PHYSICS

BOOKS - MCGROW HILL EDUCATION

PHYSICS (HINGLISH)

GRAVITATION

Elementary Question

1. Universal Law of Gravitation

A. Copernicus

B. Newton

C. Galileo

D. Archimedes

Answer: B

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2. A rock is brought from the surface of the moon,

A. its mass will change

B. its weight will change but not mass

C. both mass and weight will change

D. its mass and weight both will remain same .

Answer: B

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3. A body is weighed at the poles and then at the equator .The weight

A. at the equator will be greater than at the poles

B. at the poles will be greater than at the equator

C. at the poles will be equal to the weight at the equator

D. depends upon the shape of the object

Answer: B

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4. An iron ball and a wooden ball of the same radius are released from a height ‘ h ’ in vacuum. The time taken by both of them to reach the ground is

A. exactly equal

B. unequal

C. roughly equal

D. in the ratio of the density of lead and snow

Answer: A

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5. The weight of a body at the centre of the earth is

A. zero

B. equal to its mass

C. maximum

D. infinite

Answer: A

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6. (a) The unit of coefficient of viscosity in CGS system is poise $(g/cm.\ s)$ Convert it into SI unit.

(b) The SI unit of work is joule, convert it into CGS unit.

A. m^2 / s

B. m / s^2

C. s / m^2

D. m / s

Answer: B

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7. The SI unit of G is

A. $N^2 - m^2 / kg$

B. $N - m^2 / kg$

C. $N - m / kg$

D. $N - m^2 / kg^2$

Answer: D

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8. Choose the correct statement :

A. All bodies repel each other in this uni - verse.

B. Our earth does not behave like a magnet.

C. Acceleration due to gravity is $8.9 m / s^2$.

D. All bodies fall at the same rate in vacuum.

Answer: D

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9. Weight of a body is maximum at

A. at the centre of the earth

B. inside the earth

C. on the surface of the earth

D. above the surface of the earth

Answer: C

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10. If the distance between two masses is doubled, gravitational attraction between them

A. $1/4$ times

B. 4 times

C. $1/2$ times

D. 2 times

Answer: A

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11. A body falls freely towards the earth with

A. uniform speed

B. uniform velocity

C. uniform acceleration

D. none of these

Answer: C

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12. If the mass of body is M on the surface of the earth ,then its mass on the surface of the moon will be

A. M

B. $M - 6$

C. $M + 6$

D. $M \times 6$

Answer: a

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13. If a person jumps 1 m at the surface of the earth , he will jump 6 meteres at the surface of the moon .I heretore , the ratio of moon 's

acceleration due to gravity with respect to earth 's acceleration due to gravity would be

A. 6

B. $1/6$

C. 0.6

D. 0.06

Answer: B

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14. Choose the correct statement :

A. weight is a vector quantity

B. the weight of a body in interplanetary space is maximum

C. weight increases when the bodies go up

D. $1N = 1kg \times 1m/s$

Answer: A

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15. What is the value of acceleration due to gravity on the surface of earth ?

A. $8.9m/s^2$

B. $8.9m/s$

C. $9.8m/s^2$

D. $9.8m/s$

Answer: C

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16. The force of gravitation between two bodies does not depend upon

A. their separation

B. the gravitational constant

C. the product of their masses

D. the sum of their masses

Answer: D

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17. The type of force which exists between charged bodies is

A. only gravitational

B. only electrical

C. neigher gravitational nor electrical

D. both electrical and gravitational

Answer: D

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18. When a fruit falls from a tree

A. only the earth attracts the fruit

B. both the earth and the fruit attract each other

C. only fruit attracts the earth

D. they repel each other

Answer: B

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19. When an object is thrown up , the force of gravity

A. acts in the direction of the motion

B. acts in the opposite direction of the motion

C. remains constant as the body moves up

D. increases as the body moves up

Answer: B

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20. Newton's law of gravitation

A. can be verified in the laboratory

B. is valid only in the solar system

C. cannot be verified but is true

D. is valid only earth

Answer: A

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21. If the distance between two particles is halved, the gravitional force becomes

A. four times

B. two times

C. eight times

D. none of these

Answer: A

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22. The force of gravitation exists

A. everywhere in the universe

B. at the surface of the earth only

C. inside the earth only

D. at the surface of moon only

Answer: A

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23. Newton's law og gravitation holds good for

A. small bodies only

B. terrestrial bodies only

C. big bodies only

D. all types of bodies

Answer: D

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24. The gravitational force is a

A. contact force

B. action - at -a distance force

C. neither (a) nor (b)

D. both (a) and (b)

Answer: B

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25. 1 kg wt is equal to

A. $9.8N$

B. $980N$

C. 98 N

D. 0.98 N

Answer: A

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26. 1 kg wt is equal to

A. 980 dyne

B. 9.80 dyne

C. 98 dyne

D. none of these

Answer: D

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27. The force responsible for the existence of the solar system is

A. force of friction

B. gravitational force

C. electrostatic force

D. magnetic force

Answer: B

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28. Which of the following force is responsible for the flow of water in rivers ?

A. force of friction

B. gravitational force

C. electrostatic force

D. magnetic force

Answer: B

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29. Choose the force responsible for holding the atmosphere near the surface of the earth :

A. electrostatic force

B. magnetic force

C. factional force

D. gravitational force

Answer: D

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30. The value of G depends upon

A. nature of the interacting bodies

B. size of the interacting bodies

C. mass of the interacting bodies

D. none of these

Answer: D

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31. The ratio of SI unit to CGS unti of gravitational constant of

A. 10^3

B. 10^2

C. 10^{-2}

D. 10^{-3}

Answer: A

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32. The ratio of SI units to CGS units of g is

A. 10^2

B. 10

C. 10^{-1}

D. 10^{-2}

Answer: A

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33. SI units of G is Nm^2kg^{-2} .Which of the following can also be used as the SI unit of G?

A. $m^3kg^{-1}s^{-2}$

B. $m^2kg^{-2}s^{-1}$

C. $mkg^{-3}s^{-1}$

D. $m^2kg^{-3}s^{-2}$

Answer: A

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34. The value of G depends upon

A. the mass of the interacting bodies

B. the space where the particles are kept

C. the time at which the force is considered

D. none of these

Answer: D

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35. 1 N is nearly equal to

A. 0.1 kg wt

B. 1 kg wt

C. $\frac{1}{19.8}$ kg wt

D. 9.8 kg wt

Answer: A

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36. The force of gravitation between two bodies can be zero if the separation between the bodies becomes

A. 1

B. 0

C. -1

D. infinity

Answer: D

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37. SI unit of acceleration due to gravity is

A. ms^{-2}

B. ms^{-1}

C. N

D. Nkg^{-2}

Answer: A

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38. Choose the scientist who first performed Galileo's experiment on the moon :

A. David Scott

B. Cavendishssss

C. Newton

D. none of these

Answer: A

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39. Choose the correct statement :

A. Gravity and gravitation are same .

B. Gravity is a particular case of gravitation.

C. Acceleration due to gravity is a scalar quantity.

D. Different heavenly bodies have different values for G .

Answer: B

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40. The ratio of g_{moon} to g_{earth} is

A. 6

B. $\frac{1}{6}$

C. 4

D. $\frac{1}{4}$

Answer: B

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41. In vacuum all freely falling bodies

A. have the same speed

B. have the same velocity

C. have the same force

D. have the same acceleration

Answer: D

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42. At the centre of the earth , the value of g becomes

A. zero

B. unity

C. infinity

D. none of these

Answer: A

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43. g is vector and its direction is towards the centre of the

A. body

B. sun

C. earth

D. none of these

Answer: C

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44. The gravitational SI unit of weight is

A. kg wt

B. N

C. g wt

D. all the above

Answer: A

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45. The gravitational force which acts on 1 kg is

A. 9.8 N

B. $\frac{1}{9.8}N$

C. 980 N

D. $\frac{1}{980}N$

Answer: A

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46. A body having a mass of 1 kg on the surface of the earth weighs

A. 9.8 N

B. $\frac{1}{9.8}N$

C. 981 N

D. $\frac{1}{980}N$

Answer: A

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47. A stone dropped from a building takes 4 s to reach the ground. The height of the building is

A. 9.8 m

B. 19.6 m

C. 39.2 m

D. $78.4m$

Answer: D

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48. A ball is thrown up and attains a maximum height of 100 m .Its initial speed was

A. $9.8ms^{-1}$

B. $44.2ms^{-1}$

C. $19.6ms^{-1}$

D. none of these

Answer: B

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49. Weight is

A. measured by a spring balance

B. measured by a beam balance

C. measured in kg

D. a scalar quantity

Answer: A

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50. The weight of an object

A. is the quantity of the matter it contains

B. refers to its inertia

C. is same as its mass but is expressed in different units

D. is the force with which it is attracted to wards the earth

Answer: D

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51. What is the mass of an object whose weight is 98 N ?

A. 98 kg

B. 9.8 kg

C. 10 kg

D. none of these

Answer: C

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52. What is the mass of an object whose weight is 980 N ?

A. 980 kg

B. 98 kg

C. 100 kg

D. zero

Answer: C

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53. Mass of a body is 5 kg .What is its weight ?

A. 49 N

B. 5N

C. 49 kg wt

D. none of these

Answer: A

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54. How much would a 60 kg boy weigh on the moon ? Given : $g_{\text{moon}} = \frac{g(\text{earth})}{6}$

A. 10 kgwt

B. 6kgwt

C. $\frac{1}{6}$ kg wt

D. zero

Answer: A

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55. How much would a W kg man weigh on the moon in terms of gravitational units ?

A. $\frac{W}{6}$ kg wt

B. 6 W kg wt

C. W kg wt

D. zero

Answer: A

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56. In Q 55 above ,what would the man weigh in terms of absolute SI units ?

A. $(Wg)N$

B. $\left(\frac{W}{6}g\right)N$

C. $(6Wg)N$

D. zero

Answer: B

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57. A body has a mass M kg on the earth .What will be its weight on the earth ?

A. Mg newton

B. $\left(\frac{M}{8}\right)$ newton

C. M newton

D. Zero

Answer: A

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58. What would be its weight on the moon in Q 57 ?

A. $\frac{MgN}{6}$

B. 6M kg

C. $\frac{M}{6}kg$

D. zero

Answer: A

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59. What will be its mass on the moon in Q 57 ?

A. Mkg

B. 6Mkg

C. $\frac{M}{6}kg$

D. zero

Answer: A

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60. The gravitational force exerted by the earth on a body is called

A. true weight

B. mass

C. gravitational mass

D. inertial mass

Answer: A

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61. A body weighs 60 kg on the earth's surface . What would be its weight at the centre of the earth ?

A. $60kgwt$

B. 6kgwt

C. $60x9.8kgwt$

D. Zero

Answer: D

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62. A weighing machine measures

A. weight only

B. mass only

C. mass and weight

D. none of these

Answer: A

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63. A person stands on a weighing machine kept on the floor of an elevator .When the elevator is at rest then the apparent weight of the person is

A. equal to his true weight

B. less than his true weight

C. more than his true weight

D. more or less than his true weight

Answer: A

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64. In Q 63 above ,if the elevator moves down with a constant acceleration , the apparent weight of the person is

A. less than its true weight

B. equal to its true weight

C. more than its true weight

D. more or less than its true weight

Answer: A

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65. In Q 63 above , if the elevator moves upward with a constant acceleration , the apparent weight of the person is

A. less than his true weight

B. equal to his true weight

C. more or less than his true weight

D. more or less than his true weight

Answer: C

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66. In Q 64 above , suppose the cable breaks , then the weighing machine will read

A. more than the weight of the body

B. less than the weight of the body

C. equal to the weight of the body

D. zero

Answer: D

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67. Hold a stone at the end of a spring balance .The pointer shows 5kg wt . Now release the spring balance . Then the pointer will read

A. more than 5 kg wt

B. less than 5kg wt

C. equal to 5 kg wt

D. zero

Answer: D

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68. The apparent weight of a body , weighing M kg wt , during free fall is

A. less than M kg wt

B. more than M kg wt

C. equal to M kg wt

D. zero

Answer: D

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69. While orbiting around the earth in a spaceship, an astronaut experiences

A. more weight

B. lesser weight

C. weightless

D. nothing at all

Answer: C

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70. Which of the following motions is different from others ?

A. A ball throw horizontally in air .

B. A bomb released from a flying aeroplane .

C. A jevelin thrown by an athlete.

D. A bird flying in the air .

Answer: D

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71. An object thrown into space horizontally under the action of earth's gravity is called a

A. projectile

B. trajectory

C. spaceship

D. none of these

Answer: A

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72. The path followed by a projectile is called its

A. trajectory

B. range

C. amplitude

D. none of these

Answer: A

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73. The horizontal distance travelled by a projectile is called its

A. trajectory

B. range

C. amplitude

D. none of these

Answer: B

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74. If g is acceleration due to gravity , then the vertical distance travelled by a projectile in time t is equal to

A. $\frac{1}{2}gt^2$

B. gt

C. $\frac{3}{4}gh^2$

D. none of these

Answer: A

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75. The force between two electrons separated by a distance r is proportional to

A. r

B. r^2

C. $\frac{1}{r^2}$

D. $\frac{1}{r}$

Answer: C

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76. The force of gravity on a body of mass W is

A. W

B. Wg

C. $\frac{W}{g}$

D. Wg^2

Answer: B

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77. When an object falls freely to the earth , the force of gravity is

A. opposite to the direction of motion

B. along the direction of motion

C. constant

D. zero

Answer: B

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78. Acceleration due gravity of a body thrown up is

A. $9.8ms^{-2}$

B. $-9.8ms^{-2}$

C. $\pm 9.8ms^{-2}$

D. zero

Answer: B

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79. A bomb is released by a horizontal flying aeroplane. The trajectory of the bomb is

A. an are of a circle

B. parabola

C. a zig -zag path

D. a straight vertical path in the downward direction

Answer: B

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80. The value of acceleration due to gravity depends on

A. pressure

B. acceleration

C. gravitational force

D. none of these

Answer: D

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81. The value of acceleration due to gravity on earth depends on

A. mass of the body

B. radius of the body

C. shape of the body

D. mass of the earth

Answer: D

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82. If the symbols have their usual meanings , $\frac{GM}{R^2}$ is equal to

A. g^2

B. $\frac{1}{g^2}$

C. g

D. $\frac{1}{g}$

Answer: C

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83. The time period of a geostationary satellite is

A. 24hrs

B. 6 hrs

C. 365 days

D. none of these

Answer: A

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84. The gravitational force between two stones of mass 1 kg each separated by a distance of 1 me tre in vacuum is

A. zero

B. $6.675 \times 10^{-5} N$

C. $6.675 \times 10^{-8} N$

D. $6.675 \times 10^{-11} N$

Answer: D

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85. The weakest force of interaction is

A. electrostatic

B. gravitational

C. nuclear

D. electromagnetic

Answer: B

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86. The time taken by a radiowavw to go and come back after reflection from a communication satellite is

A. $\frac{1}{4}$s

B. $\frac{1}{2}$ s

C. 1s

D. $\frac{1}{8}$ s

Answer: A

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87. Weighlessness in a satellite is because of

A. inertia

B. zero gravity

C. centre of gravity

D. acceleration

Answer: B

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88. Who gave three laws of planetary motion ?

A. Aristotle

B. Kepler

C. Copernicus

D. Tycho Brahe

Answer: B

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89. As we go from the equator to the poles, the value of g

A. dereases

B. increases

C. remains unchanged

D. first decreases then increases

Answer: B

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90. If $R =$ radius of the earth and $g =$ acceleration due to gravity on the surface of the earth, the acceleration due to gravity at a distance $(r < R)$ from the centre of the earth is proportional to

A. $g \propto \frac{1}{r^2}$

B. $g \propto r$

C. $g \propto r^2$

D. $g \propto r^\circ$

Answer: B

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91. The value of g varies with distance (r) above the earth 's surface as

A. $g \propto \frac{1}{r^2}$

B. $g \propto r$

C. $g \propto r^2$

D. $g \propto r^{\circ}$

Answer: A

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92. The space in which a body experiences a force by virtue of its mass is called

A. magnetic field

B. electric field

C. gravitational field

D. none of these

Answer: C

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93. The force experienced by a unit mass at a point in the gravitational field is called its

A. gravitational intensity

B. electric intensity

C. magnetic intensity

D. gravitational constant

Answer: A

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94. The gravitational intensity in Q 93 is denoted by

A. g

B. G

C. E

D. none of these

Answer: A

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95. Which of the following represents the unit for gravitational intensity ?

A. N

B. kgm^{-2}

C. Nkg^{-1}

D. ms^{-3}

Answer: C

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96. Where will a body weight minimum ?

A. At a height of 100 m above the earth 's surface

B. At the earth 's surface

C. At a depth of 100 m below the earth 's surface

D. At the centre of the earth

Answer: D

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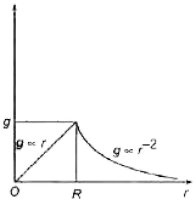
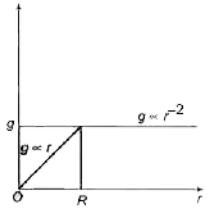
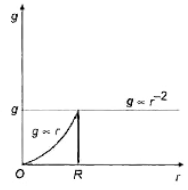
97. The variation of g with height or depth (r) is shown correctly by the graph in Fig .4.2 (where R is radius of the earth),

A. 

B. 

C. 

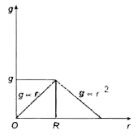
D. 

Fig. 4.1

Answer: A

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98. What is the value of gravitational intensity at the surface of Earth and at the Earth's centre?

A. 1

B. infinity

C. zero

D. can't be decided

Answer: C

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99. The ratio of SI units to CGS of the gravitational intensity is

A. 10^3

B. infinity

C. zero

D. 10^2

Answer: D

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100. If the symbols have usual meanings then $\frac{gR^2}{M}$ represents

A. G

B. G^2

C. $\frac{1}{G}$

D. $\frac{1}{G^2}$

Answer: A

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Higher Order Thinking Questions

1. The weight of a person on earth is 900 N. His weight on the moon will appear as

A. zero

B. 150 N

C. 600 N

D. 5400 N

Answer: B

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2. If G is universal gravitational constant and g is acceleration due to gravity then the unit of the quantity $\frac{G}{g}$ is

A. kg/m

B. kg/m^2

C. m^2 / kg

D. m / kg

Answer: C

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3. Gravity meter is used to measure

A. weight of body

B. gravitational constant

C. changes in acceleration due to gravity

D. none of these

Answer: C

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4. Two speres of radii r and 2r touching each other the force of attraction betweeen them is proportional

A. r^{-2}

B. r^2

C. r^4

D. r^6

Answer: C

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5. The tidel waves in the sea are primarily due to gravitational effect of

A. earth on the sea

B. sun on the earth

C. earth on the moon

D. moon on the earth

Answer: D

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6. If the distance between the sun and the earth is increased by three times, then attraction between two will

A. increase by $89\ \%$

B. decrease by $89\ \%$

C. decrease by $63\ \%$

D. remain consultant

Answer: B

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7. The ratio between masses of two planets is 2:3 and ratio between their radii is 3:2. The ratio between acceleration due to gravity on these two planets is

A. $8:27$

B. $27:8$

C. $9:4$

D. $3:5$

Answer: A

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8. If the earth suddenly shrinks (without changing mass) to half of its present radius, the acceleration due to gravity will be

A. $\frac{3}{2}$g

B. $\frac{4}{9}$ g

C. $\frac{9}{4}$ g

D. $\frac{g}{3}$

Answer: C

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9. F_g and F_e represent gravitational and electrostatic force respectively between

electrons situated at a distance 10 cm. The ratio of F_g / F_e is of the order of

A. 10^{36}

B. 10^{43}

C. 10^{-43}

D. 10^{-36}

Answer: C

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10. Two planets have same density but different radii The acceleration due to gravity would be .

A. greater on the smaller planet

B. greater on the larger planet

C. same on both the planets

D. nothing can be decided

Answer: B

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11. Gravitation on moon is $\frac{1}{6}$ th of that on earth. When a balloon filled with hydrogen is released on moon then this

A. rise with acceleration g on the moon

B. fall with acceleration g on the moon

C. rise with acceleration $g/6$ on the moon

D. fall with acceleration $g/6$ on the moon

Answer: D

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12. The accelearation due to gravity on a planet is 1.96 ms^{-2} if tit is safe to jump from a height of 3 m on the earth the corresponding height on the planet will be

A. 4 m

B. 6 m

C. 12 m

D. 20 m

Answer: D

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13. Which of the following cannot be used for measuring time in a spaceship orbiting around the earth ?

A. quartz watch

B. atomic clock

C. electric clock

D. pendulum clock

Answer: D

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14. If both the mass and radius of the earth, each decreases by 50%, the acceleration due to gravity would

A. increase by $50\ \%$

B. decrease by $50\ \%$

C. increase by $100\ \%$

D. remain the same

Answer: C

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15. The line joining the places on earht having same values of g are called

A. isobars

B. isotherms

C. isogams

D. none of these

Answer: C

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16. If different planets have the same density but diferent radii then the acceleration due to gravity (g) on the surface of the planet will depend on its radius (R) as

A. $g \propto \frac{1}{r^2}$

B. $g \propto \frac{1}{R}$

C. $g \propto R$

D. $g \propto R^2$

Answer: C

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17. Rate of change of weight near the earth 's surface varies with height h as

A. h°

B. h^{-1}

C. $h^{1/2}$

D. h^{-2}

Answer: A

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18. The period of geostationary satellite is

A. 12 hours

B. 24 hours

C. 365 days

D. $365\frac{1}{4}$ days

Answer: B

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19. Where will it be profitable to purchase 1 kilogram sugar

A. At poles

B. At equator

C. At 45° latitude

D. At 60° latitude

Answer: B

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20. As we go from the equator to the poles, the value of g

A. increases

B. decreases

C. remains same

D. nothing can be said

Answer: A

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21. Who among the following gave first the experimental value of G

A. Newton

B. Galileo

C. Kepler

D. Cavendish

Answer: D

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22. The work done by a satellite in a complete orbit is

A. infinity

B. unity

C. zero

D. negative

Answer: C

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23. A goestationary satellite revolves around the earth from

A. North to South

B. South to North

C. West to East

D. East to West

Answer: C

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24. The speed of planet is greater when it is closer to the sun than when it is farther away from the sun. explain why?

A. maximum ,minimum

B. minimum maximum

C. zero ,infinity

D. infinity ,zero

Answer: A

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25. Average density of the earth

A. is inversely proportional to g

B. is directly proportional to g

C. does not depend on g

D. is directly proportional to $\sqrt{g}$

Answer: B

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