Physicsaholics

Q 1.   Potential energy v/s position curve for one dimensional conservative field is shown. Force at A and B is respectively
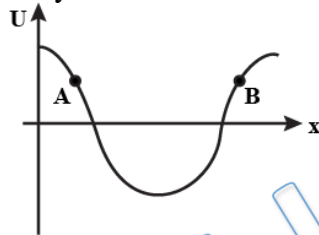
(a) Positive, Positive
(b) Positive, Negative
(c) Negative, Positive
(d) Negative, Negative

Q 2.   A particle is being acted upon by one dimensional conservative force. In the F−x curve shown, four points J, K, L, M are marked on the curve. State which type of equilibrium is the particle have at position L
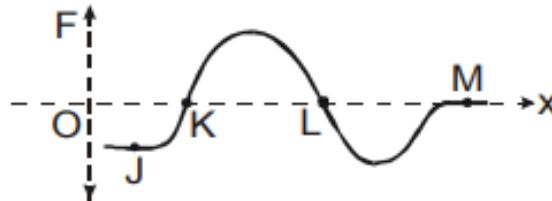
(a) stable equilibrium
(b) unstable
(c) Neutral
(d) No equilibrium

Q 3.   A particle located in one dimensional potential field has potential energy function $U(x) = \frac{a}{x^2} - \frac{b}{x^3}$, where a and b are positive constants. The position of equilibrium corresponds to x equal to

(a) $\frac{3a}{2b}$ (b) $\frac{2b}{3a}$

(c) $\frac{2a}{3b}$ (d) $\frac{3b}{2a}$

Q 4.   In a conservative field at stable equilibrium potential energy is:
(a) Maximum   (b) Minimum
(c) Constant   (d) None of these

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Q 5. The power of pump, which can pump 200 kg of water to a height of 50 m in 10 sec, will be $(g = 10\ m/s^2)$
(a) $10 \times 10^3\ watt$ (b) $20 \times 10^3\ watt$
(c) $4 \times 10^3\ watt$ (d) $60 \times 10^3\ watt$

Q 6. If the power of the motor of a water pump is 3 kW, then the volume of water in liters that can be lifted to a height of 10m in one minute by the pump is $(g = 10\ m/s^2$ and density of water = 1000 kg/m^3)
(a) 1800   (b) 180
(c) 18000   (d) 18

Q 7. If the heart pushes 1 cc of blood in one second under pressure 20000 N/m^2 the power of heart is
(a) 0.02 W   (b) 400 W
(c) 50 W   (d) 0.2 W

Q 8. The power of a heart which pumps $5 \times 10^3\ cc$ of blood per minute at a pressure of 120 mm of mercury $(g = 10\ m/s^2$ and density of Hg $= 13.6 \times 10^3\ kg/m^3)$ is
(a) 1.36 W   (b) 13.6 W
(c) 0.136 W   (d) 136 W

Q 9. A particle moves with a velocity $\vec{V} = (5\hat{\imath} - 3\hat{\jmath} + 6\hat{k})\ m/s$ under the influence of a constant force $\vec{F} = (10\hat{\imath} + 10\hat{\jmath} + 20\hat{k})N$, the instantaneous power applied to the particle is
(a) 200 W   (b) 320 W
(c) 140 W   (d) 170 W

Q 10. A motor boat is travelling with a speed of 3.0 m/sec. If the force on it due to water flow is 500 N, the power of the boat is
(a) 150 KW   (b) 15 KW
(c) 1.5 KW   (d) 150 W

Q 11. An engine develops 10 kW of power. How much time will it take to lift a mass of 200 kg to a height of 40 m $(g = 10\ m/s^2)$
(a) 4 sec   (b) 5 sec
(c) 8 sec   (d) 10 sec

Q 12. A 10 H.P. motor pumps out water from a well of depth 20m and fills a water tank of volume 22380 liters at a height of 10m from the ground. the running time of the motor to fill the empty water tank is $(g = 10\ m/s^2)$
(a) 5 minutes   (b) 10 minutes
(c) 15 minutes   (d) 20 minutes

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Answer Key

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