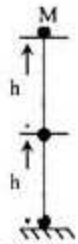
Chapter 4: Work, Power and Energy

1. **ML^2T^{-3} is the dimension of —** *[All Board-18]*
   i. Work done per unit time
   ii. Power
   iii. Energy used per unit time
   Which one of the following is correct?
   ⓐ i and ii ⓑ i and iii
   ⓒ ii and iii ⓓ i, ii and iii **ⓒ**

Observe the figure below and answer the questions on. 2 and 3 : *[All Board-18]*



2. **What is the potential energy of the body at point B?**
   ⓐ mgh_1 ⓑ mgh_2
   ⓒ $mg(h_1 + h_2)$ ⓓ $mg(h_1 - h_2)$ **ⓑ**

3. **While falling freely at which height the kinetic energy of the object will be three times of the potential energy?**
   ⓐ $\frac{h_1}{4}$ ⓑ $\frac{h_2}{3}$
   ⓒ $\frac{h_1 + h_2}{3}$ ⓓ $\frac{h_1 + h_2}{4}$ **ⓒ**

4. **An electric motor lifts a body of mass 2 kg by 5m and consumed 107J of energy. What amount of energy is wasted by the motor?** *[D.B.-17]*
   ⓐ 6J ⓑ 9J
   ⓒ 10J ⓓ 49J **ⓑ**

5. **What is the dimension of energy?** *[D.B.-17]*
   ⓐ MLT^{-2} ⓑ MLT^2
   ⓒ $ML^{-2}T^2$ ⓓ ML^2T^{-2} **ⓓ**

6. **Which one is the dimension of power?** *[R.B.-17]*
   ⓐ ML^2T^2 ⓑ MLT^{-1}
   ⓒ ML^2T^{-2} ⓓ ML^2T^{-3} **ⓓ**

7. **If a runner of 60 kg passes 100m distance within 12.5 sec, how many kinetic energy in joule will be?** *[R.B.-17]*
   ⓐ 240 ⓑ 480
   ⓒ 1920 ⓓ 3840 **ⓒ**

8. **What is the power (in watt) of a boy of mass 40 kg if he steps up 6m high stair in 12S?** *[Dj.B.-17]*
   ⓐ 20 ⓑ 32.66
   ⓒ 196 ⓓ 786 **ⓒ**

9. **Which one is correct for the energy conversion of a car engine?** *[Dj.B.-17]*
   ⓐ Mechanical energy → Chemical energy
   ⓑ Chemical energy → Mechanical energy
   ⓒ Thermal energy → Chemical energy
   ⓓ Chemical energy → Electrical energy **ⓒ**

10. **A body of mass 5 kg was dropped from the roof of a building. What will be the Kinetic Energy just before it touches the ground?** *[Ctg.B.-17]*
    ⓐ 245 J ⓑ 845 J
    ⓒ 1225 J ⓓ 2450 J **ⓓ**

11. **A boy of mass 50 kg runs with a velocity $7ms^{-1}$. What is his kinetic energy?** *[S.B.-17]*
    ⓐ 350 J ⓑ 490 J
    ⓒ 1225 J ⓓ 3430 J **ⓒ**

12. **Which one is the main fuel of thermal power station?** *[S.B. 2017]*
    ⓐ Coal ⓑ Mineral oil
    ⓒ Wind ⓓ Solar energy **ⓐ**

13. **At what condition the Kinetic energy of a body will be 16 times?** *[B.B.-17]*
    ⓐ mass twice, velocity twice
    ⓑ mass eight times, velocity half
    ⓒ mass four times, velocity unchanged
    ⓓ mass unchanged, velocity four times **ⓓ**

14. **Which one is the correct transformation of energy of a running fan?** *[B.B.-17]*
    ⓐ Electric energy → magnetic energy → mechanical energy → heat energy
    ⓑ Electric energy → mechanical energy → sound energy → heat energy
    ⓒ Electric energy → heat energy → magnetic energy →mechanical energy
    ⓓ Electric energy → mechanical energy → magnetic energy → heat energy **ⓐ**

15. **A machine is able to lift 200kg of object vertically up to a height of 30m above the ground in 50s. What is the power of the machine? [$g = 10\ ms^{-2}$]** *[D.B.-16]*
    ⓐ 0.12 KW ⓑ 1.2 KW
    ⓒ 6.0 KW ⓓ 300 KW **ⓑ**

16. **Which one of the following is renewable energy?** *[R.B.-16]*
    ⓐ Petrol ⓑ Gas
    ⓒ Coal ⓓ Water **ⓓ**

17. **A car of 1000 kg mass is moving with $10ms^{-1}$ velocity. What is the kinetic energy in joule?** *[R.B.-16]*
    ⓐ 5×10^4 ⓑ 5×10^3
    ⓒ 5×10^2 ⓓ 5×10 **ⓐ**

18. **Which one is the correct for freely falling body?** *[R.B.-16]*
    ⓐ The potential energy is increased
    ⓑ The kinetic energy is decreased
    ⓒ Potential energy and kinetic energy are equal
    ⓓ The kinetic energy is increased **ⓓ**

19. **Which one is a part of mechanical energy?** *[R.B.-16]*
    ⓐ Chemical energy ⓑ Kinetic energy
    ⓒ Electrical energy ⓓ Magnetic energy **ⓑ**

20. **What is the unit of potential energy?** *[C.B.-16]*
    ⓐ Pascal ⓑ Newton
    ⓒ Watt ⓓ Joule **ⓓ**

21. **Before releasing an arrow which type of energy is stored in arrow and bow?** *[C.B.-16]*
    ⓐ Kinetic energy ⓑ Potential energy
    ⓒ Chemical energy ⓓ Heat energy **ⓑ**

22. **In 12s a boy crosses 6m high stair. If the mass of the boy is 40 kg, then what is the power of the boy?** *[C.B.-16]*
    ⓐ 20W ⓑ 32.67W
    ⓒ 196W ⓓ 2352W **ⓒ**

23. **Which one of the following is product of force and velocity?** *[S.B.-16]*
    ⓐ Work ⓑ Energy
    ⓒ Power ⓓ Momentum **ⓒ**

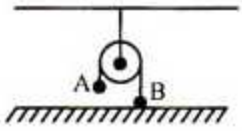
24. **Which is correct relation between kinetic energy and momentum?** *[S.B.-16]*
    ⓐ $E_k = \frac{P}{2m}$ ⓑ $E_k = \frac{2P}{m}$
    ⓒ $E_k = \frac{P^2}{2m}$ ⓓ $E_k = \frac{2P^2}{m}$ **ⓒ**

25. **In the equation $E = mc^2$, m is —** *[S.B.-16]*
ⓐ Mass of nucleus ⓑ Lost mass of nucleus
ⓒ Atomic mass ⓓ Mass of uranium **b**

26. **What will be the potential energy of a body of mass 7 kg if it is raised to a height of 2000 cm above the surface of the earth? [$g = 19.8 ms^{-2}$]** *[J.B- 2016]*
ⓐ 1372 J ⓑ 32.67 J
ⓒ 1176 J ⓓ 1376 J **a**

27. **If we throw stones at mango it may fall down for which energy?** *[J.B.-16]*
ⓐ Used energy ⓑ Potential energy
ⓒ Kinetic energy ⓓ Solar energy **c**

28.

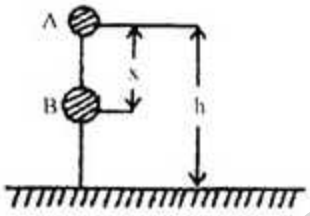


Which energy is stored at point A? *[J.B.-16]*
ⓐ Kinetic energy ⓑ Mechanical energy
ⓒ Nuclear energy ⓓ Potential energy **d**

29. **The sum of the kinetic and potential energy of the molecules of a substance is called which energy?** *[J.B.-16]*
ⓐ Stored energy
ⓑ Absolute potential energy
ⓒ Absolute kinetic energy
ⓓ Internal energy **d**

30. **A runner whose velocity is 7 ms^{-1} and mass 60 kg, then the kinetic energy is—** *[B.B.-16]*
ⓐ 100J ⓑ 1911J
ⓒ 1875J ⓓ 1470J **d**

31.

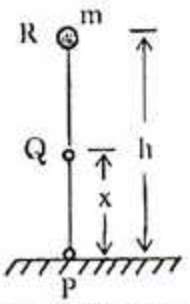


In the point *B*, what will be the kinetic energy? *[B.B.-16]*
ⓐ mgh ⓑ mg (h-x)
ⓒ 2 mgx ⓓ mgx **d**

32. **Which of the following words is regarding petroleum?** *[Ctg.B.-17]*
i. Petroleum is Greek word
ii. Petroleum products are used mainly to produce electric and mechanical energy
iii. There is nothing like petrol to be used as fuel of vehicle
Which one of the following is correct?
ⓐ i and ii ⓑ ii and iii
ⓒ i and iii ⓓ i, ii and iii **b**

33. **A body falls freely under the action of gravity, the changes of energy are —** *[D-B.-16]*
i. the potential energy is decreased
ii. the kinetic energy is increased
iii. total energy is unchanged
Which one is correct?
ⓐ i and ii ⓑ i and iii
ⓒ ii and iii ⓓ i, ii and iii **d**

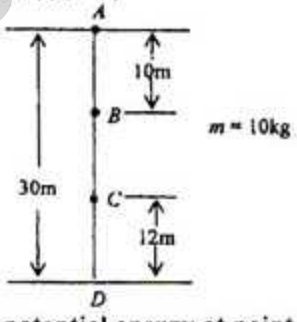
From the figure below, answer the question no. 34 and 35: *[D.B.-17]*



34. **What will be the Kinetic energy of the freely falling body at point Q if it falls from R?**
ⓐ 0 ⓑ mgx
ⓒ mgh ⓓ mg(h–x) **d**

35. **In case of a free falling body from point R —**
i. The body will gain velocity
ii. The Kinetic energy will be transformed into potential energy
iii. Velocity will increase as distance increases
Which one is correct?
ⓐ i and ii ⓑ i and iii
ⓒ ii and iii ⓓ i, ii and iii **b**

On the basis of the following fig. answer questions number 36 and 37: *[C.B.-17]*



36. **What is the potential energy at point *A*?**
ⓐ 2940J ⓑ 2900J
ⓒ 2840J ⓓ 2800J **a**

37. **On the basis of the above fig. which is correct?**
ⓐ The potential energy at point C is more than at B.
ⓑ The kinetic energy at point C is more than at point B.
ⓒ The kinetic energy at point C is more than the potential energy at point B.
ⓓ The potential energy at point C is less than the kinetic energy at point B. **b**

Read the stem carefully and answer questions no. 38 and 39:
A body of mass 10 gm is thrown vertically upward. It comes to the ground after 10 seconds. *[Ctg.B.-17]*

38. **For the object —**
i. Starting velocity was 49 ms^{-1}
ii. Maximum height will be 122.5 m
iii. The potential at maximum height will be 100J
Which one of the following is correct?
ⓐ i and ii ⓑ ii and iii
ⓒ i and iii ⓓ i, ii and iii **a**

39. **How will be the velocity at the time of touching the ground with respect to starting velocity?**
ⓐ Same velocity ⓑ Less velocity
ⓒ More velocity ⓓ Double velocity **a**

Answer the questions no. 40 and 41 reading the following stem: *[J.B.-17]*
A carpenter is being made to enter a nail into a wood by a hammer.

40. What type of energy transformation takes place when the carpenter lifts the hammer up?

ⓐ Heat energy → Potential energy
ⓑ Chemical energy → Potential energy
ⓒ Mechanical energy → Potential energy
ⓓ Potential energy → Mechanical energy

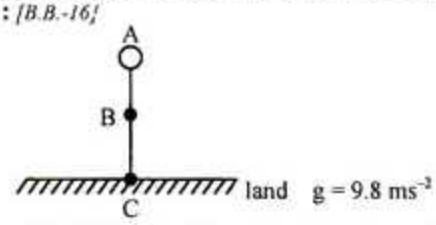
ⓑ

41. What type of energy transformation takes place when the hammer falls down?

ⓐ Potential energy → Kinetic energy → Sound energy
ⓑ Chemical energy → Sound energy → Kinetic energy
ⓒ mechanical energy → Kinetic energy → Sound energy
ⓓ Potential energy → Sound energy → Heat energy

ⓐ

According to the picture below answer to the question No. 42 and 43 : *[B.B.-16]*



An object, weight 50kg, is allowed to drop down from the point A [AC = 100m and AB = $\frac{AC}{2}$]

42. What will be the maximum velocity of the object?

ⓐ 100 ms^{-1} ⓑ 44.72 ms^{-1}
ⓒ 44.27 ms^{-1} ⓓ 31.62 ms^{-1}

ⓒ

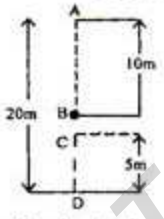
43. According to the above picture —

i. the highest potential energy will be in point 'A'
ii. potential energy and kinetic energy will be equal in point 'B'
iii. potential energy of point A is 100 J

Which one is correct?

ⓐ i & ii ⓑ i & iii
ⓒ ii & iii ⓓ i, ii & iii

ⓐ



An object of 5kg is raised at the point of A from the ground. Answer the question No. 44 and 45 according to the figure: —*[D.B.-16]*

44. What is the potential energy of the object at the point of A?

ⓐ 980 J ⓑ 98 J
ⓒ 9.8 J ⓓ 0.98 J

ⓐ

45. The figure reveals that —

i. $E_K - E_P = 0$ at point B
ii. E_P at point A = $2 \times E_p$ at point C
iii. work done at part AC > work done at part CD

Which one is correct?

ⓐ i and ii ⓑ i and iii
ⓒ ii and iii ⓓ i, ii and iii

ⓑ

Answer to the question No. 46 and 47 in the light of the following stem : *[D).B.-16]*

Force is applied on an object in such a way that the angle between applied force and the displacement is θ the work done is *W*.

46. What will be the measure of the angle θ in degree if the W = 0?

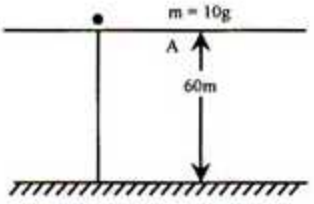
ⓐ 30 ⓑ 60
ⓒ 90 ⓓ 180

ⓒ

47. What will be the measure of θ in degree if the measure of work *'W'* is the highest?

ⓐ 180 ⓑ 90
ⓒ 45 ⓓ 0

ⓓ



On the basis of the above stem answer question number 48 and 49: *[S.B.-16]*

48. What is the height of potential energy which is five times kinetic energy from the earth surface?

ⓐ 19.6m ⓑ 48.8m
ⓒ 49m ⓓ 50m

ⓓ

49. What is the momentum of a body after 3s?

ⓐ .0294kgms^{-1} ⓑ .294kgms^{-1}
ⓒ 2.94kgms^{-1} ⓓ 29.4kgms^{-1}

ⓑ