

## مذكرة الوحدة الثامنة (منهج انجليزي)



### تم تحميل هذا الملف من موقع المناهج الإماراتية

موقع المناهج ← المناهج الإماراتية ← الصف الحادي عشر المتقدم ← فيزياء ← الفصل الأول ← ملفات متنوعة ← الملف

تاريخ إضافة الملف على موقع المناهج: 04:07:34 2025-04-11

ملفات اكتب للمعلم اكتب للطالب ا اختبارات الكترونية ا اختبارات ا حلول ا عروض بوربوينت ا أوراق عمل  
منهج انجليزي ا ملخصات وتقارير ا مذكرات وبنوك ا الامتحان النهائي ا للمدرس

المزيد من مادة  
فيزياء:

### التواصل الاجتماعي بحسب الصف الحادي عشر المتقدم



صفحة المناهج  
الإماراتية على  
فيسبوك

الرياضيات

اللغة الانجليزية

اللغة العربية

التربية الاسلامية

المواد على تلغرام

### المزيد من الملفات بحسب الصف الحادي عشر المتقدم والمادة فيزياء في الفصل الأول

دليل تصحيح أسئلة الامتحان النهائي القسم الورقي منهج بريدج الخطة C101 العام 2024-2025

1

أسئلة مراجعة نهائية وفق الهيكل الوزاري باللغتين العربية والانجليزية

2

حل تجميعية أسئلة نهائية وفق الهيكل الوزاري منهج انسباير الخطة C

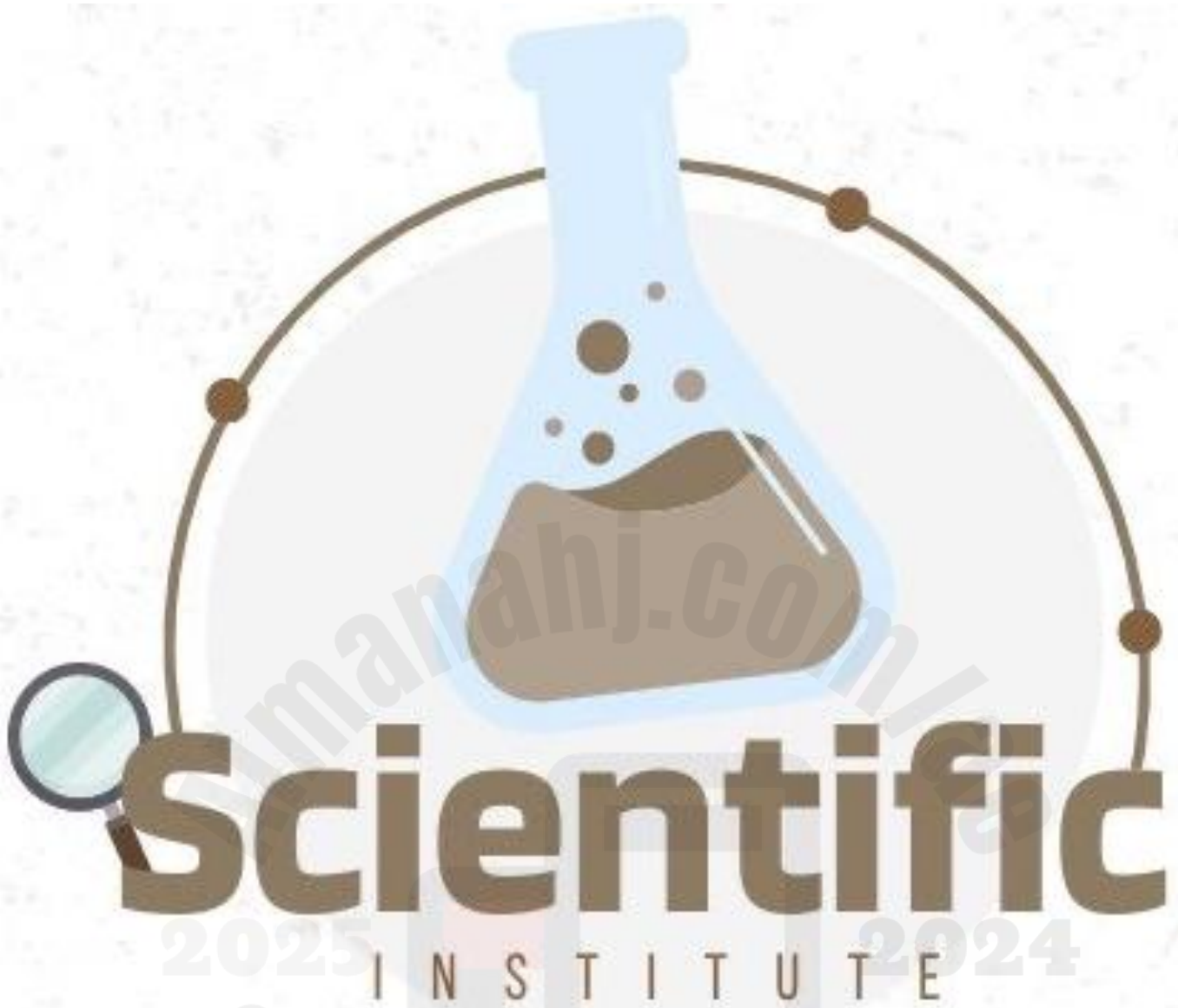
3

حل أسئلة الامتحان النهائي القسم الالكتروني منهج بريدج العام 2023-2024

4

حل مراجعة عامة وفق الهيكل الوزاري منهج بريدج الخطة 101C

5



physics

11 ADV - 2025/2024

Unit (8) -



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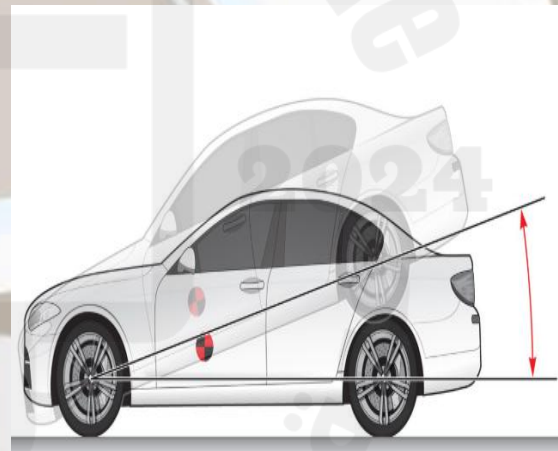
## 8.1

## Lesson 1 – Center of mass

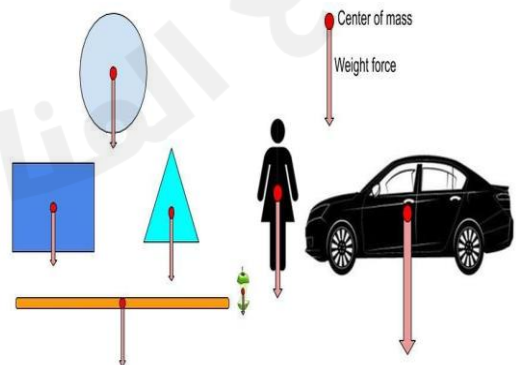
Previously when we were talking about moving cars, we were telling you the **position of the car directly**, but have you ever wondered **how do we represent 3-meter-long car with only one point?**



The answer to this question is that we choose to represent an object by the **point on which we can imagine all the mass of an object to be concentrated.**



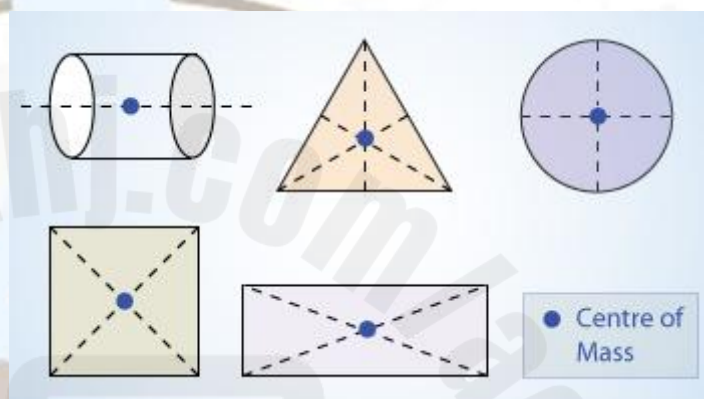
This point is called the **center of mass** and since **all the mass is concentrated in it**, we can **consider this point as the center of gravity also as force of gravity is also concentrated in it.**



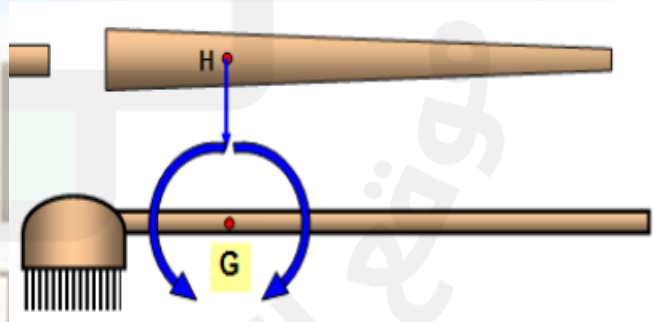
For example, the **best point** to represent the **mass of the car is the center of it.**

Note that the **center of mass might not be in the geometric center of an object**, or even it might be not in the object.

In the **regular shapes with constant densities** the **center of mass will lie in the geometric center of the object.**



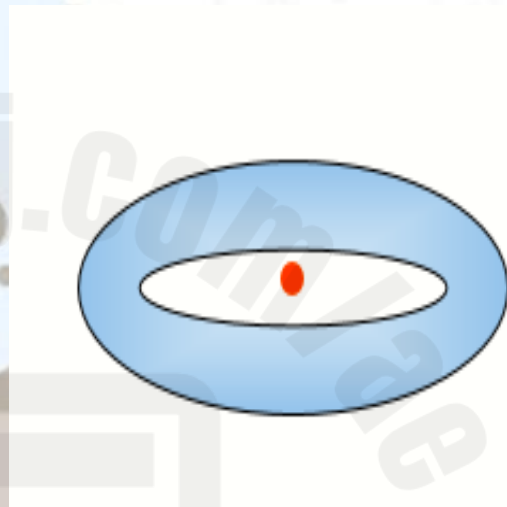
However, in **non-uniform objects** (objects with non-constant densities) the **center of mass will not lie in the geometric center of the object.**



Imagine that you have a **book which has two sides with unequal densities** in which the **right side is heavier than the left side**.

Notice that **if you want to balance the book you will not be able to balance it from the geometric center**.

The **center mass of a complete ring** is an example of a **center of mass which is not located on the object**. The center of mass of the ring will be at the center of the ring. Notice that the density of the ring is constant, and the shape is uniform, but the shape is irregular.





## The center of mass of multiple objects.

Imagine that you have a **dumbbell** with **equal mass on each side** where you think is the center of mass? It will be **exactly between the objects.**

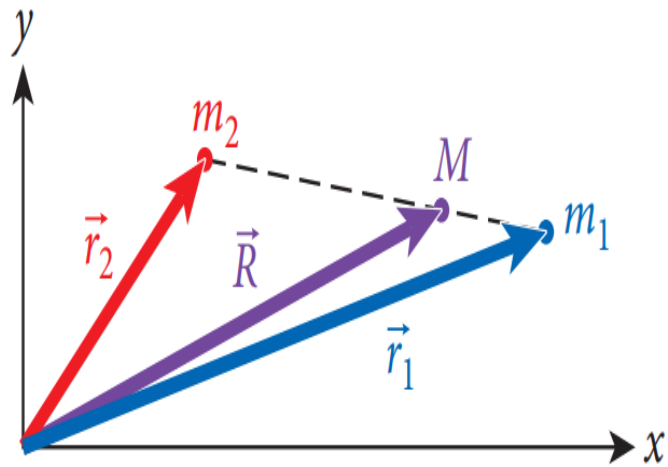


Now what do you think will happen to the **location of the center of mass** if one of the masses is reduced.



Obviously, **the center of mass will shift closer to the heavier object** since **it is the point where the mass concentrates**

The **two masses might be not connected with each other**, as an example, they could be in space, however, the **center of mass of the system of objects must lie between them on the vector connecting the two objects.**



To know the **location of the center of mass of two objects** we can use the formula:

$$\vec{R} = \frac{\vec{r}_1 m_1 + \vec{r}_2 m_2}{m_1 + m_2}.$$

Note that the **vector r is a vector in more than one dimensions**, so practically we will **use the formulas**:

$$X = \frac{x_1 m_1 + x_2 m_2}{m_1 + m_2}, \quad Y = \frac{y_1 m_1 + y_2 m_2}{m_1 + m_2}, \quad Z = \frac{z_1 m_1 + z_2 m_2}{m_1 + m_2}.$$

If the **system contains more than two objects**, we could use the formula:

$$\vec{R} = \frac{\vec{r}_1 m_1 + \vec{r}_2 m_2 + \cdots + \vec{r}_n m_n}{m_1 + m_2 + \cdots + m_n}$$

