Power

1. If a force F is applied on a body and it moves with a velocity v, the power will be

   (a) $F \times v$ (b) F/v

   (c) F/v^2 (d) $F \times v^2$

2. A body of mass m accelerates uniformly from rest to v_1 in time t_1. As a function of time t, the instantaneous power delivered to the body is

   (a) $\dfrac{mv_1 t}{t_1}$ (b) $\dfrac{mv_1^2 t}{t_1}$

   (c) $\dfrac{mv_1 t^2}{t_1}$ (d) $\dfrac{mv_1^2 t}{t_1^2}$

3. 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

4. A 12 HP motor has to be operated 8 $hours/day$. How much will it cost at the rate of 50 $paisa/kWh$ in 10 days

   (a) Rs. 350/-   (b) Rs. 358/-

   (c) Rs. 375/-   (d) Rs. 397/-

5. 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

6. An electric motor exerts a force of 40 N on a cable and pulls it by a distance of 30 m in one minute. The power supplied by the motor (in $Watts$) is

   (a) 20   (b) 200

   (c) 2   (d) 10

7. An electric motor creates a tension of 4500 $newton$ in a hoisting cable and reels it in at the rate of 2 m/sec. What is the power of electric motor

   (a) 15 kW (b) 9 kW

   (c) 225 W (d) 9000 HP

8. A weight lifter lifts 300 kg from the ground to a height of 2 $meter$ in 3 $second$. The average power generated by him is

   (a) 5880 $watt$ (b) 4410 $watt$

   (c) 2205 $watt$ (d) 1960 $watt$

9. Power of a water pump is 2 *kW*. If $g = 10m/sec^2$, 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*

10. 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*. $(g = 10m/sec^2)$

(a) 4 *sec*　　　(b) 5 *sec*

(c) 8 *sec*　　　(d) 10 *sec*

11. 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) $(ma - R)V$

12. The average power required to lift a 100 *kg* mass through a height of 50 *metres* in approximately 50 *seconds* would be

(a) 50 *J/s*　　　(b) 5000 *J/s*

(c) 100 *J/s*　　　(d) 980 *J/s*

13. From a waterfall, water is falling down at the rate of 100 *kg/s* on the blades of turbine. If the height of the fall is 100 *m*, then the power delivered to the turbine is approximately equal to

(a) 100 *kW*　　　(b) 10 *kW*

(c) 1 *kW*　　　(d) 1000 *Kw*

14. The power of a pump, which can pump 200*kg* of water to a height of 200*m* in 10*sec* is $(g = 10m/s^2)$

(a) 40 *kW*　　　(b) 80 *kW*

(c) 400 *kW*　　　(d) 960 *kW*

15. A 10 *H.P.* motor pumps out water from a well of depth 20*m* and fills a water tank of volume 22380 *litres* at a height of 10*m* from the ground. the running time of the motor to fill the empty water tank is $(g = 10ms^{-2})$

(a) 5 *minutes*　　　(b) 10 *minutes*

(c) 15 *minutes*　　　(d) 20 *minutes*

16. A car of mass 1250 *kg* is moving at 30*m/s*. Its engine delivers 30 *kW* while resistive force due to surface is 750*N*. What max acceleration can be given in the car

(a) $\frac{1}{3}m/s^2$　　　(b) $\frac{1}{4}m/s^2$

(c) $\frac{1}{5}m/s^2$ (d) $\frac{1}{6}m/s^2$

(a) 16 times (b) 4 times

(c) 8 times (d) 2 times

17. A force applied by an engine of a train of mass $2.05 \times 10^6 kg$ changes its velocity from $5 m/s$ to $25 m/s$ in 5 minutes. The power of the engine is

(a) $1.025 MW$ (b) $2.05 MW$

(c) $5 MW$ (d) $6 MW$

18. A truck of mass 30,000 kg moves up an inclined plane of slope 1 in 100 at a speed of 30 $kmph$. The power of the truck is (given $g = 10 ms^{-1}$)

(a) 25 kW (b) 10 kW

(c) 5 kW (d) 2.5 kW

19. A 60 kg man runs up a staircase in 12 seconds while a 50 kg man runs up the same staircase in 11, seconds, the ratio of the rate of doing their work is

(a) 6 : 5 (b) 12 : 11

(c) 11 : 10 (d) 10 : 11

20. A pump motor is used to deliver water at a certain rate from a given pipe. To obtain twice as much water from the same pipe in the same time, power of the motor has to be increased to

21. What average horsepower is developed by an 80 kg man while climbing in 10 s a flight of stairs that rises 6 m vertically

(a) 0.63 HP (b) 1.26 HP

(c) 1.8 HP (d) 2.1 HP

22. A car of mass 1000 kg accelerates uniformly from rest to a velocity of 54 km/hour in 5s. The average power of the engine during this period in watts is (neglect friction)

(a) 2000 W (b) 22500 W

(c) 5000 W (d) 2250 W

23. A quarter horse power motor runs at a speed of 600 $r.p.m.$ Assuming 40% efficiency the work done by the motor in one rotation will be

(a) 7.46 J (b) 7400 J

(c) 7.46 $ergs$ (d) 74.6 J

24. 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 $g = 10 ms^{-2}$, the power of the engine is

(a) $3.3 kW$ (b) $0.33 kW$

(c) $0.033 kW$ (d) $33 kW$

25. A force of $2\hat{\imath} + 3\hat{\jmath} + 4\hat{k}$ N acts on a body for 4 second, produces a displacement of $(3\hat{\imath} + 4\hat{\jmath} + 5\hat{k})m$. The power used is

(a) 9.5 W (b) 7.5 W

(c) 6.5 W (d) 4.5 W

26. The power of pump, which can pump 200 kg of water to a height of 50 m in 10 sec, will be

(a) $10 \times 10^3 watt$

(b) $20 \times 10^3 watt$

(c) $4 \times 10^3 watt$

(d) $60 \times 10^3 watt$

27. From an automatic gun a man fires 360 bullet per minute with a speed of 360 $km/hour$. If each weighs 20 g, the power of the gun is

(a) $600W$ (b) $300W$

(c) $150W$ (d) $75W$

28. An engine pump is used to pump a liquid of density ρ continuously through a pipe of cross-sectional area A. If the speed of flow of the liquid in the pipe is v, then the rate at which kinetic energy is being imparted to the liquid is

(a) $\frac{1}{2}A\rho v^3$ (b) $\frac{1}{2}A\rho v^2$

(c) $\frac{1}{2}A\rho v$ (d) $A\rho v$

29. 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) 5×10^{-10} W (d) 0.2 W

30. A man does a given amount of work in 10 sec. Another man does the same amount of work in 20 sec. The ratio of the output power of first man to the second man is

(a) 1

(b) 1/2

(c) 2/1

(d) None of these