CLASS : XITh
SUBJECT : PHYSICS
DATE:
DPP NO. : 4

## Topic :- WORK ENERGY AND POWER

1. A constant power $p$ is applied to a car starting from rest. If $v$ is the velocity of the car at time $t$, then
a) $v \propto t$
b) $v \propto \frac{1}{t}$
c) $v \propto \sqrt{t}$
d) $v \propto \frac{1}{\sqrt{t}}$
2. A body of mass 3 kg is under a force which causes a displacement in it, given by $s=t^{2} / 3$ (in m ). Find the work done by the force in 2 s
a) 2 J
b) 3.8 J
c) 5.2 J
d) 2.6 J
3. A bomb of mass 9 kg explodes into two parts. One part of mass 3 kg moves with velocity 16 $\mathrm{m} / \mathrm{s}$, then the KE of the other part is
a) 162 J
b) 150 J
c) 192 J
d) 200 J
4. A spring gun of spring constant $90 \mathrm{~N} / \mathrm{cm}$ is compressed 12 cm by a ball of mass 16 g . If the trigger is pulled, the velocity of the ball is
a) $50 \mathrm{~ms}^{-1}$
b) $9 \mathrm{~ms}^{-1}$
c) $40 \mathrm{~ms}^{-1}$
d) $90 \mathrm{~ms}^{-1}$
5. A body is initially at rest. It undergoes one-dimensional motion with constant acceleration. The power delivered to it at time $t$ is proportional to
a) $t^{1 / 2}$
b) $t$
c) $t^{3 / 2}$
d) $t^{2}$
6. A shell initially at rest explodes into two pieces of equal mass, then the two pieces will
a) Be at rest
b) Move with different velocities in different directions
c) Move with the same velocity in opposite directions
d) Move with the same velocity in same direction
7. The slope of the kinetic energy displacement curve of a particle in motion is
a) Equal to the acceleration of the particle
b) Inversely proportional to the acceleration
c) Directly proportional to the acceleration
d) None of the above
8. From a building two balls $A$ to $B$ are thrown such that $A$ is thrown upwards and $B$ downwards (both vertically). If $v_{A}$ and $v_{B}$ are their respective velocities on reaching the ground, then
a) $v_{B}>v_{A}$
b) $v_{B}=v_{A}$
c) $v_{A}>v_{B}$
d) Their velocities depends on their masses
9. A 50 g bullet moving with velocity $10 \mathrm{~m} / \mathrm{s}$ strikes a block of mass 950 g at rest and gets embedded in it. The loss in kinetic energy will be
a) $100 \%$
b) $95 \%$
c) $5 \%$
d) $50 \%$
10. If the heart pushes 1 cc of blocked in one second under pressure $20000 \mathrm{~N} / \mathrm{m}^{2}$ the power of heart is
a) 0.02 W
b) 400 W
c) $5 \times 10^{-10} \mathrm{~W}$
d) 0.2 W
11. A ball is released from certain height. It loses $50 \%$ of its kinetic energy on striking the ground. It will attain a height again equal to
a) One fourth the initial height
b) Half the initial height
c) Three fourth initial height
d) None of these
12. An object of mass $m$ is tied to a string of length $L$ and a variable horizontal force is applied on it which starts at zero and gradually increases until the string makes an angel $\theta$ with the vertical. Work done by the force $F$ is

a) $m g L(1-\sin \theta)$
b) $m g L$
c) $m g L(1-\cos \theta)$
d) $m g L(1+\cos \theta)$
13. A light inextensible string that goes over a smooth fixed pulley as shown in the figure connects two blocks of masses 0.36 kg and 0.72 kg . Taking $g=10 \mathrm{~m} / \mathrm{s}^{2}$, find the work done (in joules) by the string on the block of mass 0.36 kg during the first second after the system is released from rest

a) 6 Joule
b) 5 Joule
c) 8 Joule
d) 2 Joule
14. A body of mass 2 kg moving with a velocity of $3 \mathrm{~m} / \mathrm{sec}$ collides head on with a body of mass 1 kg moving in opposite direction with a velocity of $4 \mathrm{~m} / \mathrm{sec}$. After collision, two bodies stick together and move with a common velocity which in $\mathrm{m} / \mathrm{sec}$ is equal to
a) $1 / 4$
b) $1 / 3$
c) $2 / 3$
d) $3 / 4$
15. A particle of mass 100 g is thrown vertically upwards with a speed of $5 \mathrm{~m} / \mathrm{s}$. The work done by the force of gravity during the time the particle goes up is
a) -1.25 J
b) 1.25 J
c) 0.5 J
d) -0.5 J
16. A neutron makes a head-on elastic collision with a stationary deuteron. The fractional energy loss of the neutron in the collision is
a) $16 / 81$
b) $8 / 9$
c) $8 / 27$
d) $2 / 3$
17. Which among the following, is a form of energy
a) Light
b) Pressure
c) Momentum
d) Power
18. A particle moves in a straight line with retardation proportional to its displacement. Its loss of KE for any displacement $x$ is proportional to
a) $x$
b) $x^{2}$
c) $x^{0}$
d) $e^{x}$
19. A smooth sphere of mass $M$ moving with velocity $u$ directly collides elastically with another sphere of mass $m$ at rest. After collision their final velocities are $V$ and $v$ respectively. The value of $v$ is
a) $\frac{2 u M}{m}$
b) $\frac{2 u m}{M}$
c) $\frac{2 u}{1+\frac{m}{m}}$
d) $\frac{2 u}{1+\frac{M}{m}}$
20. A body of mass 2 kg is thrown up vertically with kinetic energy of 490 J . The height at which the kinetic energy of the body becomes half of its original value is?
a) 50 m
b) 12.25 m
c) 25 m
d) 10 m
