

9th Science Question Paper SDV (CBSE Board Exam 2018)

Class- IX

Science

FM- 100

PHYSICS

1. What do you mean by buoyant force? 1
2. State Archimedes principle. 1
3. What is 1J of work? 2
4. How are the wavelength and frequency of a sound wave related to its speed? 2
5. Flash and thunder arc produced simultaneously. But thunder is heard a few seconds after the flash is seen. Why? 2
6. A man whose mass is 75kg walks up 10 steps, each 20cm high, in 5 second. Find the power he develops. 2
7. A radio station transmits wave of wavelength 280m If the speed of the wave is 3×10^8 m/s. Find the frequency of the wave emitted by the radio station. 3
8. A body of mass 10kg is dropped from a height of 20m. Find (i) its potential energy before it is dropped. (ii) its kinetic energy it is 8m above the ground and (iii) its kinetic energy when it hits the ground. @jsuniltutorial.in 3
9. A tube-well pumps out 2400 kg out of water per minute if water is coming out with a velocity of 3m/s. What is the power of the pump? How much work is done if the pump runs for 10 hours? 3
10. Calculates the change that should be affected in the velocity of a body to maintain the same kinetic energy. If the mass of the body is increased four times. 3
11. The frequency of a body is 20 Hz. If the velocity of the waves produced is 340 m/s. Find the wavelength of the wave. 3
12. Two pistons of hydraulic press have diameters 24cm and 2cm. Calculate the force exerted by the longer piston when 40 kg wt. is placed on the smaller piston. 5
13. A ball is dropped from rest from a height of 12m. If the ball loses 25% of its KE on striking the ground what is the height to which it bounces? How do you account for the loss in K.E.? 5

Chemistry

1. Define the following. (a) Solubility (b) Molarity (c) Vaporization (d) Freezing (e) Mass percentage 5
2. Write the formulae of the given compound: 5
(a) Sodium acetate (b) Ammonium acetate (c) Carbon tetrachloride (d) Hydrogen sulphide. (e) Zinc chloride
(f) Potassium sulphate (g) Ammonium chloride (h) Magnesium sulphate (i) Calcium hydroxide (j) Calcium oxide
3. Answer these questions 5
(a) Consider two isotopes of hydrogen ${}^1_1\text{H}$ and ${}^2_1\text{H}$. If average atomic mass of hydrogen is 1.008 amu. Find the % abundance of ${}^1_1\text{H}$?
(b) An element consists of two isotopes ${}^{10}\text{X}$ and ${}^{11}\text{X}$ occurring in the ratio of m:n. If the average atomic mass is 10.8 than find the simplest value of m/n?
4. Find the moles of atoms in. 5
(i) 2g Hydrogen (ii) 60g carbon (iii) 240g calcium (iv) 12mg helium (v) 1.2046×10^{22} atoms of H
5. (a) List the points of differences between homogeneous and heterogeneous mixtures.
(b) What are the properties of solution? 5
6. (a) Describe the properties of anode and cathode rays. 5

(b) Why was a gas at low pressure taken by Thomson while conducting the experiment?

7. Define the following.

5

(i) Zeeman effect

(ii) Stark effect

(iii) Orbits

(iv) Valency

(v) if Rutherford's atomic model is correct, then the atom should collapse. Why ?

Biology

1. How are clouds formed ?

2

2. What are biogeochemical cycles ?

2

3. Explain the larva stage of life cycle of mosquito.

2

4. What are the differences between animals belonging to the aves group and those in the mammalia group?

2

5. State four adaptive features of cockroach.

2

6. How are pteridophytes different from phanerogams?

4

7. What are antibiotics? Name the scientist who first discovered antibiotics.

4

8. Explain the following.

4

(i) Eutrophication (ii) Bio magnification.

4

9. Write an account of acute and chronic diseases.

10. Why do we classify organisms ?

4

Or, Name the phylum of the following animals. (a) Tapeworm (b) Starfish (c) Jelly fish (d) Octopus

Hint/Solution of selected questions

Question: What is Zeeman Effect?

Ans: The Zeeman Effect is the splitting of the spectral lines of an atom in the presence of a strong magnetic field. The effect is due to the distortion of the electron orbitals because of the magnetic field.

Question: What is Stark Effect in Atomic Spectra?

Ans: The splitting of atomic spectral lines as a result of an externally applied electric field is called the Stark effect

Question: why was gas at low pressure is taken during discharge tube experiment for discovery of electron?

Ans: Gas at low pressure is taken during discharge tube experiment so that the electrons in the beam cannot be deflected if they hit molecules of gas.

Question: if Rutherford model is correct then why atom should collapse?

Ans: if we apply magnetic theory to Rutherford model of atom then electron will lose energy continuously due to radiation when revolve around nucleus. Nucleus attract electron strongly and at last electron will fall in nucleus. So, at last atom collapse.

Q. A man whose mass is 75kg walks up 10 steps, each 20cm high, in 5 second. Find the power he develops.

$$\text{Solution: } P = \frac{w}{t} = \frac{mgh}{t} = \frac{75kg \times 10 \times 10 \times 0.20m}{5sec} = 30w$$

Q. A radio station transmits wave of wavelength 280m. If the speed of the wave is 3×10^8 m/s. Find the frequency of the wave emitted by the radio station.

$$\text{Solution: } v = f \lambda \Rightarrow f = \frac{v}{\lambda} \Rightarrow f = \frac{3 \times 10^8}{280} = 1.07 \times 10^6 \text{ Hz}$$

Q. A body of mass 10kg is dropped from a height of 20m. Find (i) its potential energy before it is dropped.

(ii) its kinetic energy at 8m above the ground and (iii) its kinetic energy when it hits the ground.

$$\text{Solution: (i) Potential energy} = mgh = 10 \times 10 \times 20 = 2000 \text{ J}$$

$$\text{(ii) KE when it is 8m above the ground} = \text{PE at 12m} = 10 \times 10 \times 12 = 1200 \text{ J}$$

(iii) According to law of conservation of energy, Potential energy of the ball just before dropping = KE of the ball just on touching the ground = 2000 J

Q.A tube-well pumps out 2400 kg out of water per minute if water is coming out with a velocity of 3m/s. What is the power of the pump? How much work is done if the pump runs for 10 hours?

Solution: Speed of water = 3 m/s

Mass of water flow in 1 sec = 2400/60 kg = 40 kg/s

Work done by pump = The kinetic energy of water flowing = $\frac{1}{2} m v^2 = \frac{1}{2} \times 40 \times (3)^2 = 180J$

Power of the pump = $\frac{w}{t} = \frac{180j}{1sec} = 180w$

Work done if the pump runs for 10 hours = $Pt = 180 w \times 10 \times 3600 = 6.48 \times 10^6 j$

Q. Calculates the change that should be affected in the velocity of a body to maintain the same kinetic energy. If the mass of the body is increased four times.

Solution: Let original mass = m the, Changed mass $m' = 4m$.

let initial velocity be v and new velocity will be v'

$$\frac{KE}{KE'} = \frac{\frac{1}{2}mv^2}{\frac{1}{2}m'v'^2} \Rightarrow 1 = \frac{m v^2}{4m v'^2} \Rightarrow v'^2 = \left(\frac{v}{2}\right)^2 \Rightarrow v' = \frac{v}{2}$$

Hence, New velocity will be half of initial velocity.

Q. Two pistons of hydraulic press have diameters 24cm and 2cm. Calculate the force exerted by the longer piston when 40 kg wt. is placed on the smaller piston.

Solution: Pascal Law: Pascal's law states that "pressure applied to an enclosed fluid is transmitted undiminished to every portion of the fluid and the walls of the containing vessel".

A piston with small cross section area A_1 , exerts a force F_1 on the surface of a liquid such as oil. The applied pressure $P = F_1 / A_1$ is transmitted through connecting pipe to a larger piston of area A_2 .

The applied pressure is the same in both cylinders, so, $P = \frac{F_2}{A_2} = \frac{F_1}{A_1}$

$$\frac{F_1}{A_1} = \frac{F_2}{A_2} \Rightarrow \frac{F_1}{\pi(12)^2} = \frac{40}{\pi(1)^2} \Rightarrow F_1 = 40 \times 144 = 5760N$$

Q.A ball is dropped from rest from a height of 12m. If the ball loses 25% of its KE on striking the ground what is the height to which it bounces? How do you account for the loss in K.E.?

Solution: KE on striking ground = 75% KE = $0.75 \times m g H = m g h' \Rightarrow h' = 0.75 \times 12 = 9m$