PHYSICS

NCERT - NCERT PHYSICS(ENGLISH)

GRAVITION

Exercise

1. The mass of the earth is 6×10^{24} kg and that of the moon is 7.4×10^{22} kg. If the distance between the earth and the moon is

3.84×10^5 km, calculate the force exerted by the earth on the moon. (Take $G = 6.7 \times 10^{-11} Nm^2 kg^{-2}$)

2. A car falls off a ledge and drops to the ground in $0.5s$. let$g = 10m/s^2$ (for simplifyng the calculation).

(i) what is its speed on striking the ground ?

what is its average speed during 0.5s?

(iii) How high is the ledge from the ground ?

3. An object is thrown vertically upwards and rises to a height of 10 m. Calculate

(i) the velocity with which the object was thrown upwards and (ii) the time taken by the object to reach the highest point.

4. Mass of an object is 10 kg. what is its weight on earth ?

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5. An object weigh 10 N when measured on the surface of the earth. What would be its weight when measure on the surface of moon ?

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6. A block of wood is kept on a table top The mass of the wooden block is 5 kg and its dimensions are $40cm \times 20cm \times 10cm$. Find the pressure exerted by the wooden block on the table top if it is made to lie on the table with its sides of dimension (a)$20cm \times 10cm$ (b) $40cm \times 20cm$. Given $g = 9.8\dfrac{m}{s^2}$.

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7. Relative density of silver is 10.8. The density of water is $10^3 \dfrac{kg}{m^3}$. What is the density of silver in SI.

8. State the universal law of gravitation.

9. Write the formula to find the magnitude of the gravitational force between the Earth and an object on the surface of the Earth.

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10. What do you mean by free fall?

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11. What do you mean by acceleration due to gravity?

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12. Distinguish between mass and weight.

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13. Why is the weight of an object on the Moon $(1/6)$th its weight on the Earth?

14. Why is it difficult to hold a school bag having strap made of thin and strong string?

15. What do you mean by buoyancy?

16. Why does an object float or sink when placed on the surface of water?

17. You find your mass to be 42 kg on a weighing machine. Is your mass more or less than 42kg?

18. You have a bag of cotton and an iron bar, each indicating a mass of 100 kg when measured of a weighing machine. In reality, one is heavier than the other. Can you say which one is heavier and why?

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

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

21. What is the magnitude of the gravitational force between the Earth and a 1kg object on its surface ? (Mass of the earth is 6×10^{24} kg and radius of the Earth is $6.4 \times 10^6 m$).

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

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

24. What happens to the force between two object, if

(i) The mass of one object is doubled? (ii) The distance between the object is doubled and tripled?

(iii) The masses of both object are doubled?

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

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26. What is the acceleration of free fall?

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27. What do we call the gravitational force between the earth and an object ?

28. Amit buys few grams of gold at the 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 ? [Hint. The

value of g is greater at the poles than at the equater.]

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

30. Gravitational force on the surface of the moon is only $1/6$ as gravitational force on the

earth. What is the weight in newtons of a 10kg object on the moon and on the earth?

31. A ball is thrown vertically upwards with a velocity of $49m/s$. Calulate

(i) The maximum height to which it rises,

(ii) the total time it takes to return to the surface of the earth.

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

33. A stone is thrown verticaly upward with an initial velocity of $40m/s$. Taking $g = 10m/s^2$, find the maximum height reached by the stone. What is the net displacement and the total distance covered by the stone?

34. Calculate the force of gravitation between the earth the sun, given that the mass of the earth $= 6 \times 10^{24}$kg and mass of the sun $= 2 \times 10^{30}$kg. The average distance between the two is $1.5 \times 10^{11}m$.

35. A stone is allowed to fall from the top of a tower 100m high and at the same time

another stone is projected vertically upwards from the ground with a velocity of $25m/s$. Calculate when and where the two stone will meet.

36. A ball thrown up verically returns to the thrower after 6 s. Find

(a) the velocity with which it was thrown up.

(b) the maximum height it reaches, and (c) its position after 4 s.

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

38. Why does a block of plastic released under water come up to the surface of water?

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

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40. The volume of 500 g sealed packet is 350 cm^3. Will the packet float or sink if the density of water is $1\dfrac{g}{cm^3}$? What will be the mass of the water displaced by this packed?

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