**Work Energy Theorem**

**Q.1** A body of mass M was slowly hauled up a rough hill by a force F which at each point was directed along a tangent to the path of the hill. The work done by this force.

**(A)** Depends on vertical component only

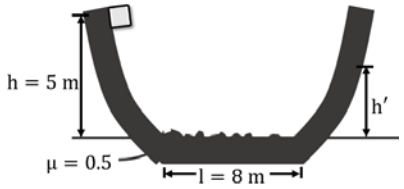
**(B)** Does not depend on coefficient of friction

**(C)** Depends on horizontal component only

**(D)** Depends on both horizontal and vertical components of displacement

**Work Done**

**Q.2** A block is released from rest from a height h = 5 m. After travelling through the smooth curved surface, it moves on the rough horizontal surface through a length l = 8 m, and climbs onto the other smooth curved surface through a height h' If coefficient of friction of the rough surface is $\mu = 0.5$, find $h'$.



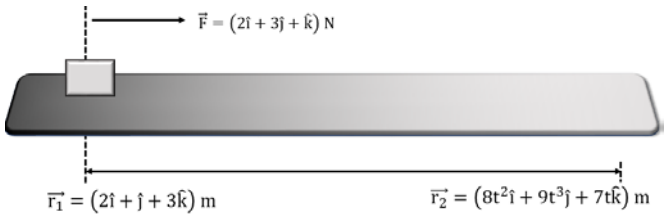

**(A)** 2 m **(B)** 4 m **(C)** 5 m **(D)** 1m

**Power**

**Q.3** A force $(4\hat{\imath} + \hat{\jmath} - 2\hat{k})$Nacting on a body maintains its velocity at $(2\hat{\imath} + 3\hat{\jmath} - \hat{k})$m/s. The power exerted is.

**(A)** 15 W **(B)** 13W **(C)** 12 W **(D)** 20 W

**Q.4** A force $(2\hat{\imath} + 3\hat{\jmath} + \hat{k})$N acting on a body displaces it form $\vec{r_1} = (2\hat{\imath} + \hat{\jmath} + 3\hat{k})$mto $\vec{r_1} = (8t^2\hat{\imath} + 9t^3\hat{\jmath} + 7t\hat{k})$m. Find the instantaneous power delivered by the force at t = 1 sec.




**(A)**100 W **(B)** 60 W **(C)**80 W **(D)** 120 W

**Q.5** A block of mass m = 3 kg is pulled by a force F = 50 N upwards through 2 m height in vertical direction. It takes 8 second to lift the mass. Find the average power delivered by the force.

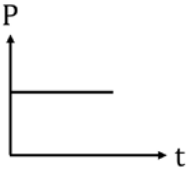
**(A)**12.5 W **(B) 25 W** **(C)20 W** **(D) 50 W**

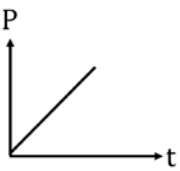
**Q.6** An engine generates a power of 75 KW, having efficiency of 80% and the car moves with a constant velocity of 20m/s Find the force generated by the engine. (Assume the engine applies a constant force on the car)

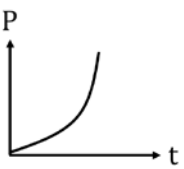
**(A)**2000 N **(B)**3000 N **(C)**6000 N **(D) 1500** N

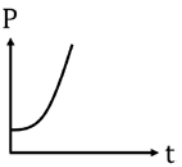
**Power Time Graph**

**Q.7** body starts from rest and is accelerated by a force F = Kt (N).Options given below show the variation of power with time. Find the correct option related to the above case.

**(A)** 

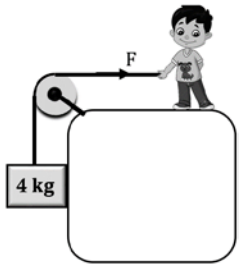

**(B)** 


**(C)** 


**(D)** 

**Power**

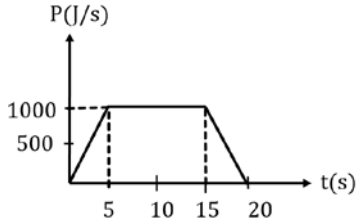
**Q.8** A man is pulling a block resting on the ground by applying force F = (20 t + 40) N as shown in the figure. if the pulley is frictionless and mass of the block is 4 Kg. find out the power delivered by the force, 3 second after the man starts pulling the block. (Take g = 10 m/s$^2$)




**(A)** 2250 J/s **(B) 5250** J/s **(C) 3000** J/s **(D) 1250** J/s

**Work Energy Theorem**

**Q.9** The graph below shows power (P) delivered by the engine of a car as a function of time. Find out the final velocity of car, if initial velocity of the car is 10 m/s and mass is 200 kg.




**(A)** $5\sqrt{10}$m/s **(B)** $5\sqrt{5}$ m/s **(C)** 20 m/s **(D)** 15 m/s

**Q.10** A riffle bullets losses $(\frac{1}{20})^{th}$ of its velocity in passing through a plank. Assuming that the plank exerts a constant retarding force, the least number of such planks required to just stop the bullet is.

**ANSWER KEY**

| Q. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sol. | (D) | (D) | (B) | (D) | (A) | (B) | (C) | (A) | (A) | 10.25 |