Physicsaholics

DPP – 1 (Gravitational Force)

Q 1. By what percent will the gravitational force between the two bodies be increased if their masses are increased by 50%
(a) 50 %
(b) 100 %
(c) 75 %
(d) 125 %

Q 2. What will happen to the gravitational force between two bodies if they are brought closer by half of their initial separation ?
(a) It increases to 2 times
(b) It decreases to 4 times
(c) It decreases to 2 times
(d) It increases to 4 times

Q 3. The force of gravitation between two bodies does not depend upon
(a) The separation between them
(b) The gravitational constant
(c) The product of their masses
(d) the sum of their masses

Q 4. The gravitational force between two stones of mass 1 kg each, separated by a distance of 1 m in vacuum is.
(a) zero
(b) 6.675×10^{-6}N
(c) 8.326×10^{-8}N
(d) 6.675×10^{-11}N

Q 5. If F is the force between two bodies of masses m_1 and m_2 at certain separation. Find the force between $\sqrt{2}m_1$ and $\sqrt{3}m_2$ at same separation
(a) F
(b) 5F
(c) 6F
(d) $\sqrt{6}$F

Q 6. Two planet of mass m and 100m. If gravitational force exerted by planet of mass 100m on the planet of mass m is F_1 and gravitational force exerted by planet of mass m on the planet of mass 100m is F_2. Then which of the following is true?
(a) $F_1 = 100F_2$
(b) $F_1 = 10F_2$
(c) $F_1 = F_2$
(d) $F_2 = 100F_1$

Q 7. Find the gravitational force between two protons kept at a separation of 1 femtometer (1 femtometer $= 10^{-15}$m). The mass of a protons is 1.67×10^{-27}kg
(a) 1.8×10^{-42}N
(b) 1.8×10^{-29}N
(c) 1.8×10^{-34}N
(d) 1.86×10^{-36}N

Q 8. A mass is at the center of a square, with four masses at the corners as shown. Rank the choices according to the magnitude of the gravitational force on the center mass.
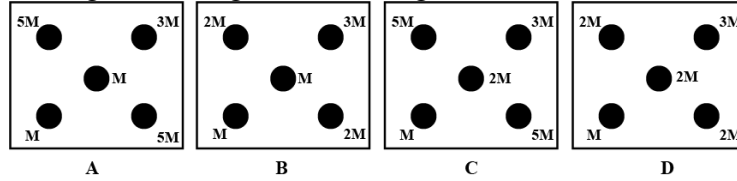
(a) $F_A = F_B < F_C = F_D$
(b) $F_A > F_B < F_C < F_D$
(c) $F_A = F_B > F_C = F_D$
(d) None

Q 9. Four similar particles of mass M are orbiting in a circle of radius r in the same angular direction because of their mutual gravitational attractive force. Velocity of a particle is given by
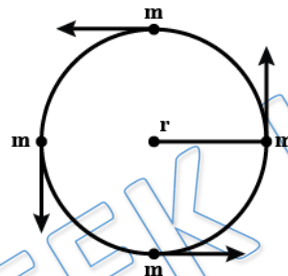
(a) $\left[\frac{GM}{r}\left(\frac{1+2\sqrt{2}}{4}\right)\right]^{1/2}$

(b) $\left[\frac{GM}{r}\right]^{3/2}$

(c) $\left[\frac{GM}{r}\left(1 + 2\sqrt{2}\right)\right]^{1/2}$

(d) $\left[\frac{GM}{2r}\left(\frac{1+\sqrt{2}}{2}\right)\right]^{1/2}$

Q 10. A mass m is at a distance a from one end of a uniform rod of length l and mass M. Find the gravitational force on the mass due to the rod.

(a) $\frac{GmM}{al}$

(b) $\frac{GmM}{\left(a+\frac{l}{2}\right)}$

(c) $\frac{GmM}{(a+l)l}$

(d) $\frac{GmM}{a(a+l)}$

Q 11. Gravitational force between two masses at a distance 'd' apart is 6N. If these masses are taken to moon and kept at same separation, then the force between them will become :

(a) 1 N (b) $\frac{1}{6}$ N

(c) 36 N (d) 6 N

Q 12. Gravitational force _____ on the nature of the medium between the masses.

(a) depends   (b) does not depend

(c) sometimes depends   (d) none of these

Q 13. Two spheres of masses m and M are situated in air and the gravitational force between the is F. The space around the masses is now filled with a liquid of specific gravity 3. The gravitational force between spheres will now be

(a) 3F   (b) F

(c) $\dfrac{F}{3}$ (d) $\dfrac{F}{9}$

Answer Key

Q.1 d	Q.2 d	Q.3 d	Q.4 d	Q.5 d
Q.6 c	Q.7 c	Q.8 a	Q.9 a	Q.10 d
Q.11 d	Q.12 b	Q.13 b		