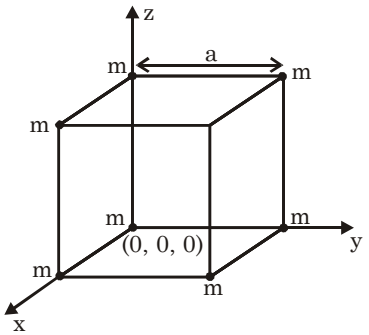
1. Four particles are in x-y plane placed at
(1) 1 kg at (0, 0) (2) 2 kg at (1, 0) (3) 3 kg at (1, 2) (4) 4 kg at (2, 0)
The centre of mass is located at
(A) (0.3, 1.2) (B) (1.3, 0.6) (C) (0.5, 1.4) (D) (1.2, 0.3)

2. Seven particles, each of mass m are placed at the seven corners of a cube of side 'a' but one corner is vacant, as shown in figure. The co-ordinates of the centre of mass of the system is :-

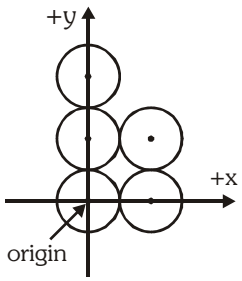


(A) $\left(\frac{2a}{7},\frac{2a}{7},\frac{2a}{7}\right)$ (B) $\left(\frac{3a}{7},\frac{3a}{7},\frac{3a}{7}\right)$ (C) $\left(\frac{a}{3},\frac{a}{3},\frac{a}{3}\right)$ (D) $\left(\frac{5a}{11},\frac{5a}{11},\frac{5a}{11}\right)$

3. Particles of masses m, 2m, 3m.....nm grams are placed on the same line at distances ℓ, 2ℓ, 3ℓ,.....$n\ell$ cm from a fixed point. The distance of centre of mass of the particles from the fixed point in centimetres is :

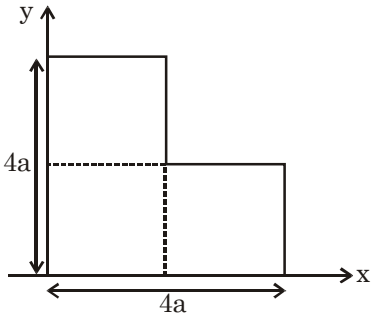
(A) $\frac{(2n+1)\ell}{3}$ (B) $\frac{\ell}{n+1}$ (C) $\frac{n(n^2+1)\ell}{2}$ (D) $\frac{2\ell}{n(n^2+1)}$

4. Five uniform circular plates, each of diameter D and mass m are laid out in a pattern shown. Using the origin shown, find the y co–ordinate of the centre of mass of the five–plate system.



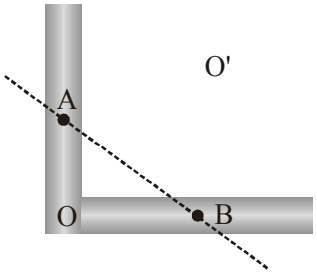
(A) 2D/5 (B) 4D/5 (C) D/3 (D) D/5

5. The position of centre of mass of uniform sheet is :-



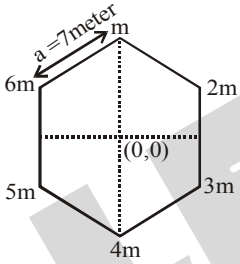
(A) $\frac{3a}{6},\frac{3a}{6}$ (B) $\frac{5a}{6},\frac{5a}{6}$ (C) $\frac{5a}{3},\frac{5a}{3}$ (D) $\frac{3a}{2},\frac{3a}{2}$

6. Figure shows two cylindrical rods whose center of mass is marked as A and B. Line AB divides the region in two parts one containing point O (region 1) and other containing point O' (region 2). Choose the correct option regarding the center of mass of the combined system.



(A) The center of mass of the system lies in region 1
(B) The center of mass of the system lies in region 2
(C) The center of mass of the system lies on line AB
(D) The center of mass of the system may lie in region 1 or region 2 depending on the mass of the rods

7. Six point mass particles are is placed on horizontal surface such that arrangement form a regular hexagon as shown. Calculate coordinate of center of mass of arrangement

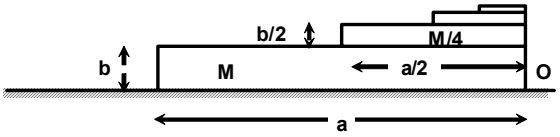


(A) $\left(-1,\sqrt{3}\right)$ (B) $\left(\sqrt{3},1\right)$ (C) $\left(-\sqrt{3},1\right)$ (D) $\left(-\sqrt{3},-1\right)$

8. A two particle system of masses 2 kg and 3 kg present at (15,0) and (0, 20) in a x,y plane then its centre of mass lies on lines :-

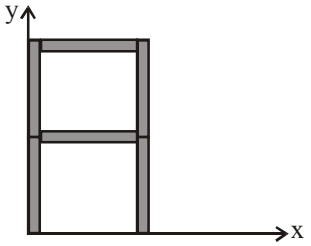
(A) $y = 2x$ (B) $\frac{x}{12}+\frac{y}{24}=1$ (C) $3x - y = 6$ (D) $y = x$

9. An infinite no of bricks are placed one over the other as shown in the figure. Each succeeding brick having half the length and breadth of its preceding brick and the mass of each succeeding bricks being $1/4^{th}$ of the preceding one, take 'O' as the origin, the centre of mass of the system of bricks is at



(A) $-\frac{3a}{7}$ (B) $-\frac{2a}{7}$ (C) $-\frac{a}{7}$ (D) $-\frac{4a}{7}$

10. Six rods of the same mass m and length ℓ are arrange as shown in figure. Calculate the coordinate of the centre of mass of the system :-



(A) $\left(\frac{\ell}{2};\frac{7\ell}{6}\right)$ (B) $\left(\frac{\ell}{3};\ell\right)$ (C) $\left(\frac{\ell}{2};\frac{4\ell}{3}\right)$ (D) $\left(\frac{\ell}{2};\frac{5\ell}{3}\right)$

N_Race # 45			ANSWER KEY
1. Ans. (B)	**2. Ans. (B)**	**3. Ans. (A)**	**4. Ans. (B)**
5. Ans. (C)	**6. Ans. (C)**	**7.Ans. (D)**	**8. Ans. (A,B,C)**
9. Ans. (A)	**10. Ans. (A)**		