

## Work, Energy and Sound

### Practice Exercise

1. Which of the following is the S.I. unit of force?  
 (a) Newton (b) Meter  
 (c) Joule (d) Ampere  
 (e) None of these
2. A ball weighing  $\frac{1}{2}$  kg has a kinetic energy 1 joule when its speed is:  
 (a) 1 m/s (b) 2 m/s  
 (c) 3 m/s (d) 4 m/s  
 (e) None of these
3. What kind of energy is present in a rotating wheel?  
 (a) Kinetic energy (b) Electrical energy  
 (c) Potential energy (d) Wind energy  
 (e) None of these
4. An object of 10 kg moves with a uniform velocity of 2 m/s, what is the kinetic energy possessed by the object?  
 (a) 20 J (b) 10 J  
 (c) 40 J (d) 30 J  
 (e) None of these
5. A person lifts a luggage of 10 kg at the height of 2 m above the ground. What is the potential energy possessed by the luggage?  
 (a) 180 J (b) 196 J  
 (c) 20 J (d) 10 J  
 (e) None of these
6. What is the S.I. unit of power?  
 (a) Joule (b) Newton  
 (c) Newton meter (d) Watt  
 (e) None of these
7. An object is dropped from certain height. Which of the following statements is correct about the object when it is about to reach the ground?  
 (a) It has minimum kinetic energy.  
 (b) It has maximum kinetic energy.  
 (c) The kinetic energy is zero at this point.  
 (d) It has maximum potential energy.  
 (e) None of these
8. Law of conservation of energy states that \_\_\_\_\_.  
 (a) Total energy of system remains constant.  
 (b) Energy cannot be created or destroyed.  
 (c) There is no gain or loss of energy in a system.  
 (d) All the above  
 (e) None of these
9. Mechanical energy of a system is equal to \_\_\_\_\_.  
 (a)  $mgh + \frac{1}{2}mv^2$  (b)  $mg + mv^2$   
 (c)  $mgh + \frac{1}{2}m$  (d)  $mgh + \frac{1}{2}v^2$   
 (e) None of these
10. What is the work done in lifting a mass of 10 kg at a height of 100 cm?  
 (a) 90 J (b) 98 J  
 (c) 96 J (d) 92 J  
 (e) None of these
11. Which one of the following statements is incorrect?  
 (a) Sound is a form of energy.  
 (b) Sound energy enables us to hear.  
 (c) Sound waves are electromagnetic waves.  
 (d) All the above  
 (e) None of these
12. Which one of the following statements is correct?  
**Statement 1:** Sound waves are longitudinal waves.  
**Statement 2:** Sound waves have low frequency and long wavelength.  
 (a) Statement 1  
 (b) Statement 2  
 (c) Both statements are correct  
 (d) Both statements are incorrect  
 (e) None of these

- 13.** Which of the following statements is correct?  
 (a) Frequency is directly proportional to time period.  
 (b) Frequency is directly proportional to square root of time period.  
 (c) Frequency is inversely proportional to time period.  
 (d) Frequency is inversely proportional to square root of time period.  
 (e) None of these
- 14.** Which one of the following statements is correct?  
 (a) The speed of sound depends on the nature of medium through which it travels.  
 (b) The speed of sound depends on the temperature of medium through which it travels.  
 (c) The speed of sound depends on the humidity of air when it travels in air.  
 (d) All the above  
 (e) None of these
- 15.** A sound wave has a frequency of 5 kHz and wavelength 10 cm. How long will it take to travel 2.5 km?  
 (a) 5 s (b) 4 s  
 (c) 3 s (d) 2 s  
 (e) None of these
- 16.** Which of the following is the hearing range for human beings?  
 (a) 20 Hz to 200 Hz  
 (b) 2 Hz to 200 Hz  
 (c) 20 Hz to 20 kHz  
 (d) 20 kHz to 200 kHz  
 (e) None of these
- 17.** Sound waves travel in air with a speed of about 340 m/s. What is the wavelength of sound whose frequency is 500 hertz?  
 (a) 0.68 m (b) 0.70 m  
 (c) 0.72 m (d) 0.74 m  
 (e) None of these
- 18.** The sound having too high frequency which cannot be heard by human beings are called:  
 (a) Audible sound (b) Ultrasound  
 (c) Infrasound (d) All the above  
 (e) None of these
- 19.** In a cloud, lightning and thunder are produced simultaneously. If thunder is heard by a man 5 seconds after the lightening is seen, how far the cloud is from the man? (Speed of sound in air = 340 m/s)  
 (a) 1500 m (b) 1600 m  
 (c) 1700 m (d) 1800 m  
 (e) None of these
- 20.** Which among the following is represented by Force  $\times$  Displacement?  
 (a) Frequency (b) Work done  
 (c) Speed (d) Time  
 (e) None of these
- 21.** A man pushing a computer by applying a force of 15 N. Find the work done by this force in displacing the computer through 20 cm along the direction of the push.  
 (a) 300 J (b) 3 N  
 (c) 3.4 J (d) 3 J  
 (e) None of these
- 22.** Which of the following statements is incorrect?  
 (a) Work done is positive when displacement is along the force applied.  
 (b) Work done is negative when displacement is opposite the force applied.  
 (c) Work done is zero when displacement is perpendicular to the force applied.  
 (d) All the above  
 (e) None of these
- 23.** In which of the following examples mechanical energy is transformed into heat energy?  
 (a) Electrolysis  
 (b) Rubbing two pieces of stone to generate fire.  
 (c) Burning of magnesium.  
 (d) In steam engine.  
 (e) None of these
- 24.** The energy consumed in KWh in 6 hours by 2 devices of power 500W each.  
 (a) 5000 kwh (b) 5 kwh  
 (c) 2.5 kwh (d) 2500 kwh  
 (e) None of these

- 25.** If mass is halved and velocity increased by eight times then kinetic energy will be:  
 (a) Halved (b)  $\frac{1}{4}$  times  
 (c) 4 times (d) 8 times  
 (e) None of these
- 26.** In which of the following air blown into is made to vibrate?  
 (a) Mridangam (b) Shehnai  
 (c) Veena (d) Violin  
 (e) None of these
- 27.** If an electric tubelight of 40 watt is lighted for 3 hours daily, how much KWh energy would be consumed?  
 (a) 120 Kwh (b) 1200 Kwh  
 (c) 0.12 Kwh (d) 13.6 Kwh  
 (e) None of these
- 28.** A man of mass 86 kg climbs 40 steps of a staircase, each measuring 15cm high. The potential energy gained by the boy is: [ $g = 9.8 m/s^2$ ]  
 (a) 5000 J (b) 5056.8 J  
 (c) 6000 J (d) 500 J  
 (e) None of these
- 29.** A girl is carrying a school bag of 3 Kg mass on her back and moves 200 m on a levelled road. The work done against the gravitational force will be ( $g = 10 m/s^2$ ):  
 (a)  $6 \times 10^3 J$  (b) 6 J  
 (c) 0.6 J (d) Zero  
 (e) None of these
- 30.** An arrow of mass 80g is moving with a velocity of 100 m/s. The kinetic energy of the arrow is:  
 (a) 40 J (b) 400 J  
 (c) 40,000 J (d) 8,000 J  
 (e) None of these
- 31.** An iron sphere of mass 10 kg has the same diameter as an aluminium sphere of mass is 3.5kg. Both spheres are dropped simultaneously from a tower. When they are 10 m above the ground, they have the same:  
 (a) Acceleration (b) Momenta  
 (c) Potential energy (d) Kinetic energy  
 (e) None of these
- 32.** A pen is dropped from a height H. When it reaches the ground, its velocity is 50 m/s. The value of H is ( $g = 9.8 m/s^2$ ):  
 (a) 55 m (b) 127.5 m  
 (c) 105 m (d) 120 m  
 (e) None of these
- 33.** The kinetic energy of body depends:  
 (a) On the mass of the body only.  
 (b) On the velocity of the body only.  
 (c) Both (a) and (b)  
 (d) Either (a) or (b)  
 (e) None of these
- 34.** In which of the following cases the potential energy of an elastic rubber band is minimum?  
 (a) When it is compressed.  
 (b) When it is extended.  
 (c) When it is at its natural length.  
 (d) When it is at its natural length but is kept at a height h above the ground.  
 (e) None of these
- 35.** Which one of the following statements best describes the definition of amplitude of sound wave in air?  
 (a) Amplitude is how the brain interprets the frequency of sound.  
 (b) Amplitude is the maximum displacement of a layer of air from its mean position as the sound wave passes through.  
 (c) Amplitude is the persistence of sound due to repeated reflection.  
 (d) All the above.  
 (e) None of these
- 36.** A body is falling from a height h. After it has fallen a height h/2, it will possess:  
 (a) Only potential energy  
 (b) Only kinetic energy  
 (c) Half potential and half kinetic energy  
 (d) More kinetic and less potential energy  
 (e) None of these

- 37.** Which of the following is correct?  
(a) Loudness of sound depends on the frequency of sound.  
(b) The higher the frequency, the higher is the pitch.  
(c) The unit of amplitude is  $kg / m^3$ .  
(d) Both (b) and (c)  
(e) None of these
- 38.** In which of the following multiple reflections of sound is used?  
(a) In stethoscopes  
(b) In megaphones  
(c) Design of concert halls  
(d) All the above  
(e) None of these
- 39.** In which part of the ear cochlea is present?  
(a) Inner ear (b) Middle ear  
(c) Outer ear (d) Brain  
(e) None of these
- 40.** A sound-wave source produces 40 crests and 40 troughs in 0.4 second. Find the frequency of the wave.  
(a) 40 hz (b) 400 hz  
(c) 100 hz (d) 10.4 hz  
(e) None of these

## Answers – Key

<b>1.</b> A	<b>2.</b> B	<b>3.</b> A	<b>4.</b> A	<b>5.</b> B
<b>6.</b> D	<b>7.</b> B	<b>8.</b> D	<b>9.</b> A	<b>10.</b> B
<b>11.</b> C	<b>12.</b> C	<b>13.</b> C	<b>14.</b> D	<b>15.</b> A
<b>16.</b> C	<b>17.</b> A	<b>18.</b> B	<b>19.</b> C	<b>20.</b> B
<b>21.</b> D	<b>22.</b> E	<b>23.</b> B	<b>24.</b> B	<b>25.</b> E
<b>26.</b> B	<b>27.</b> C	<b>28.</b> B	<b>29.</b> D	<b>30.</b> B
<b>31.</b> A	<b>32.</b> B	<b>33.</b> C	<b>34.</b> C	<b>35.</b> B
<b>36.</b> C	<b>37.</b> B	<b>38.</b> D	<b>39.</b> A	<b>40.</b> C