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Chapter no.7

MCQs

Work, Power and Energy

- When a body is displaced in a closed path in the gravitational field of the earth net work done is:
 - Positive.
 - Negative.
 - Maximum.
 - Zero.
- If a graph is plotted between force and the resulting displacement the area under the graph gives:
 - Work done.
 - Power delivered.
 - Kinetic energy.
 - None of these.
- S.I unit of work is:
 - N/m.
 - Dyne-m
 - Joule.
 - Watt.
- Work is a:
 - Scalar quantity.
 - Vector quantity.
 - Neither a vector nor a scalar.
- Work is said to be done when a force produces.....in a body.
 - Displacement.
 - Acceleration.
 - Torque.
 - Velocity.
- Ability of doing work is called:
 - Force.
 - Power.
 - Energy.
 - Elasticity.
- S.I unit of energy is:
 - Watt.
 - Horse power.
 - Joule.
 - Erg.
- The scalar or dot product of applied force \vec{F} and displacement \vec{d} is called:
 - Torque.
 - Power.
 - Angular momentum.
 - Work.
- If θ is the angle between the applied force \vec{F} and the resulting displacement \vec{d} then the magnitude of work done is given by:
 - Work = F d Sin θ .
 - Work = F d Cos θ .
 - Work = F d tan θ .
- Work done has a maximum value when:
 - Force and displacement are in the same direction.
 - Force and displacement are perpendicular to each other.
 - Force and displacement are inclined at an angle of 45°.
 - Force and displacement are opposite to each other.
- Work done by force of friction is negative, because:
 - Friction is parallel to the direction of displacement.
 - Friction is perpendicular to the direction of displacement.
 - Friction is always opposite to the direction of displacement.
 - Friction decreases efficiency.
- If a body slides down a friction less inclined plane no work is done by the component $w \cos \theta$ of its weight, because
 - $W \cos \theta$ is parallel to displacement.
 - $W \cos \theta$ is perpendicular to displacement.
 - $W \cos \theta$ is inclined with respect to displacement.
 - $W \cos \theta$ is opposite to displacement.
- When a body moves with a constant speed along a circular path, no work is done by the centripetal force, because.
 - Centripetal force is always parallel to displacement.
 - Centripetal force is always perpendicular to displacement.
 - Centripetal force is always opposite to displacement

14. When a spring is wound work is done on it, this work done is stored in it as:
- Gravitational potential energy.
 - Kinetic energy.
 - Winding energy.
 - Elastic potential energy.
15. To lift a body through a certain height "h" work has to be done on it, this work done is stored in it as:
- Elastic potential energy.
 - Kinetic energy.
 - Magnetic potential energy.
 - Gravitational potential energy.
16. Fast bowlers throw the ball with a very high speed, to do so they spend large quantity of their muscular energy, energy spent appears as:
- Potential energy of the ball.
 - Kinetic energy of the ball.
 - Heat produced in the bowler's body.
 - Kinetic energy of the bowler.
17. Gravitational potential energy possessed by a body lifted through small vertical height "h" is given by:
- $\frac{1}{2} mv^2$.
 - Mgh.
 - Mg/h.
 - M h/g.
18. If a body is dropped, according to law of conservation of energy (assuming there is no frictional force):
- P.E lost. = K.E gained.
 - P.E gained = K.E lost.
 - K.E lost = momentum gained.
19. Rate of doing work is called:
- Kinetic energy
 - Energy.
 - Work.
 - Power.
20. S.I unit of power is:
- Joule.
 - Erg.
 - Horse power.
 - Watt.
21. "kwh" is the unit of:
- Power.
 - Energy.
 - Momentum.
 - Rate of doing work.
22. When a piece of paper is burnt, is energy in the form of heat and light created in this process?
- Yes, energy is created due to the destruction of matter.
 - Yes, energy is created and matter changes its state.
 - Combustion is a simple chemical process, energy stored in the paper as bond energy etc. is released as heat and light but matter is not destroyed, it changes its state.
 - Law of conservation of matter is violated but law of conservation of energy is obeyed.
23. A bullet thrown by hand can not kill an enemy but the same bullet fired from a gun can, because:
- Bullet fired from a gun has large momentum.
 - Bullet fired from a gun has large inertia.
 - Bullet fired from a gun has large kinetic energy.
 - A and b.
 - B and c
 - All of these.
24. A body in motion has the ability to do work, this ability of doing work due to motion is called:
- Energy.
 - Kinetic energy.
 - Potential energy.
 - Nuclear energy.
25. Ability of a body to do work due its position or configuration is called:
- Kinetic energy.
 - Potential energy.
 - Positional energy.
26. Kinetic energy possessed by a body is given by:
- Mv.
 - Mv^2 .
 - $\frac{1}{2} m v^2$.
 - $\frac{1}{2} m^2 v$.
27. Energy possessed by a body due to position in the gravitational field of the earth is called:
- Elastic potential energy.
 - Field potential energy
 - Gravitational potential energy.
 - Magnetic potential energy.
28. If mass and velocity of a body are doubled then it's kinetic energy increases by:
- Two times.
 - Four times.
 - Eight times.
 - Sixteen times.

29. For a small vertical height potential energy possessed by a body is "mgh" it is directly proportional to mass of the body and vertical height through which it is displaced, hence if mass "m" and vertical height "h" both are simultaneously doubled, then it's potential energy:
- Increases by two times.
 - Increases by four times.
 - Increases by eight times.
 - Increases by sixteen times.
30. Which of the following is not the unit of power: (2-a ii, 2001 , 4-a iii, pre-Eng.02)
- Horse power.
 - Joules/sec.
 - Kilowatt hour.
 - Foot pound/sec.
31. One kilowatt hour is equal to:
- 3.6×10^6 J.
 - 36×10^6 J.
 - 0.36×10^6 J.
 - 0.0036×10^6 J
32. When the direction of force is opposite to the direction of displacement, then the work done will be: (4-a I, 2001)
- Positive.
 - Negative.
 - Zero.
 - None of them.
33. Watt-hour is the unit of: (2-a I, Eng.03)
- Force.
 - Acceleration.
 - Energy.
 - Velocity.
34. One horse power is equal to: (3-a I, Pre.Eng.2003)
- 400 watt.
 - 580 watt.
 - 746 watt.
 - 70 watt.
35. The absolute P.E of a body of mass "m" in the earth's gravitational field is given by: (4-a ii, Pre-Eng.2002)
- $-G M_c m/r$.
 - $G M_c m/r^2$.
 - $G M_c m/r$.
 - $G M_c m/R_c^2$.
36. Electron volt (ev) is the unit of:
- Power.
 - Voltage.
 - Energy.
 - Charge.
37. Dimensions of work re:
- MLT.
 - ML^2T .
 - $ML^2 T^2$.
 - $ML^2 T^{-2}$.
38. Dimension of power are:
- $ML^2 T^2$.
 - $ML^2 T$.
 - $ML^2 T^3$.
 - $ML^2 T^{-3}$.
39. Dimensions of energy are
- MLT.
 - $ML^2 T$.
 - $ML^2 T^2$.
 - $ML^2 T^{-2}$.
40. Absolute gravitational potential energy of a body of mass "m" at distance "R" from the center of earth is given by :
- $G m M_c /R_c$.
 - $G m M_c /R$.
 - $G M_c /R$.
 - $M M_c /R$.
41. Kinetic energy of a body is directly proportional to it's mass, it means that if mass of the body is doubled its kinetic energy:
- Becomes double its initial value.
 - Three times its initial value.
 - Four times its initial value.
 - None of these.
42. Kinetic energy of a body is directly proportional to square of it's velocity, it means that if mass of the body is doubled its kinetic energy:
- Becomes double its initial value.
 - Three times its initial value.
 - Four times its initial value.
 - Eight time its initial value.

43. Kilo-watt Hour is a unit of: 3a I 04)
- Energy.
 - Power.
 - Time.
44. The work done by the centripetal force is always: 4a iii 04)
- Positive.
 - Zero.
 - Negative.
45. Power is equal to.
- $\vec{F} \times \vec{d} / \vec{t}$
 - $\vec{F} \cdot \vec{v} / \vec{t}$
 - $\vec{F} \cdot \vec{d} / \vec{t}$
 - $\vec{F} \times \vec{v}$
46. If mass and speed both are doubled, the kinetic energy of a moving body : (4a iii,05)
- Increase 4 times.
 - Increase 6 times.
 - Increase 8 times.
 - Remains the same.
47. The work done by a conservative field along a closed path is: 4a-iii 08)
- Positive.
 - Negative.
 - Zero.
 - None.
48. When a body moves vertically, the work done will be:
- Positive.
 - Negative.
 - Zero.
 - Maximum.
49. If speed of a body is halved, its kinetic energy becomes: (1-iii 2011)
- One fourth.
 - Half.
 - Three times.
 - None of these.
50. The work done by a conservative force along a closed path is: (1-xi 2011)
- Positive.
 - Negative.
 - Zero.
 - None of these.

ANSWERS

1. Work.
2. $W = F d \cos\theta$.
3. Force and displacement are in the same direction.
4. Friction is always opposite to the direction of displacement.
5. $W \cos \theta$ is perpendicular to displacement.
6. Centripetal force is always perpendicular to displacement.
7. Zero.
8. Work done.
9. Joule.
10. Scalar quantity.
11. Displacement.
12. Energy.
13. Joule.
14. Combustion is a simple chemical process, energy stored in the paper as bond energy etc. is released as heat and light but matter is not destroyed, it changes its state.
15. All of these.
16. Kinetic energy.
17. Potential energy.
18. $\frac{1}{2} m v^2$.
19. Gravitational potential energy.
20. Eight times.
21. Elastic potential energy.
22. Gravitational potential energy.
23. Kinetic energy of the ball.
24. $M g h$.
25. P. E lost = K.E gained.
26. Power.
27. Watt.
28. Energy.
29. Energy.
30. $M L^2 T^{-2}$
31. $M L^2 T^{-3}$
32. $M L^2 T^{-2}$
33. $G m M_c/R$
34. Becomes double its initial value.
35. Four times its initial value.
36. Increases by four times.
37. Kilowatt hour.
38. 3.6×10^6 J.
39. Negative.
40. Energy.
41. 746 Watt
42. $- G M_e m/r$.
43. Energy.
44. Zero.
45. $\frac{\vec{F}}{F} \cdot \frac{\vec{d}}{d} / \frac{\vec{t}}{t}$.
46. Increase 8 times.
47. Zero.
48. Negative.
49. One fourth.
50. Zero.