



# PHYSICS

## BOOKS - PSEB

### Gravitation

#### Exercise

1. How does the force of gravitation between two objects change when the distance between them is reduced to half ?



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2. Gravitational force acts on all objects in proportion to their masses. Why then, a heavy object does not fall faster than a light object ?



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3. What is magnitude of gravitational force between the earth and a 1 kg object on its surface ? Take mass of earth to be  $6 \times 10^{24} \text{ kg}$

and radius of the earth is

$$6.4 \times 10^6 \text{ m. } G = 6.67 \times 10^{-11} \text{ Nm}^2 \text{ kg}^{-2}.$$



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4. The earth and the moon are attracted to each other by gravitational force. Does the earth attracts the moon with a force that is greater than or smaller than or the same as the force with which the moon attracts the earth ? Why ?



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5. If the moon attracts the earth, why does the earth not move towards the moon ?



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6. What happens to the force between two objects, if the mass of one object is doubled ?



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7. What happens to the force between two objects, if the distance between the objects is doubled and tripled ?



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8. What happens to the force between two objects, if the masses of both objects are doubled ?



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9. What is the importance of universal law of gravitation?



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10. What is the acceleration of free fall?



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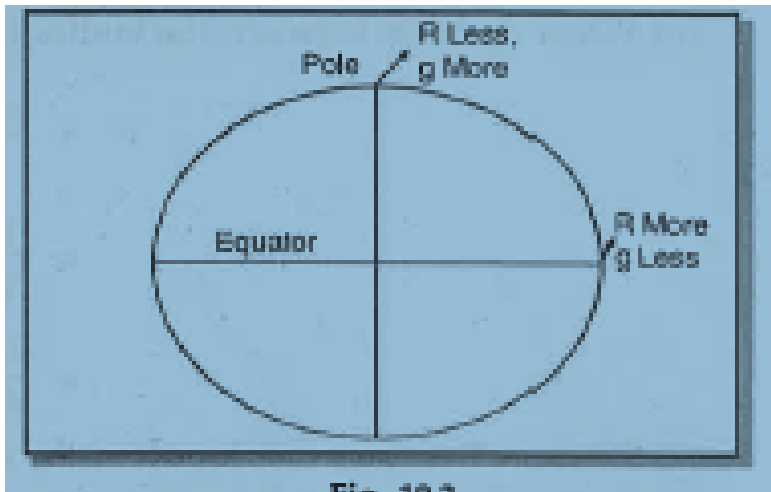
11. What do you call the gravitational force between the earth and an object?





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12. A person 'A' buys few grams of gold at poles as per the instruction of one of his friends. He hands over the same when he meets him at the equator. Will the friend agree with the weight of gold bought? If not, Why?



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**13.** Why will a sheet of paper fall slower than one that is crumpled into a ball?



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**14.** Gravitational force on the surface of moon is  $\frac{1}{6}$  as strong as gravitational force on the earth. What is the weight in newton of a 10 kg object on moon and on the earth ?



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**15.** A ball is thrown vertically upwards with a velocity of  $49\text{ms}^{-1}$ . Calculate :The maximum height to which it rises



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**16.** A ball is thrown vertically upwards with a velocity of  $49\text{ms}^{-1}$ . Calculate :The total time it takes to return to the surface of earth.



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17. A stone is released from the top of a tower of height 19.6 m. Calculate the final velocity just before touching the ground.



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18. A stone is thrown vertically upward with an initial velocity of  $40\text{ms}^{-1}$ . Taking  $g = 10\text{ms}^{-2}$ , find the maximum height reached by the stone. What is the net displacement and the total distance covered by the stone ?





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**19.** Calculate the force of gravitation between the earth and the sun, given the mass of earth =  $6 \times 10^{24} \text{ kg}$  and of the sun =  $2 \times 10^{30} \text{ kg}$ . Average distance between the two is  $1.5 \times 10^{10} \text{ m}$ .



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**20.** A stone is allowed to fall from the top of a tower after 6 s. Find : the velocity with which it

was thrown up,



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**21.** A stone is allowed to fall from the top of a tower after 6 s. Find : the maximum height it reaches, and



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**22.** A stone is allowed to fall from the top of a tower after 6 s. Find : its position after 4 s.



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**23.** In what direction does the buoyant force on an object immersed in a liquid act.



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**24.** Why does a block of plastic immersed under water come to the surface of water ?



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**25.** The volume of 50 g of a substance is  $20\text{cm}^3$ . If the density of water is  $1\text{gcm}^{-3}$ , will the substance float or sink?



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**26.** The volume of 500 g sealed packed in  $350\text{cm}^3$ . Will the packet float or sink in water of the density of water is  $1\text{gcm}^{-3}$ ? What will the mass of the water displaced by his packet?



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