



# PHYSICS

## BOOKS - R G PUBLICATION

### GRAVIATION

#### Exercise

1. Define gravitational potential.



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2. Define gravitational potential.



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3. Establish a relation between acceleration due to gravity and universal gravitational constant.



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4. Find the expression of acceleration due to gravity at a high  $h$  above the surface of the earth.



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5. Deduce the relation between the orbital velocity of a body moving round the earth just over its surface and its escape velocity.



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**6.** What is a Geostationary Satellite? State an essential feature of it.



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**7.** Distinguish between gravitation and gravity.



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**8.** What is escape velocity? Find an expression for the escape velocity of a body when

projected from the surface of the earth. Show that the escape velocity from the earth's surface is about 11.2 km/sec.



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9. State Kepler's law of planetary motion. Obtain Newton's law of gravitation from Kepler's laws.



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**10.** Find the expression of acceleration due to gravity at a high  $h$  above the surface of the earth.



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**11.** Deduce the relation between the orbital velocity of a body moving round the earth just over its surface and its escape velocity.



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**12.** What is escape velocity? Find an expression for the escape velocity of a body when projected from the surface of the earth. Show that the escape velocity from the earth's surface is about 11.2 km/sec.



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**13.** Why  $G$  is called universal gravitational constant?



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**14.** What is the difference between inertial mass and gravitational mass ?



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**15.** What is the relation between gravitational intensity and gravitational potential at a point?



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**16.** If the radius of earth strinks by one percent it mass remaining the same by what percent will the acceleration due to gravity change at surface.



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**17.** What is escape velocity? Find an expression for the escape velocity of a body when projected from the surface of the earth. Show

that the escape velocity from the earth's surface is about 11.2 km/sec.



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**18.** Under what condition gravitation potential of a body will be zero?



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**19.** What is artificial satellite?



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**20.** What is time period and period of revolution?



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**21.** Write the unit and dimension of G.



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**22.** Write Kepler's laws on planetary motion.



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**23.** What is orbital velocity? Derive its expression.



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**24.** What is the difference between inertial mass and gravitational mass ?



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**25.** Why gravitational potential not uniform all places.



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**26.** What is artificial satellite?



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**27.** What is a Geostationary Satellite? State an essential feature of it.





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**28.** Write about weightlessness in space.



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**29.** The orbital radius of earth is  $1.49 \times 10^{13}$  cm. Calculate the mass of sun.



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**30.** A saturn year is 29.3 times the earth year. How far is the saturn from the sun if the earth's  $1.5 \times 10^8$  km away from the sun.



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**31.** A rocket is fired from the earth towards the sun. At what distance form the earth's centre is the gravitational force on the rocket zero?  
Mass of the sun =  $2 \times 10^{30}$  kg and mass of

earth =  $6 \times 10^{24}$  kg and orbital radius  
 $1.5 \times 10^{-8}$  km.



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**32.** How acceleration due to gravity changes with variation of height 'h'.



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**33.** Drive the expression for time period for an artificial satellite.





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**34.** How acceleration due to gravity changes with depth 'd'.



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**35.** How Kepler's third law derived from Newton's universal law of gravitation.



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**36.** How acceleration due to gravity change due to the shape of earth.



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**37.** Derive Newton's universal law of gravitation from Kepler's 3rd law.



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**38.** Calculate the total energy of an artificial satellite. What is the meaning of negative sign.



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**39.** Write the main characteristics of geostationary satellite and polar satellite.



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