DPP – 07

Power

1.   A 60HP electric motor lifts an elevator having a maximum total load capacity of 2000 kg. If the frictional force on the elevator is 4000 N, the speed of the elevator at full load is close to (1HP = 746 W, g = 10 m s^{-2})_____ (m s^{-1}).

2.   A body of mass m is accelerated uniformly from rest to a speed v in a time T. The instantaneous power delivered to the body as a function of time is given by $\frac{mv^2}{T^k}t$. Then the value of k _____

3.   A body of mass 2 kg is driven by an engine delivering a constant power of 1 J/s. The body starts from rest and moves in a straight line. After 9 seconds, the body has moved a distance (in m) ___.

4.   What average power is generated by a 90.0 − kg mountain climber who climbs a summit of height 600 m in 90.0 min ?

      (A) 100W   (B) 50W   (C) 25W   (D) 200W

5.   A man is riding on a cycle with velocity 7.2 km/hr up a hill having a slope 1 in 20. The total mass of the man and cycle is 100 kg. The power of the man is

      (A) 200 W   (B) 175 W   (C) 125 W   (D) 98 W

6.   Power of a water pump is 2 kW. If g = 10 m/sec^2, the amount of water it can raise in one minute to a height of 10 m is

      (A) 2000 litre   (B) 1000 litre   (C) 100 litre   (D) 1200 litre

7.   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/sec^2) ?

      (A) 4sec   (B) 5sec   (C) 8sec   (D) 10sec

8.   A car of mass ' m ' is driven with acceleration ' a ' along a straight level road against a constant external resistive force ' R '. When the velocity of the car is ' V', the rate at which the engine of the car is doing work will be

      (A) RV   (B) maV   (C) (R + ma)V   (D) (ma-R) V

9. An engine pumps up 100 kg of water through a height of 10 m in 5 s. Given that the efficiency of the engine is 60%. If $g = 10 \text{ ms}^{-2}$, the power of the engine is

(A) 3.3 kW   (B) 0.33 kW   (C) 0.033 kW   (D) 33 kW

10. An electric scooter has a battery capable of supplying 120Wh of energy. If friction forces and other losses account for 60.0% of the energy usage, what altitude change can a rider achieve when driving in hilly terrain if the rider and scooter have a combined weight of 900 N ?

(A) 252 m   (B) 88 m   (C) 192 m   (D) 64 m

11. An 800 N Marine in basic training climbs a $12.0 - \text{m}$ vertical rope at a constant speed in 8.00 s. What is his power output?

(A) 1.8 kW   (B) 1.2 kW   (C) 2.2 kW   (D) 2.8 kW

ANSWER KEY

1. 1.9 **2.** 2 **3.** 18 **4.** (A) **5.** (D) **6.** (D) **7.** (C)

8. (C) **9.** (A) **10.** (C) **11.** (B)

Home Work

Ex. 1	Q. 11,
Ex. 2	Q. 25,29
Ex.3	Q.
Ex.4	Q.
Ex.5	Q.