Work Done by Constant Force

1. A body of mass m is moving in a circle of radius r with a constant speed v. The force on the body is $\frac{mv^2}{r}$ and is directed towards the centre. What is the work done by this force in moving the body over half the circumference of the circle

(a) $\frac{mv^2}{\pi r^2}$ (b) Zero

(c) $\frac{mv^2}{r^2}$ (d) $\frac{\pi r^2}{mv^2}$

2. If the unit of force and length each be increased by four times, then the unit of energy is increased by

(a) 16 times (b) 8 times

(c) 2 times (d) 4 times

3. A man pushes a wall and fails to displace it. He does

(a) Negative work

(b) Positive but not maximum work

(c) No work at all

(d) Maximum work

4. The same retarding force is applied to stop a train. The train stops after 80 m. If the speed is doubled, then the distance will be

(a) The same (b) Doubled

(c) Halved (d) Four times

5. A body moves a distance of 10 m along a straight line under the action of a force of 5 N. If the work done is 25 *joules*, the angle which the force makes with the direction of motion of the body is

(a) 0° (b) 30°

(c) 60° (d) 90°

6. You lift a heavy book from the floor of the room and keep it in the book-shelf having a height 2 m. In this process you take 5 seconds. The work done by you will depend upon

(a) Mass of the book and time taken

(b) Weight of the book and height of the book-shelf

(c) Height of the book-shelf and time taken

(d) Mass of the book, height of the book-shelf and time taken

7. A body of mass m *kg* is lifted by a man to a height of one metre in 30 *sec*. Another man lifts the same

mass to the same height in 60 *sec*. The work done by them are in the ratio

(a) 1: 2 (b) 1 : 1

(c) 2 : 1 (d) 4 : 1

8. A force $F = (5\hat{\imath} + 3\hat{\jmath})$ *newton* is applied over a particle which displaces it from its origin to the point $r = (2\hat{\imath} - 1\hat{\jmath})$ *metres*. The work done on the particle is

(a) – 7 *joules* (b) + 13 *joules*

(c) + 7 *joules* (d) + 11 *joules*

9. A force acts on a 30 *gm* particle in such a way that the position of the particle as a function of time is given by $x = 3t - 4t^2 + t^3$, where *x* is in *metres* and *t* is in seconds. The work done during the first 4 seconds is

(a) 5.28 *J* (b) 450 *mJ*

(c) 490 *mJ* (d) 530 *mJ*

10. A body of mass 10 *kg* is dropped to the ground from a height of 10 *metres*. The work done by the gravitational force is $(g = 9.8m/sec^2)$

(a) – 490 *Joules*

(b) + 490 *Joules*

(c) – 980 *Joules*

(d) + 980 *Joules*

11. Which of the following is a scalar quantity

(a) Displacement

(b) Electric field

(c) Acceleration

(d) Work

12. The work done in pulling up a block of wood weighing 2 *kN* for a length of 10*m* on a smooth plane inclined at an angle of 15° with the horizontal is

(a) 4.36 *kJ* (b) 5.17 *kJ*

(c) 8.91 *kJ* (d) 9.82 *kJ*

13. A force $\vec{F} = 5\hat{\imath} + 6\hat{\jmath} - 4\hat{k}$ acting on a body, produces a displacement $\vec{s} = 6\vec{\imath} + 5\vec{k}$. Work done by the force is

(a) 18 units (b) 15 units

(c) 12 units (d) 10 units

14. A force of 5 *N* acts on a 15 *kg* body initially at rest. The work done by the force during the first second of motion of the body is

(a) 5 *J* (b) $\frac{5}{6}J$

(c) 6 *J* (d) $75J$

15. A force of 5 *N*, making an angle θ with the horizontal, acting on an object displaces it by $0.4m$ along the horizontal direction. If the object gains kinetic energy of 1*J*, the horizontal component of the force is

(a) 1.5 *N* (b) 2.5 *N*

(c) 3.5 *N* (d) 4.5 *N*

16. The work done against gravity in taking 10 *kg* mass at 1*m* height in 1*sec* will be

(a) 49 *J*

(b) 98 *J*

(c) 196 *J*

(d) None of these

17. The energy which an e^- acquires when accelerated through a potential difference of 1 volt is called

(a) 1 *Joule*

(b) 1 *Electron volt*

(c) 1 *Erg*

(d) 1 *Watt*.

18. A body of mass 6*kg* is under a force which causes displacement in it given by $S = \frac{t^2}{4}$ *metres* where *t* is time. The work done by the force in 2 seconds is

(a) 12 *J* (b) 9 *J*

(c) 6 *J* (d) 3 *J*

19. A body of mass 10*kg* at rest is acted upon simultaneously by two forces 4 *N* and 3*N* at right angles to each other. The kinetic energy of the body at the end of 10 *sec* is

(a) 100 *J* (b) 300 *J*

(c) 50 *J* (d) 125 *J*

20. A cylinder of mass 10*kg* is sliding on a plane with an initial velocity of 10*m*/*s*. If coefficient of friction between surface and cylinder is 0.5, then before stopping it will describe

(a) 12.5 *m* (b) 5 *m*

(c) 7.5 *m* (d) 10 *m*