Nayak's Tutorials

Way to Excellence

Year: 2024-25 | **Practice Paper - 3** | **Marks - 80**

Std:- X ICSE | **Physics** | **Duration :- 2 Hrs**

*Attempt **all** questions from **Section A** and **any four** questions from **Section B.***
The intended marks for question or parts of questions are given in brackets [ ].

Section A (40 marks)

Multiple Choice Questions 15

1. For a given mass if kinetic energy increases 16 times the momentum:

(a) increases four times (b) increases twice (c) decreases four times (d) decreases twice

2. The relationship to evaluate the velocity ratio is:

(a) velocity of effort / velocity of load (b) displacement of effort / displacement of load

(c) Mechanical advantage / efficiency (d) all of the above

3. State which of the following statements are true.

(a) Efficiency of an ideal machine is equal to one

(b) Efficiency of a practical machine is less than one

(c) Efficiency is always expresses in fraction

(d) both (a) and (b)

4. Select the correct reason for the cause that is responsible for mirage in deserts:

(a) It has a low critical angle

(b) Due to total internal reflection.

(c) Due to total internal reflection followed by successive refraction of light.

(d) Due to diffraction

5. In our houses, point of liquid appliances are connected in ..... with the mains.

(a) Series (b) Parallel (c) Any of the Series and Parallel

(d) It only depends upon the voltage supply at the mains

6. What is the energy required to raise the temperature of 5 kg of water from 10 K to 50 K?

[Specific heat capacity of water is 4184 $J.kg^{-1}. K^{-1}$.]

(a) 836.8 J (b) 836.8 kJ (c) 242.k J (d) 242.4 J

7. What is the maximum number of electrons an atom can contain in its fourth orbit ?

(a) 4 (b) 16 (c) 24 (d) 32

8. Lenz's law is based on conversation of ..... .

(a) mass (b) current (c) angular momentum (d) energy

9. In linear motion the acceleration is :

(a) Positive (b) Negative (c) Zero (d) Constant

10. The force which is not a real force :

(a) Force of tension (b) Centripetal force (c) Centrifugal force (d) Gravitational force

11. The internal resistance of a 2.1 V cell which generates a current of 0.2 A through a resistance of 10 Ω is :

(a) 5 Ω (b) 10 Ω (c) 0.5 Ω (d) 50 Ω

12. Choose the correct statement with respect to force:

(a) The CGS unit of momentum of force is Newton × meter

(b) The turning effect on a body by a force depends on momentum of force.

(c) 1 gf × cm = 980 dyne cm

(d) 1 kgf × m = 10^7 dyne cm

13. Refractive index of diamond with respect to air is 2.4 and speed of light in vacuum is 3×10^8 ms^{-1}. Hence speed of light in diamond is :

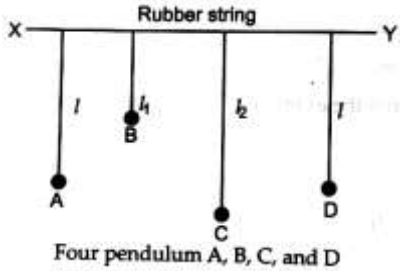
(a) 2.5×10^8 ms^{-1} (b) 2.25×10^8 ms^{-1} (c) 1.25×10^8 ms^{-1} (d) 1.5×10^8 ms^{-1}

14. Force is positive when:

(a) displacement and force are in same direction (b) when $\theta = 90°$

(c) when displacement and force are in opposite direction (d) $\theta = 180°$

15. Four pendulums A, B, C, and D are suspended from a piece of rubber string XY, as shown in figure. Pendulums A and D have same lengths of l. Pendulums B and C have lengths of $_1$ and $_2$ respectively.



Four pendulum A, B, C, and D

Which of the following will experience resonance when pendulum A is brought into vibration by setting its bob to one side normal to the length of XY ?

(a) B (b) C (c) D (d) Both (b) and (c)

Q2

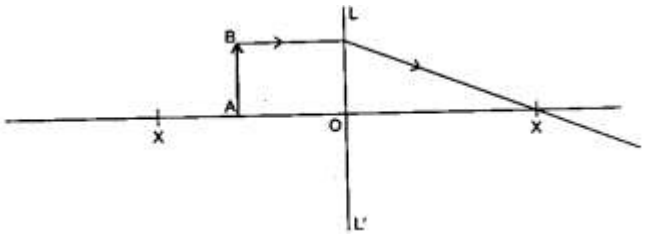
A. An engine can pump 30,000 litres of water to a vertical height of 45 metre in 10 minutes. Calculate the work done by the machine and the power. **2**

(Density of water = 10^3 kg/m^3, 1000 litre = 1 m^3, g = 9.8 ms^{-2})

B. (a) Define one kilowatt hour. How is it related to the joule ? **2**

(b) How can the work done be measured when force is applied at an angle to the direction of displacement ?

C. **3**



(a) Copy and complete the ray diagram to show the formation of the image of the object AB.

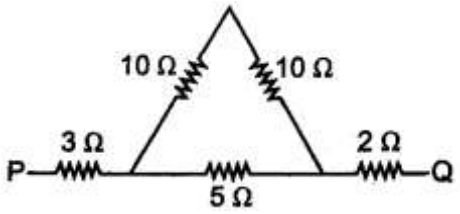
(b) Name the lens LL.'

(c) Name a device in which this principle is used.

D. State the use of echo in medical field. 2

E. A man is standing at a distance of 12 m from a cliff. Will he be able to hear a clear echo of this sound ? Give a reason for your answer. 2

F. Calculate the equivalent resistance between P an Q from the following diagram. 2



G. State the two ways by which the magnetic field of a solenoid can be made stronger. 2

Q3. A. The refractive index of glass is 1.5. What is meant by this statement ? 2

B. (a) What is meant by the term critical angle ? 2

(b) How is it related to the refractive index of the medium ?

C. (a) Specific heat capacity of water is more compared to ice. Correct or Wrong? Why? 2

(b) State the principle of Calorimetry.

D. (a) Write two differences between a chemical change and a nuclear change. 2

(b) Mention the beneficial and harmful effects of radiations.

E. (a) The refractive index of water with respect to air is . What is the refractive index of air with respect to water ? 2

(b) A ray of light is incident as a normal ray on the surface of separation of two different mediums. What is the value of the angle of incidence in this case ?

Section B (40 marks) (Attempt any 4 questions)

Q4. A. A uniform metre scale balances at 50 cm mark such that two weighs 20 gf and 50 gf are suspended at 12 cm mark and X cm mark on either sides of the fulcrum. Find the value of X for the scale to be in equilibrium. 3

B. (a) A boy uses a single fixed pulley to lift a load of 50 kgf to some height. Another boy uses a single movable pulley to lift the same load to the same height. Compare the effort applied by them. Give a reason to support your Answer. 2

(b) How does uniform circular motion differ from uniform linear motion ? 1

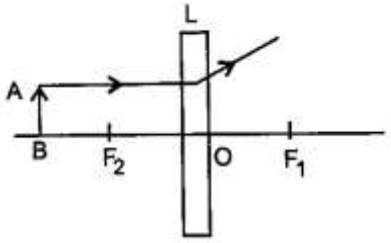
C. A pulley system with V.R. = 4 is used to lift a load of 175 kgf through a vertical height of 15 m. The effort required is 50 kgf in the downward direction. ($g = 10\ N\ kg^{-1}$) Calculate : 4

(a) Distance moved by the effort (b) Work done by the effort.

(c) M.A. of the pulley system (d) Efficiency of the pulley system.

Q.5 A. Copy the given figure and complete it to show the formation of the image of the object AB.

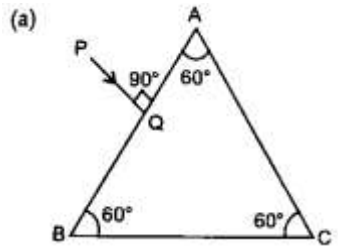
Name the type of lens used and state the characteristics of the image formed. 3

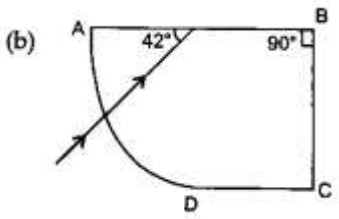


B. (a) With the help of a diagram, show that the apparent depth of an object, such as a coin, in water is less than its real depth. 2

(b) How is the refractive index of water related to the real depth and the apparent depth of a column of water ? 1

C. Copy and complete the following diagrams. Mark the angles, wherever necessary. 4
(Critical angle for glass with respect to air = 42°).





Q.6 A. State any four factors on which intensity of sound depends. 3

B. Define the law of vibrating strings. 3

C. A person standing between two vertical cliffs hears two sounds one after 3 seconds and another after 6 second. Find the distance between the two cliffs if velocity of sound is 340 ms^{-1}. 4

Q.7 A. State three factors on which a current induced in a conductor depends when placed in a Magnetic field. 3

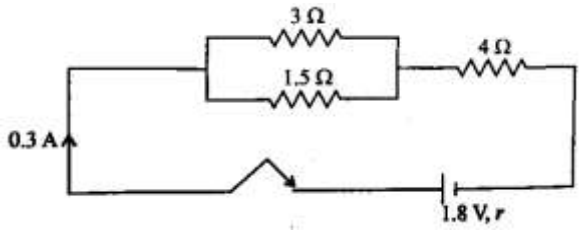
B. (a) What are superconductors ? 3

(b) Calculate the current drawn by an appliance rated 110 W, 220 V when connected across 220 V supply.

(c) Name a substance whose resistance decreases with the increase in temperature.

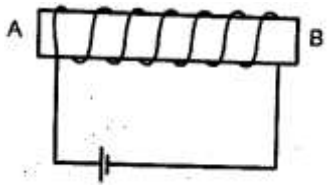
C. The diagram above shows three resistors connected across a cell of e.m.f. 1.8 V and internal resistance r. Calculate :

(a) Current through 3 Ω resistor. (b) The internal resistance r. 4



Q.8 A. You have been provided with a solenoid AB.

(a) What is the polarity at end A ? 2



(b) Give one advantage of an electromagnet over a permanent magnet. 1

B. (a) What is isotope ?

(b) Write any two isotopes of Carbon. Is there a radioactive isotope of carbon ?

C. (a) Define Quality of a sound. 1

(b) Present two differences between Music and Noise. 2

(c) When a tuning fork is allowed to vibrate in the air, what type of vibration does it produce ? 1

Q.9 A. A certain nucleus X has a mass number 14 and atomic number 6. The nucleus X changes to after the loss of a particle.

(a) Name the particle emitted.

(b) Represent this change in the form of an equation.

(c) A radioactivity substance is oxidized. What change would you expect to take place in the nature of its radioactivity?

Give a reason for your answer. 3

B. State, giving reasons, whether the following nuclear decays are allowed or no ?

(i) (ii) (iii) 3

C. An imaginary radioactive element $_{92}X^{235}$ decays to form X_1, X_2, X_3, X_4, X_5 and X_6 nuclides by ejecting two β- particles followed by an α- particle and again two β- particles and an α- particle. Represent the various nuclear changes in the form of an equation. State the mass number and atomic number of X_6. Also, list the isotopes and isobars in the above nuclear equation. 4

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