CLASS XI PHY CH: 7

SET 4 – GRAVITATION

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1. The universal law of gravitation was proposed by:
(a) Newton
(b) Cavendish
(c) Kepler
(d) Einstein

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2. Gravitational force between two masses varies directly with:
(a) product of their masses
(b) sum of their masses
(c) difference of their masses
(d) square of their masses

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3. Gravitational force between two masses varies inversely with:
(a) square of distance
(b) distance
(c) cube of distance
(d) square of their product

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4. The dimensional formula of G is:
(a) $[M^{-1}L^{3}T^{-2}]$
(b) $[ML^{2}T^{-2}]$
(c) $[MLT^{-2}]$
(d) $[M^{-2}L^{3}T^{-2}]$

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5. SI unit of G is:
(a) $N \cdot m^2/kg^2$
(b) N/kg^2
(c) m^2/kg^2
(d) $N \cdot m/kg$

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6. The value of G is:
(a) $6.67 \times 10^{-11}\ N \cdot m^2/kg^2$
(b) 9.8 N/kg

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(c) 3×10^8 m/s
(d) 1.6×10^{-19} C

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7. The value of G is:
(a) constant everywhere
(b) depends on location
(c) depends on medium
(d) depends on mass

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8. Gravitational force is:
(a) always attractive
(b) always repulsive
(c) zero
(d) both attractive and repulsive

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9. The value of acceleration due to gravity at poles is:
(a) maximum
(b) minimum
(c) zero
(d) equal to that at equator

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10. The value of acceleration due to gravity at Earth's centre is:
(a) zero
(b) maximum
(c) infinite
(d) 9.8 m/s^2

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11. The value of g on Moon is about:
(a) 1/6th of Earth's
(b) 6 times Earth's
(c) 1/3rd of Earth's
(d) equal to Earth's

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12. Gravitational field intensity is defined as:
(a) force per unit mass
(b) force per unit volume

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(c) mass per unit force
(d) acceleration per unit time

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13. Gravitational field intensity near Earth's surface is:
(a) 9.8 N/kg
(b) 9.8 m/s
(c) 1 N/kg
(d) 10 kg/N

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14. The potential at infinity is taken as:
(a) zero
(b) minimum
(c) maximum
(d) negative

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15. Gravitational potential energy between two bodies is:
(a) $-Gm_1m_2/r$
(b) Gm_1m_2r
(c) Gm_1m_2/r^2
(d) $-Gm_1m_2r^2$

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16. Kepler's first law is the law of:
(a) elliptical orbits
(b) areas
(c) gravitation
(d) attraction

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17. Kepler's second law states that:
(a) Equal areas are swept in equal time intervals
(b) $T^2 \propto R^3$
(c) $F \propto 1/r^2$
(d) F = ma

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18. Kepler's third law gives relation between:
(a) T^2 and R^3
(b) T and R^2

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(c) F and M
(d) V and M

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19. The gravitational potential energy is always:
(a) negative
(b) positive
(c) zero
(d) infinite

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20. For a satellite of mass m at height h, potential energy is:
(a) −GMm/(R+h)
(b) GMm/(R+h)
(c) GMmR/h
(d) −GMmR/h²

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21. The escape velocity is given by:
(a) √(2GM/R)
(b) √(GM/R)
(c) √(GM/2R)
(d) √(GR/M)

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22. The escape velocity from Earth's surface is approximately:
(a) 11.2 km/s
(b) 9.8 km/s
(c) 7.9 km/s
(d) 8.2 km/s

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23. The escape velocity depends on:
(a) radius and mass of the planet
(b) mass of object
(c) shape of object
(d) atmosphere

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24. The ratio of escape velocity to orbital velocity is:
(a) √2
(b) 2

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(c) 1
(d) ½

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25. The total energy of a satellite in circular orbit is:
(a) −GMm/2R
(b) GMm/R
(c) GMm/2R
(d) −GMm/R

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26. The kinetic energy of a satellite in circular orbit is:
(a) GMm/2R
(b) −GMm/2R
(c) GMm/R
(d) −GMm/R

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27. The potential energy of a satellite in circular orbit is:
(a) −GMm/R
(b) GMm/R
(c) −GMm/2R
(d) GMm/2R

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28. The time period of a satellite is related to its orbital radius by:
(a) $T^2 \propto R^3$
(b) $T^2 \propto R^2$
(c) $T \propto R^2$
(d) $T^3 \propto R^2$

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29. The gravitational potential decreases with:
(a) increase in distance
(b) decrease in distance
(c) increase in mass
(d) none

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30. The gravitational field is a:
(a) conservative field
(b) non-conservative field

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(c) electric field
(d) mechanical field

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31. A geostationary satellite revolves:
(a) from west to east
(b) from east to west
(c) perpendicular to equator
(d) through poles

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32. A geostationary satellite has a time period of:
(a) 24 hours
(b) 12 hours
(c) 6 hours
(d) 48 hours

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33. The height of a geostationary satellite from Earth's surface is about:
(a) 36,000 km
(b) 3,600 km
(c) 42,000 km
(d) 64,000 km

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34. The orbital velocity of a satellite close to Earth is:
(a) 7.9 km/s
(b) 9.8 km/s
(c) 10 km/s
(d) 11.2 km/s

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35. The energy required to launch a satellite depends on:
(a) mass and height of orbit
(b) only mass
(c) only height
(d) none

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36. The gravitational potential at infinity is:
(a) zero
(b) positive

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(c) negative
(d) infinite

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37. The weight of a body at the equator is:
(a) less than at poles
(b) greater than at poles
(c) equal to poles
(d) zero

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38. Weightlessness occurs when:
(a) object is in free fall
(b) object is at rest
(c) object is stationary
(d) g is maximum

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39. The value of g decreases with:
(a) height, depth, and rotation
(b) only height
(c) only depth
(d) only rotation

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40. The gravitational field intensity at a distance r from mass M is:
(a) GM/r^2
(b) $-GM/r^2$
(c) GM/r
(d) $-GM/r^3$

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41. The potential energy of a satellite is:
(a) twice its total energy
(b) equal to total energy
(c) half of total energy
(d) negative of total energy

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42. Gravitational field intensity is:
(a) vector quantity
(b) scalar quantity

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(c) tensor
(d) none

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43. Gravitational potential is:
(a) scalar quantity
(b) vector quantity
(c) tensor quantity
(d) none

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44. The gravitational constant G is:
(a) same everywhere
(b) changes with height
(c) changes with mass
(d) depends on gravity

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45. The value of g at height h << R is:
(a) g(1 − 2h/R)
(b) g(1 − h/R)
(c) g(1 + h/R)
(d) g(1 + 2h/R)

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46. The escape velocity from the Moon is:
(a) 2.4 km/s
(b) 7.9 km/s
(c) 11.2 km/s
(d) 8.2 km/s

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47. The gravitational potential energy is zero when:
(a) two bodies are infinitely apart
(b) two bodies touch
(c) at finite separation
(d) inside Earth

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48. If distance between two bodies is tripled, gravitational force becomes:
(a) 1/9th
(b) one-third

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(c) nine times
(d) one-ninth

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49. The total mechanical energy of a satellite in circular orbit is:
(a) negative
(b) positive
(c) zero
(d) infinite

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50. Gravitational field lines never:
(a) intersect
(b) cross twice
(c) start from infinity
(d) bend

✅ Answers – SET 4

1 (a)	2 (a)	3 (a)	4 (a)	5 (a)	6 (a)	7 (a)	8 (a)	9 (a)	10 (a)
11 (a)	12 (a)	13 (a)	14 (a)	15 (a)	16 (a)	17 (a)	18 (a)	19 (a)	20 (a)
21 (a)	22 (a)	23 (a)	24 (a)	25 (a)	26 (a)	27 (a)	28 (a)	29 (a)	30 (a)
31 (a)	32 (a)	33 (a)	34 (a)	35 (a)	36 (a)	37 (a)	38 (a)	39 (a)	40 (b)
41 (a)	42 (a)	43 (a)	44 (a)	45 (a)	46 (a)	47 (a)	48 (a)	49 (a)	50 (a)

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