1. Force of Gravitation is directly proportional to the product of _____: A
   a) Masses b) Volumes
   c) Weights d) Surface areas

2. Gravitational force is inversely proportional to _____ the two bodies: B
   a) Distance between b) Square of the distance between
   c) Product of the masses d) None of the above

3. Newton's law of gravitation can be mathematically represents as: D
   a) $F = G\frac{m_1 m_2}{r}$ b) $F = \frac{Gm^2}{r^2}$
   c) $F = G\frac{r^2}{m_1 m_2}$ d) $F = G\frac{m_1 m_2}{r^2}$

4. The value of universal constant G is: C
   a) $6.73 \times 10^{-11}\ Nm^2kg^{-2}$ b) $6.673 \times 10^{-13}\ Nm^2kg^{-2}$
   c) $6.673 \times 10^{-11}\ Nm^2kg^{-2}$ d) $6.73 \times 10^{-11}\ Nmkg^{-2}$

5. Gravitational force can be considered as a: B
   a) Fictitious force b) Universal force
   c) Pair of action and reaction forces d) Dragging force

6. Two bodies of masses m_1 and m_2 exert gravitational forces of f_1 and f_2 on one another. The relation between f_1 and f_2 is given by: B
   a) $f_1 = f_2$ b) $f_1 = -f_2$
   c) $f_1 = 2f_2$ d) $f_1 = \frac{1}{f_2}$

7. The vectorial form of the law of gravitation is: D
   a) $\vec{F} = \frac{Gm_1m_2}{r^2}\hat{r}$ b) $\vec{F} = G\frac{m_1m_2}{r^2}\vec{r}$
   c) $\vec{F} = \frac{Gm_1m_2}{r^3}\hat{r}$ d) $\vec{F} = -\frac{Gm_1m_2}{r^2}\hat{r}$

8. The value of G was found by: A
   a) Cavendish b) Newton
   c) Michelson d) Watt

9. The formula used by Cavendish to find out the value of G with the help of "Cavendish apparatus" was: C
   a) $G = \frac{C\theta r}{Mml^2}$ b) $G = \frac{C\theta^2 r}{Mml}$
   c) $G = \frac{C\theta r^2}{Mml}$ d) $G = \frac{C^2\theta r}{Mml^2}$

10. When the downward acceleration of the elevator increased, the weight of the objects inside it will: A
    a) Decrease b) Increase
    c) Remain the same d) None of these

11. The acceleration due to gravity is denoted by: C
    a) G b) a
    c) g d) None of the above

12. The force with which the earth attracts a body is its: A
    a) Weight b) Mass
    c) Density d) Gravitational acceleration

13. The mass of the earth comes out to be: D
    a) 6.67×10^{13} kg b) 6.025×10^{23} kg
    c) 1.6×10^{19} kg d) 6×10^{24} kg

14. Density of the earth is found out to be: B
a) 5.1 gm cm^{-3} b) 5.5 gm cm^{-3}
c) 1.5 gm cm^{-3} d) 5 gm cm^{-3}

15. The gravitational acceleration changes with altitude h according to the formula: A
a) $g_h = g - \frac{2gh}{R_e}$ b) $g_h = 2g - \frac{gh}{R_e}$
c) $g_h = 2g - \frac{gh^2}{R_e}$ d) $g_h = g - \frac{g^2h}{R_e}$

16. The value of gravitational acceleration at the surface of the earth is: C
a) 8.9 ms^{-2} b) 8.8 ms^{-2}
c) 9.8 ms^{-2} d) 1.98 ms^{-2}

17. The value of g at the surface of the earth can be found by the formula: D
a) $g = \frac{GmM_e}{R_e^2}$ b) $g = \frac{GM_e}{R_e}$
c) $g = \frac{GM_e^2}{R_e^2}$ d) $g = \frac{GM_e}{R_e^2}$

18. The value of g at a depth of x metres form the surface of the earth is calculated from the formula: D
a) $g_x = \frac{GM'_e}{R_e - x}$ b) $g_x = \frac{GM'_e}{(R_e - x)^{-2}}$
c) $g_x = \frac{GM'_e}{x - R_e}$ d) $g_x = \frac{GM'_e}{(R_e - x)^2}$

19. As we go below the surface of the earth, the value of g: B
a) Increases b) Decreases
c) Remains constant d) Has no value

20. At the centre of the earth, the value of g becomes: A
a) Zero b) Infinity
c) 9.8 ms^{-2} d) None of the above

21. An astronaut, in a satellite, orbiting the earth, experience a state of weightlessness because of: D
a) The satellite orbits the earth at a very large speed
b) The satellite orbits the earth with a centripetal acceleration greater than 'g'
c) The satellite orbits the earth with a centripetal acceleration less than 'g'
d) The satellite orbits the earth with a centripetal acceleration equal to 'g'

22. Gravitational mass, when multiplied by _____ gives measure of gravity of the earth: D
a) Inertial mass b) Mass of earth
c) G d) g

23. Practically the inertial mass and the gravitational mass are: C
a) Additive inverse of each other b) Multiplicative inverse of each other
c) Equal d) Not equal

24. When a lift is moving upward with a uniform velocity, the apparent weight of a body inside the lift will be: A
a) Equal to its actual weight b) Less than the actual weight
c) More than the actual weight d) Zero

25. When the lift is moving upward with a uniform acceleration, the apparent weight of the body inside it will be: B
a) Less than its actual weight b) More than its actual weight
c) Varying with velocity d) The same as its actual weight

26. When the lift moves upward with a uniform acceleration "a", the apparent value of g inside the lift changes to: A
a) g + a b) g - a
c) g – 2a d) g + 2a

27. When the lift moves downward with a uniform acceleration, the apparent weight of the body inside the lift will be: A
a) Less than its actual weight b) More than its actual weight
c) Varying with its velocity d) The same as its actual weight

28. When the lift moves downward with an acceleration "a", the apparent value of "g" inside the lift changes to: B
a) g + a b) g - a
c) g – 2a d) g + 2a

29. When the lift falls with an acceleration equal to "g", the apparent weight of an object inside it will: C
a) Remain the same b) Become half
c) Become zero d) Become double

30. The weight of a body on moon is _____ of its weight on earth: B
a) One fourth b) One sixth
c) One eighth d) One third

31. The astronauts in a satellite experience a state of weightlessness because both the astronaut and the satellite fall toward the earth with an acceleration of: A
a) g b) 2g
c) 3g d) -g

32. In a spaceship, artificial gravity is created with the help of: A
a) Centripetal force b) Centrifugal force
c) Magnetic force d) None of the above

33. The frequency of a spaceship of radius R revolving around its axis to provide a force of gravity equal to the weight of the astronauts on earth, should be: B
a) $2\pi\sqrt{\frac{g}{R}}$ b) $\frac{1}{2\pi}\sqrt{\frac{g}{R}}$
c) $\frac{1}{2\pi}\sqrt{\frac{R}{g}}$ d) $\frac{1}{2\pi}\sqrt{gR}$

34. How the artificial gravity is created in a satellite to overcome the state of weightlessness experienced by the astronaut in it? D
a) By increasing the orbital speed of the satellite b) By decreasing the orbital speed of satellite
c) By keeping the orbital speed of the satellite constant equal to that of the earth's around sun
d) By causing the satellite to spin about its own axis

35. If the value of G is doubled, the value of g: A
a) Is also doubled b) Remains the same
c) Becomes one half d) Become a quarter of the original value

36. If the mass of body moves towards the axis of rotation, its moment of inertia: B
a) Increased b) Decreased
c) Remained constant d) None of the above

37. _____ force is responsible for the motion of the planets around the sun: A
a) Gravitation b) Weak
c) Strong d) None of these

38. According to Newton's law of gravitation, force is _____ proportional to the product of their masses: A
a) Directly b) Universal
c) Inversely d) None of these

39. Force is _____ proportional to the square of the distance between the centers of the masses of two objects: B
a) Directly b) Inversely
c) Gravitation d) None of these

40. "G" is known as _____: B
a) Gravitation of the earth b) Universal gravitational constant
c) Gravitational distance d) None of these

41. The value of universal constant "G" is _____: C
a) 4.49×10^{12} Nm b) 6.67×10^{-9} Nm
c) 6.67×10^{-11} Nm^2/kg^2 d) 6.67×10^{-6} Nm^2/kg^2

42. The gravitational force between two bodies is _____, _____ pair: D
a) Normal and general b) Positive and negative
c) Negative and positive d) Action and reaction

43. Two bodies "A" and "B" exert gravitational forces of "F_1" and "F_2" on one another, then we can say that both forces are equal in magnitude but _____ in direction: C
a) Action b) Reaction
c) Opposite d) None of these

44. Cavendish used his method to find the value of _____: B
a) R b) G
c) -R d) R^2

45. The Cavendish formula to find the value of "G" is _____: B
a) $F = \frac{Gm_1m_2}{r^2}$ b) $G = \frac{r^2}{Mml} C\theta$
c) $G = \frac{r}{Mml} c\theta$ d) None of these

46. The value of radius of earth is _____: A
a) 6.4×10^6 m b) 6.4×10^3 m
c) 64.5×10^3 m d) 64.5×10^6 m

47. The acceleration due to gravity is denoted as _____: C
a) G b) Mass of earth
c) g d) None of these

48. The formula to find the mass of the earth is _____: A
a) $M_e = \frac{gR^2}{G}$ b) $M_e = \frac{gR}{G^2}$
c) $M_e = \frac{g^2R}{G}$ d) $M_e = \frac{g^2R}{G^2}$

49. If we write $g \alpha \frac{1}{R^2}$, then we can say that _____: B
a) It shows gravitation constant b) The value of "g" depends upon the radius of earth
c) The value of "g" is so greater d) None of these

50. The formula for "g" with altitude is _____: A
a) $g_h = g - \frac{2gh}{R}$ b) $g_h = g + \frac{2gh}{R}$
c) $g_h = 2g + \frac{2gh}{R}$ d) $g_h = 2g - \frac{2gh}{R}$

51. The value of "g" at the surface of the earth _____: B
a) 49.7 m/s^2 b) 9.8 m/s^2
c) 8.9 m/s^2 d) 47.3 m/s^2

52. The value of "g" can be found by the formula _____: A
a) $g = \frac{GMe}{R_e^2}$ b) $g = \frac{-GMe}{R^2}$
c) $g = \frac{G^2Me}{R_e}$ d) $g = \frac{G^3Me}{R_e}$

53. The value of "g" is _____ in "Murree" than "Hyderabad": A
a) Less b) Greater
c) Same d) Equal

54. At the center of the earth, the value of "g" becomes _____: D
a) Greater b) Decreases
c) Increases d) Zero

55. In reference frame if a = 0, then weight of the body is equal to the force of _____: C
a) Mass b) Weight
c) Gravity d) None of these

56. When a satellite moves in a circular orbit around the earth, the necessary _____ force is provided by the force of gravity: A
a) Centripetal b) Artificial
c) Mass d) None of these

57. If the mass of the earth becomes double, then value of "G" _____: B
a) Also doubles b) Remains same
c) Four times d) Two times

58. If the mass of earth becomes four times, then the value of "g" _____: A
a) Also becomes four times b) One fourth of the mass of the earth
c) Twice the mass of the earth d) None of these

59. The formula to find the volume of earth is _____: C
a) $\frac{2}{3}\pi R^3e$ b) $\frac{1}{3}\pi R^3e$
c) $\frac{4}{3}\pi R^3e$ d) None of these

60. The value of g is _____: B
a) Greatest at the equator b) Least at the equator
c) Least at the poles d) Same all over the earth surface

61. The weight of a body is minimum at: A
a) The equator b) The poles
c) A place in between pole and equator d) None of these

62. As we go below the surface of the earth the value of g: A
a) Decreases b) Increases
c) Becomes zero d) Remains unchanged

63. At what depth below the earth surface the value of g reduces to one-half of its value on the earth's surface: B
a) $R_e/4$ b) $R_e/2$
c) R_e d) $2\ R_e$

64. The value of g at a height equal to the radius of earth from its surface is: C
a) g b) g/2
c) g/4 d) 2g

65. The artificial gravity is created in a satellite to overcome the state of weightlessness, experienced by the astronauts in it, by: C
a) Decreasing the orbital speed of the satellite
b) In creasing the orbital speed of the satellite
c) Causing the satellite to rotate about its own axis
d) None of the above

66. The artificial gravity is created in the satellite to: D
a) Increase the orbital speed of the satellite b) Keep the satellite in its orbit
c) Keep the orbital radius of the satellite constant
d) Overcome the weightlessness experienced by astronaut

67. Weight rather than mass must be used when calculating: C
a) The gravitational force between two bodies b) Specific heat capacity of a body
c) The stress in a wire due to a load hanging from it d) The moment of inertia of a body

68. A body of mass m is projected from the earth's surface at the point of launch, the acceleration of free fall is g and the radius of earth is R_e. To escape from the gravitational field of the earth, the speed of the body (i.e. escape velocity) must be at least: C
a) $\sqrt{g R_e}$ b) $m g R_e$
c) $\sqrt{2g R_e}$ d) $m g/2 R_e$

69. Assuming the earth to be a uniform sphere rotating about an axis through the poles, the weight of a body at equator compared with its weight at the pole would be: A
a) Greater b) Smaller
c) Equal d) None of these

70. An ice-skater can greatly increase his speed of rotation in a spin by drawing in his limbs towards the spin axis. This is because: A
a) His moment of inertia decreases b) His angular momentum increases
c) His potential energy decreases d) His centre of gravity changes

71. If M is the mass and R is the radius of the earth, then which one of the following equations correctly relates the universal gravitational constant G to the acceleration of free fall g at the surface of the Earth? C
a) $G = \frac{gM}{R^2}$ b) $G = \frac{R^2}{gM}$
c) $G = \frac{gR^2}{M}$ d) $G = \frac{M}{gR^2}$

72. A man weighs 98 N on earth. His weight on the surface of moon where $g = 1.6\ ms^{-2}$ will be: C
a) 15.68 N b) 156.8 N
c) 16 N d) 9.8 N

73. The value of "g": A
a) Decreases with altitude b) Increases with altitude
c) Is constant every where d) Does not depend upon altitude

74. The value of "g" _____ with increase of the distance of the body from the centre of the earth: C
a) Increase b) Remain same
c) Decrease d) Becomes twice

75. The gravitational forces acting on the two bodies form: D
a) Couple b) Reaction force
c) Both couple and reaction pair d) An action and reaction pair

76. The main aim of Cavendish experiment was to obtain the measurement of: D
a) Acceleration due to gravity b) Inertia mass of a spherical body
c) Tensional constant of small fibbers d) The value of universal gravitational constant

77. The value of gravitational constant "G" was found by means of: D
a) Newton's laws of motion b) Newton's law of gravitation
c) Kepler's law d) Cavendish apparatus

78. Numerical value of "G" can also be estimated by knowing the _____: B
a) Circular motion b) Mass of earth
c) Average density of the air d) Weight of the earth

79. If the distance between two bodies is doubled the gravitational force between them becomes: D
a) Half of the original value b) One third of the original value
c) Doubled d) One fourth of the original value

80. The gravitational force is responsible for the motion of _____: D
a) Atom round the nucleus b) Motor car on the road
c) A body round the axes d) Planet around the sun

81. The mass of earth can be determined by using: D
a) Kepler's law b) The Cavendish experiment
c) Newton's second law of motion d) Universal law of gravitation

82. If we go away from the surface of the earth distance equal to the radius of earth, the value of "g" will become: A
a) 1/4 b) 1/8
c) 1/9 d) 1/6

83. Free falling bodies in a state of: A
a) Weight lessens b) Dynamic equilibrium
c) Static equilibrium d) Rest

84. The law of gravitation was introduced by: D
a) Pascal b) Boyle's
c) Huygen d) Newton

85. If the speed of rotation of the earth is increased, the mass lying on its surface will be: A
a) Increased in weight b) Decreased in weight
c) Some time increase & some time decrease d) Have no change in weight

86. Weightlessness experienced while orbiting the earth in space ship is the result of: C
a) Inertia b) Acceleration
c) Zero gravity d) Centre of gravity

87. A spoon is gently detached from a geostationary satellite, The spoon will: C
a) Now follow an irregular path b) Fall to the earth
c) Continue to move with satellite d) Follow a parabolic path

88. A man standing in an elevator is acted upon by: C
a) Four forces b) Three forces
c) Two forces d) One force

89. A rocket can go vertically upward in earth's atmosphere because: D
a) It is lighter than air b) Of gravitational pull of earth
c) It has a fan, which displaces more air per unit time then, the weight of rocket
d) Of the force exerted on the rocket by gases ejected by it

90. The time period of a satellite in a circular orbit round a planet is independent of: A
a) Mass of the satellite b) The radius of the planet
c) The mass planet d) All of these

91. The escape velocity of a projectile from the earth is approximately: C
a) 7 km/sec b) 112 km/sec
c) 11.2 km/sec d) 1.1 km/sec

92. The ratio of the inertial mass to gravitational masses is equal to: B
a) 0.5 b) 1
c) 2 d) No fixed number

93. There is a body lying on the surface of the earth and suppose the earth suddenly loses its power of attraction then: B
a) The mass of the body will reduce to zero
b) The weight of the body will reduce to zero
c) Both will reduce to zero
d) It becomes infinity

94. The escape velocity for the moon is nearly: D
a) 11.2 km/sec
b) 5 km/sec
c) 10 km/sec
d) 2.4 km/sec

95. Which of the following is the evidence to show that there must be force acting on earth and directed towards the sun? B
a) Deviation of the falling bodies towards east
b) Revolution of the earth round the sun
c) Phenomenon of day and night
d) Apparent motion of sun round the earth

96. If the radius of earth were to shrink by one percent, its mass remaining the same, the acceleration due to gravity on the earth's surface would: C
a) Decrease
b) Remains unchanged
c) Increase
d) None of these

97. In planetary motion B
a) The angular speed remains constant
b) The total angular momentum remains constant
c) The linear speed remains constant
d) Neither the angular momentum nor angular speed remains constant

98. The escape velocity of an object projected from the surface of a given planet is independent of: A
a) The mass the object
b) The direction of projection
c) The mass of the planet
d) Radius of the planet

99. The southern Hemisphere of earth is "up side down" but the people living there do not fall off the earth because: A
a) Earth attracts every body nearly towards its center
b) Their weight is zero
c) Their weight is infinite
d) The value of g is zero in the Southern Hemisphere

100. Newton's law of gravitation is universal because: C
a) It is always attractive
b) It acts on all heavenly bodies and particles
c) It acts on all the masses at all the distances and is not affected by the medium
d) None of the above

101. As we go from the equator to the poles, the value of "g": C
a) Remains the same
b) Decreases
c) Increases
d) Decreases upto latitude of 45°

102. G, which is used in universal law of gravitation, is actually: B
a) Force of gravitation
b) Constant of gravitation
c) Gravitational acceleration
d) Gravitational attraction

103. According to the law of gravitation the attraction between the two bodies increases when distance between them is: B
a) Increased
b) Decreased
c) Kept the same
d) Nothing can be said

104. The minimum velocity of projection to go out from the earth's gravitational pull is called: B
a) Terminal velocity
b) Escape velocity
c) Angular velocity
d) Orbital velocity

105. Newton's law of gravitation applies to: C
a) Small bodies only
b) Planets only
c) Both small and big bodies
d) Only valid for solar system

106. The weight of a man is equal to the force of gravity acting on it when: A
a) The elevator is at rest
b) The elevator moves up with an acceleration 'a'
c) The elevator moves down with an acceleration 'a'
d) None of these

107. Inertial mass is: A
a) Equal to gravitational mass
b) Less than gravitational mass
c) More than gravitational mass
d) Not related to gravitational mass at ordinary speed

108. The acceleration due to gravity on a planet with mass and radius half that of earth will be: C
a) g
b) 2g
c) g/2
d) g/4

109. If the distance between two masses is doubled and their masses are also doubled, the gravitational force: D
a) Becomes five times
b) Becomes half
c) Becomes doubled
d) Remains unchanged

110. The gravitational force with which earth attracts the moon: C
a) Is smaller than the force with which moon attracts the earth
b) Is greater than the force with which moon attracts the earth
c) Is equal to the force with which moon attracts the earth
d) The fact is yet to be established

111. A body is taken from the earth's surface to the moon, the weight of the body will be zero at a point where force of attraction due to: C
a) The earth is zero
b) The moon is zero
c) The moon and earth is equal and opposite
d) Both the moon and earth is zero

112. A satellite orbiting the earth receives centripetal force from: B
a) Gravitational pull of the sun on the satellite
b) Gravitational pull of the earth on the satellite
c) The rocket engine attached to the satellite
d) None of the above

113. If the distance between two bodies is doubled, the gravitational force between them becomes: D
a) Double
b) Half of the original value
c) One third of the original value
d) One fourth of the original value

114. The average mass per unit volume (or average density) or the earth is: C
a) 3 times the density of water
b) 4 times the density of water
c) 5.5 times density of water
d) Equal to the density of water

115. The force of gravitation between two bodies 2m apart and each of 1000 kg is: C
a) 1.6×10^{-7} N
b) 3.34×10^{-8} N
c) 1.67×10^{-5} N
d) 3.34×10^{-5} N

116. The value of g at a height equal to the radius of the earth from its surface is: B
a) $g' = g$
b) $g' = g/4$
c) $g' = g/9$
d) $g' = g/2$

117. A man in an elevator ascending with an acceleration will conclude that his weight has: A
a) Increased
b) Decreased
c) Reduced to zero
d) Remained constant

118. A man in an elevator descending with an acceleration will conclude that his weight has: B
a) Increased
b) Decreased
c) Remained constant
d) Reduced to zero

119. The gravitational force of attraction between the earth and a body of mass 1kg on the surface: A
a) 9.8 N
b) 9.8 Dyne
c) 980 N
d) 98 N

120. The acceleration due to gravity above the earth surface would be half of its value on the surface of earth at an altitude of (R = 4000 miles): A
a) 1600 miles b) 200 miles
c) 1000 miles d) 400 miles

121. A satellite moving round the earth constitutes: B
a) An inertial frame of reference b) Non-inertial frame
c) Neither inertial nor non-inertial d) Both inertial and non-inertial

122. A body of 2kg is suspended from the ceiling of an elevator moving up with an acceleration 'g' its apparent weight in the elevator will be: D
a) 9.8 N b) 19.6 N
c) 129.4 N d) 39.2 N

123. Pull of the earth on a mass of 20 kg on the surface of earth is: B
a) 20 N b) 196 N
c) 19.6 N d) 1960 N

124. The weight of a man in an elevator moving down with an acceleration of 9.8 ms^{-2} will become: B
a) Half b) Zero
c) Unchanged d) Doubled

125. A man of mass 100 kg is falling freely, its weight becomes: D
a) 980 N b) 490 N
c) 1380 N d) None of above

126. If a body of mass 10 kg is falling freely, its weight becomes: A
a) Zero b) 98 N
c) 9.8 N d) 10 N

127. The value of g is affected by earth's: C
a) Non-spherical shape b) Daily rotation
c) Non-spherical shape and daily rotation d) None of these

128. Under which force energy is not conserved? A
a) Frictional force b) Electrostatic force
c) Gravitational force d) Magnetic force

129. Which one of the following is not a universal constant? A
a) Acceleration due to gravity g b) Electronic charge e
c) Plank's constant h d) Gravitational constant G

130. A tunnel is bored through the centre of the earth and a pebble is dropped, then it: A
a) Performs S.H.M b) Sticks to the side of the side
c) Stops at the centre of the earth d) Drops to the other side

131. Which of the following does not affect g? D
a) Depth of the place b) Longitude of the place
c) Altitude of the place d) Latitude of the place

132. An astronaut in space with a life belt is attached to the spaceship outside. If the life belt is cut by accident: A
a) He will continue moving in the orbit b) He will fall to the earth
c) He will go to the outer space d) None of these

133. The weight of a body of 15 kg mass placed in a spaceship orbiting the earth at a speed of 3000 m/sec at a height of 500 m will be: D
a) 176.5 N b) 240 N
c) 122.5 N d) Zero

134. An elevator initially accelerates upward from rest and then ascends with uniform speed. Time period of a simple pendulum in the elevator will: B
a) Increase and then decrease b) Decrease and then increase
c) Increase d) Decrease

135. Assume the earth to be homogeneous. Scientist A goes deep down in a mine and Scientist B goes up in a balloon. The value of g measured by: A
a) Each goes on decreasing
b) Each remains unaltered
c) B goes on decreasing and that of A goes on increasing
d) A goes on decreasing and that of B goes on increasing

136. A man of weight w is standing on a lift which is moving upward with an acceleration a. The apparent weight of the man is: D
a) w
b) $w\ (1 - \frac{a^2}{g^2})$
c) $w\ (1 - \frac{a}{g})$
d) $w\ (1 + \frac{a}{g})$

137. If a satellite of mass m orbits around the earth of mass Me in an orbit of radius r, its angular speed will be: A
a) $\sqrt{\frac{GMe}{r^3}}$
b) $\sqrt{\frac{GMe}{r^2}}$
c) $\sqrt{\frac{GMe}{r}}$
d) $\sqrt{GMe}$

138. If two masses 1 kg and 10 kg are 1 m apart, then acceleration of: B
a) Both masses is same
b) 1 kg is greater than that of 10 kg
c) 10 kg is greater that that of 1 kg
d) Both masses is zero

139. If gravitational force between two identical masses m, m be 6.67×10^{-11} N when they are 1 m apart, then value of each mass will be: B
a) 2 kg
b) 1 kg
c) 0.5 kg
d) 4 kg

140. A mass of 100 kg in an elevator is descending with a = 1m/sec^2. Its apparent weight will be: B
a) 1080 N
b) 880 N
c) 980 N
d) 100 N

141. If the distance between two masses each 1kg is 1m, then force of attraction between the two will be: B
a) 9×10^9 N
b) 6.67×10^{-11} N
c) 3×10^{-11} N
d) 8.8×10^{-12} N

142. The relation between orbital speed v of a planet and its orbital radius r is: A
a) $v\ \alpha\ \frac{1}{\sqrt{r}}$
b) $v\ \alpha\ \frac{1}{r}$
c) $v\ \alpha\ r$
d) $v\ \alpha\ \sqrt{r}$

143. The acceleration due to gravity on a planet with mass and radius half of the earth will be: C
a) 4.9 m/sec^2
b) 9.8 m/sec^2
c) 19.6 m/sec^2
d) 2.45 m/sec^2

144. The apparent weight of a man in an elevator moving up with an acceleration a is: B
a) mg
b) mg + ma
c) mg - ma
d) mg/2

145. Inertial mass is: C
a) Greater than gravitational mass
b) Smaller than gravitational mass
c) Equal to gravitational mass
d) Not related to gravitational mass

146. If the distance between two bodies is doubled the gravitational force will: D
a) Remain same
b) Become four times
c) Increase four times
d) Become one fourth

147. If the distance between two masses is halved the gravitational force is: C
a) Halved b) Doubled
c) Four times d) Same

148. Newton's law of Gravitation states that the force of attraction between the two bodies is inversely proportional to: C
a) Product of their masses b) Square of the distance between them
c) Square of the distance between their centers d) Product of mass & distance between them

149. The gravitational force between two bodies is: D
a) Impulsive b) Reactive
c) Repulsive d) Attractive

150. Newton's law of Gravitation states that the force of attraction between two bodies is directly proportional to: C
a) Product of mass and distance between them b) Square of the distance between them
c) Product of their masses d) Product of square of their masses

151. Which force is responsible for the motion of falling bodies and the motion of planets around the sun? B
a) Nuclear force b) Gravitational force
c) Electrostatic force d) Electromagnetic force

152. If law of gravitation is written in vector form with negative sign, then gravitational force is written as A
a) Attractive force b) Repulsive force
c) Negative force d) None of these

153. The mass of earth is given as: A
a) 6×10^{24} kg b) 1.6×10^{-30} kg
c) 1.6×10^{-31} kg d) None of the above

154. Mass per unit volume is called: B
a) Torque b) Density
c) Viscosity d) None of these

155. The mean density of earth is: A
a) 5462 kgm^{-3} b) 5462 gm^{-3}
c) 5462 kgm^{3} d) None of these

156. Acceleration due to gravity is given by the equation: B
a) $g = \frac{M_e G}{R_e}$ b) $g = \frac{M_e G}{R_e^2}$
c) $g = \frac{G}{R_e^2}$ d) None of these

157. Value of acceleration due to gravity g_h at height h is given by the equation: B
a) $g_h = g - \frac{2gh}{R_e}$ b) $g_h = g + \frac{2gh}{R_e}$
c) $g_h = g - \frac{2gh}{R_e^2}$ d) None of these

158. The radius of earth is: B
a) 6400 m b) 6400 km
c) 6400 cm d) 6400 dm

159. It is a measure of its reluctance to change its state of motion when force is applied: B
a) Mass b) Inertial mass
c) Gravitational mass d) None of the above

160. Acceleration due to gravity at a depth x is given as: A

a) $g_x = g - \frac{x}{R_e} g$ b) $g_x = g + \frac{R_e}{g_x}$

c) $g_x = g - \frac{g_x}{R_e}$ d) None of the above

161. When a body is lifted to twice earth's radius above the surface of the earth, the value of g decreases by: D

a) Two times b) Three times
c) Six times d) Nine times

162. The frequency of rotation for artificial gravity is: C

a) $2\pi \sqrt{\frac{R}{g}}$ b) $2\pi \sqrt{\frac{g}{R}}$

c) $\frac{1}{2\pi} \sqrt{\frac{g}{R}}$ d) None of the above

163. Freely falling bodies are in a state of: D

a) Rest b) Static equilibrium
c) Dynamic equilibrium d) Weightlessness

164. What is produced by spinning the spaceship around its own axis with a certain frequency which can provide centripetal force equal to the force of gravity at that point? B

a) Weightlessness b) Artificial gravity
c) Vacuum d) None of the above

165. A bird resting on the floor of an air tight box which is being carried by a boy, starts flying. The boy will feel that the box is now: B

a) Heavier in the beginning and lighter afterwards b) Lighter
c) Shows no change in weight d) Heavier afterwards

166. The minimum velocity required to go out from earth's gravitational pull is called: D

a) Terminal velocity b) Angular velocity
c) Drift velocity d) Escape velocity

167. The force of attraction acts along the: B

a) Axis of rotation b) Line joining the interacting bodies
c) Line perpendicular to the interacting bodies d) None of these

168. The range through which the gravitational force acts is: C

a) Limited to 1×10^{-10} m b) Limited to 1×10^{-2} m
c) Extremely long d) about 1×10^{5} m

169. A satellite is launched from earth into orbit. What happens to the mass & weight of the satellite? C

	Mass	**Weight**		**Mass**	**Weight**
a)	Decreases	Decreases	b)	Decreases	Stays constant
c)	Stays constant	Decreases	d)	Stays constant	Stays constant

170. According to the law of Universal Gravitation: D

a) Every body in the universe attracts every other body
b) The force of attraction is directly proportional to the product of their masses
c) The force of attraction is inversely proportional to the square of their distance
d) All of the above

171. The acceleration due to gravity on moon is $1/6^{th}$ of that on earth, what will be the mass of the body on moon, if its mass on earth is m: C

a) m/6 b) 6m
c) m d) m/3

172. The radius of a planet is 5 times the radius of earth but of same mass, value of g on the planet is: D
a) 5 g
b) $g/5$
c) $g/20$
d) $g/25$

173. Two masses 10 cm apart, attract each other with a force f Newtons. When 5 cm apart of these masses will attract each other with a force (in Newtons) of: C
a) f/2
b) f/4
c) 4f
d) 2f

174. If the earth were three times farther from the sun than it is now, the gravitational force exerted on earth by the sun will be: C
a) Three times
b) Nine times
c) One-ninth times
d) One-third times

175. If the mass of the earth becomes four times large, the value of 'g' will: B
a) Remain unchanged
b) Becomes four times larger
c) Be doubled
d) Become sixteen times larger

176. The gravitational acceleration is maximum on poles as compared to that on equator because: A
a) Distance between poles and center of earth is less as compared to that between equator & center
b) Distance between poles and center of earth more as compared to that between equator and center
c) Mass of earth on poles is greater as compared to that on equator
d) Mass of earth on poles is less as compared to that on equator

177. An astronaut of weight mg is moving upwards in a rocket with acceleration 4g. His apparent weight in side that rocket will be: D
a) zero
b) mg
c) 3 mg
d) 5 mg

178. When a lift is moving upward with a uniform velocity, the apparent weight of a body inside the lift will be: A
a) Equal to its actual weight
b) Less than the actual weight
c) More than the actual weight
d) Zero

179. Free falling bodies: C
a) Have maximum weight
b) Have minimum weight
c) Have no weight
d) Any weight

180. A boy standing in a lift falling freely under gravity releases a ball from his hand. As seen by him the ball: B
a) Falls down
b) Remains stationary
c) Goes up
d) None of the above

181. A satellite moves in the circle orbit at the constant speed under the action of the gravitational force of a planet. The work done on the satellite in one revolution will have magnitude: A
a) Zero
b) Half of the gravitational pull of the planet
c) Equal to the gravitational pull of the planet
d) Proportional to the diameter of the orbit

182. A body in satellite orbiting round the earth is weightless because: A
a) It is essentially a freely falling body
b) It is far away from the earth to experience the pull of the earth
c) The moon attracts the body with a force equal to its weight
d) None of the above

183. Artificial gravity can be created in the space craft by: B
a) Revolving it around the earth
b) Spinning it around its own axis
c) Increasing its velocity
d) Decreasing its velocity

184. When a man circles round the earth in a satellite, then: B
a) His mass becomes zero but weight remains constant
b) His mass remains constant but weight becomes zero
c) Both mass and weight remain constant
d) Both mass and weight become zero

185. A space ship is coming towards earth from moon at a high speed. The speed of the air ship has to be reduced. The rocket is fired to lower its speed in which direction. The rocket should be fired: A
a) In the direction towards the earth
b) In the direction towards the moon
c) On the right side of space ship
d) On the left side of space ship

186. The radius of earth 6×10^6 m. What is the acceleration of a meteor, when it is 8×10^6 m from the center of the earth? D
a) $8\ m/s^2$
b) $4\ m/s^2$
c) $9.8\ m/s^2$
d) None of above

187. A man whose weight is 900 N on the earth's surface goes to a height, which is equal to twice the earth's radius, above the surface of the earth, then the new weight of the man will be: B
a) 900 N
b) 225 N
c) 300 N
d) 100 N

188. An object is taken from the earth to a planet where the value 'g' is $20\ m/s^2$, if it is compared with value of 'g' earth, which of the following statement is true? A
a) Weight at the planet will be greater
b) Weight at the planet will be same
c) Mass at the planet will be greater
d) Mass at the planet will be smaller

189. An air craft pulls out of a drive in a circular arc of radius 1000 m at speed 200 m/s, the apparent weight of the 80 kg pilot at the lowest point will be: D
a) 3990 N
b) 4264 N
c) 2920 N
d) 3984 N