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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST-3 EXAMINATION, JUNE-2016
B.Tech. Civil Engineering, II Semester

COURSE CODE: **10B11CE211**   MAX. MARKS: 35
COURSE NAME: Engineering Mechanics
COURSE CREDITS: 4   MAX. TIME: 2 HRS

Note: *All questions are compulsory. All questions carry equal marks.*
Carrying of mobile phone during examinations will be treated as case of unfair means.

1. Find the principal moments of inertia with respect to origin O of the area shown in **Fig. 1**.

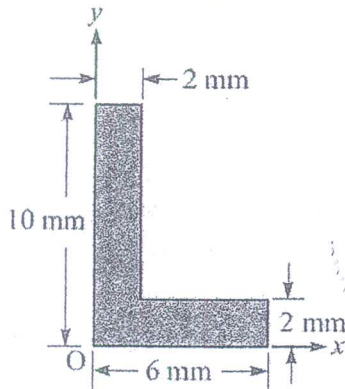**Fig. 1**   **Fig. 2**
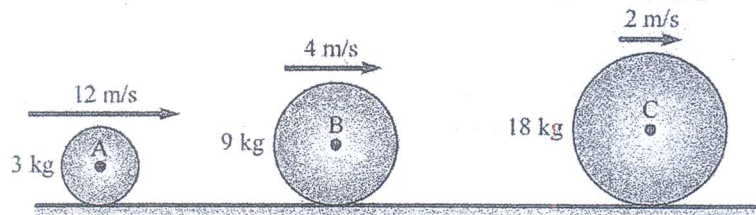
2. Three solid balls A, B and C of 3 kg, 9 kg and 18 kg masses are moving in the same direction with velocities of 12 m/s, 4 m/s and 2 m/s, respectively, as shown in **Fig. 2**. If the ball A collides with the ball B which in turn collides with the ball C, prove that the balls A and B come to rest after the impacts. Assume that all the impacts are perfectly elastic.

3. Figure **3** shows three thin rods each of length l and mass m forming an equilateral triangle. Determine the mass moment of inertia of the assembly about an axis perpendicular to its plane and passing through geometrical centre O.
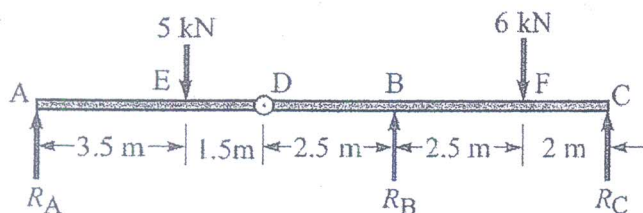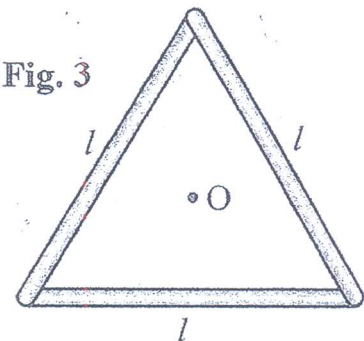
Fig. 3

Fig. 4

4. Two light-weight beams AD and DC are hinged internally at D and supported at A, B and C. Find the reaction at the support B using the principle of virtual work, if the beam is loaded as shown in **Fig. 4**.

5. For the truss shown in Fig. 5, find the forces in all the members. Given that all the horizontal and vertical members are of the same length.
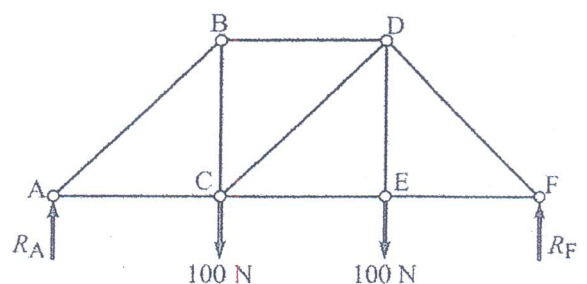

Fig. 5

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