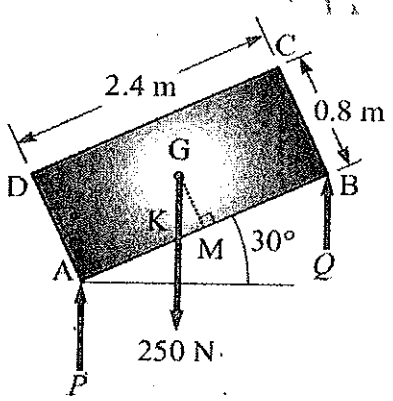

Fig. 2

Q.3. Two men P and Q carry a 250-N box of 2.4 m length and 0.8 m height up a ramp inclined at 30° to the horizontal, by holding the front and back edges of its bottom (**Fig. 2**). Determine the weight supported by each man. [3]

Q.4. Two equally heavy spheres of weight *W* and 60 mm radius each are kept in a smooth spherical cup of 180 mm radius (**Fig. 3**). Show that, when in equilibrium, the reaction (at point C) between the two spheres is half the reaction between a sphere and the cup (at D or E). [3]

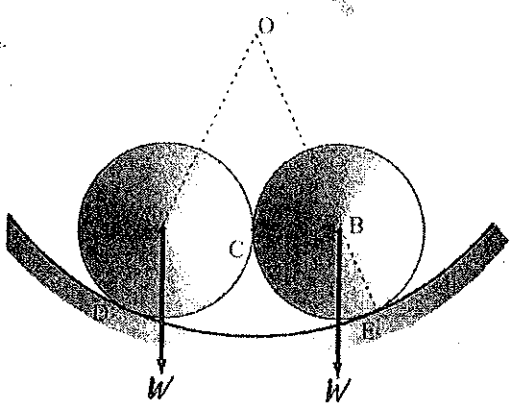

Fig. 3

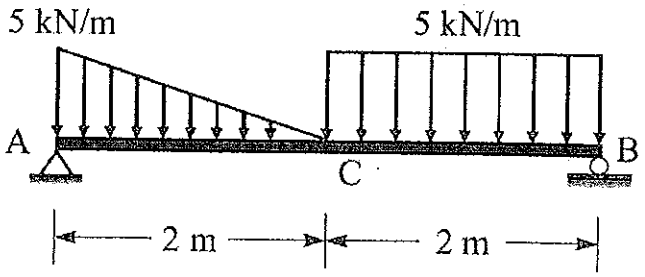

Fig. 4

Q.5. Find the support reactions in the simply-supported beam shown in **Fig. 4**. [3]

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