



DELHI PUBLIC SCHOOL, DURGAPUR

QUESTION BANK & REVISION SHEET FOR FINAL EXAMINATION (2017-18)

CLASS-IX

SUBJECT: PHYSICS

TOPIC- WORK ENERGY AND POWER

THEORY BASED QUESTIONS

1. Can any object have mechanical energy even if its momentum is zero? Explain.
2. What is power? How do you differentiate kilowatt from kilowatt hour?
3. Give one example each of potential energy (i) due to position (ii) due to shape.
4. What kind of energy transformation takes place when a body is dropped from a certain height?
5. Can kinetic energy of a body be negative?
6. A freely falling object eventually stops on reaching the ground. What happens to its kinetic energy?
7. What is the work done by the force of gravity on a satellite moving round the Earth? Justify your answer.
8. The potential energy of a freely falling object decreases progressively. Does this violate the law of conservation of energy? Why?
9. Define 1 J of work.
10. Derive the formula for potential energy.
11. Explain the Law of conservation of energy with pendulum.
12. If energy is neither created nor destroyed then from where do we get energy?
13. State and explain one example where kinetic energy is present in a body and is used.
14. Define power and give its unit.
15. How is work and energy related to each other?
16. Give one example where work done on an object is negative.
17. Give one example where work done on an object is zero.

NUMERICALS

1. The potential energy of a body is 39600J. How high is the body if its mass is 20kg?
2. A force of 20 N displaces a body through a distance of 1 m at an angle of 60° from its own direction. Calculate the amount of work done.
3. How much work is done by a force of 10 N in moving an object through a distance of 4 m in the direction of the force.
4. A light and a heavy object have the same momentum find out the ratio of their kinetic energies. Which one has a larger kinetic energy?
5. A rocket is moving up with a velocity v . If the velocity of this rocket is suddenly tripled, what will be the ratio of two kinetic energies?
6. Calculate the work done in lifting 200 kg of water through a vertical height of 6 m.
7. Find the energy in kWh consumed in 10 hours by four devices of power 500 W each.
8. Calculate the work required to be done to stop a car of 1500 kg moving at a velocity of 60 km/h?
9. A man does 60 J of work in 6 seconds. Calculate the power.
10. The power of a heart which beats 72 times in a minute is 1.2kW. Calculate the work done by heart for each beat.

11. A bullet of mass 15 g has a speed of 400 m/s. What is its kinetic energy? The bullet strikes a thick target and is brought to rest in 2 cm, calculate the average net force acting on the bullet. What happens to kinetic energy originally in the bullet?
12. Calculate the cost of using a 2kwh immersion rod for heating water in a house for one hour each day for 60 days if the rate is Rs. 1.50 per unit kWh.
13. A horse exerts a force of 200N to pull the cart. If the horse cart system moves with velocity 36kmh⁻¹ on the level road., then find the power of horse in term of horse power (
14. In an experiment to measure his power, a student records the time taken by him in running up a flight of steps on a staircase.
Use the following data to calculate the power of the student:
Number of steps = 28; Height of each step = 20 cm; Time taken = 5.4 s.
Mass of student = 55 Kg; Acceleration due to gravity = 9.8 m s⁻²
15. When loading a truck, a man lifts boxes of 100 N each through a height of 1.5 m.
 - (a) How much work does he do in lifting one box?
 - (b) How much energy is transferred when one box is lifted?
 - (c) If the man lifts 4 boxes per minute, at what power is he working? ($g = 10 \text{ m s}^{-2}$)

TOPIC-SOUND

THEORY BASED QUESTIONS

1. How can we distinguish one sound from another having the same pitch and loudness?
2. What is the audible range of frequency for human beings?
3. What is pitch of sound?
4. What is crest and trough?
5. What do we don't get echo in small room?
6. What is the function of middle ear?
7. What us ultrasonic and infrasonic sound waves?
8. What is SONAR?
9. Define wave-motion.
10. What is one Hz?
11. What is the time period of sound wave?
12. What is the minimum distance required to hear distinct echo?
13. Why does sound become faint with distance?
14. Give two applications of echo.
15. Explain structure of the human ear with the help of diagram.
16. What is wavelength?
17. What is pitch?
18. Define amplitude, time period and frequency of sound water.
19. Why do we say that sound waves are longitudinal?
20. Give three uses of ultrasound.
21. Sound cannot travel in vacuum. Describe an experiment to demonstrate this.

NUMERICALS

1. A ship sends out ultrasound that returns from the seabed and is detected after 3.42 s. If the speed of ultrasound through seawater is 1531 m/s . What is the distance of the seabed from the ship?
2. A child watching Dussehra from a distance sees the effigy of ravana burst into flames and hears the explosion associated with it 2 sec after that. How far was he from the effigy if the speed of sound in air that night was 335m/sec ?

3. A sound has 13 crests and 15 troughs in 3 seconds. When the second crest is produced the first is 2cm away from the source? Calculate a. The wavelength, b. The frequency, c. The wave speed
4. Given that sound travels in air at 340m/sec, find the wavelength of the waves in air produced by 20 kHz sound source. If the same source is put in a water tank, what would be the wavelength of the sound waves in water? Speed of sound in water is 1480m/s
5. Find the frequency of a wave whose time period is 0.002 second.
6. A source of wave produces 40 crests and 40 troughs in 0.4 second. Find the frequency of the wave
7. A person has a hearing range from 20 Hz to 20 kHz. What are the typical wavelengths of sound waves in air corresponding to these two frequencies? Take the speed of sound in air as 344 m s⁻¹.
8. Calculate the wavelength of a sound wave whose frequency is 220 Hz and speed is 440 m/ s in a given medium.
9. A person is listening to sound of 50 Hz sitting at a distance of 450 m from the source of sound. What is the time interval between successive compressions from the source reaches him?
10. A human heart, on an average, is found to beat 75 times a minute. Calculate its frequency.
11. A boat at anchor is rocked by waves whose consecutive crests are 100 m apart. The wave velocity of the moving crests is 20 m/ s. What is the frequency of rocking of the boat?
12. A longitudinal wave is produced on a toy slinky. The wave travels at a speed of 30 cm/ s and the frequency of the wave is 20 Hz. What is the minimum separation between the consecutive compressions of the slinky?
13. A bat can hear sound at frequencies up to 120 kHz. Determine the wavelength of sound in the air at this frequency. Take the speed of sound in the air as 344 m/s.
14. A gun is fired in the air at a distance of 660 m, from a person. He hears the sound of the gun after 2 s. What is the speed of sound?
15. A child hears an echo from a cliff 4 seconds after the sound from a powerful cracker is produced. How far away is the cliff from the child? Velocity of sound in air at 20°C is 344 m/ s.
16. A ship sends on a high frequency sound wave and receives an echo after 1 second. What is the depth of the sea? Speed of sound in water is 1500 m/s.
17. A sonar echo takes 2.2 s to return from a whale. How far away is the whale?
18. Using the SONAR, sound pulses are emitted at the surface of water. These pulses after being reflected from the bottom are detected. If the time interval from the emission to the detection of the sound pulses is 2 seconds, find the depth of the water. Velocity of sound in water = 1498 m/s.
19. A wave moves a distance of 8 m in 0.05 s. (a) Find the velocity of the wave.
20. (b) What is the wavelength of the wave if its frequency is 200 Hz ?
21. Two children are at opposite ends of an iron pipe. One strikes his end of the iron pipe with a stone. Find the ratio of times taken by the sound waves in air and in iron to reach the other child. Given velocity of sound in air is 344 ms⁻¹ and that in iron is 5130 ms⁻¹.
22. A boat at anchor is rocked by waves whose consecutive crests are 100 m apart. The wave velocity of the moving crests is 20 m/s. What is the frequency of rocking of the boat?
23. A stone is dropped into a well 44.1 m deep. The splash is heard 3.13 seconds after the stone is dropped. Find the velocity of sound in air.
24. Using sonar, sound pulses are emitted at the surface of water. These pulses after being reflected from water bottom are detected. If the time interval from the emission to the detection of the sound pulses is 2 seconds, find the depth of the water. [Speed of sound in water = 1531 m/s given].

SYLLABUS FOR ANNUAL EXAMINATION

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| 1. MOTION | 2. FORCES AND NEWTON'S LAW OF MOTION | 3. GRAVITATION |
| 4.WORK ENERGY AND POWER | 5. SOUND | |