

Std.: 10th ICSE

Sub: Physics



Marks : 80

Time : 2 Hrs.

Date : 28/12/2022

**Pre- Board Test
Set-1**

General Instructions:

- (i) Answers to this paper must be written on the paper provided separately.
- (ii) You will not be allowed to write during first 15 minutes. This time is to be spent in reading the question paper.
- (iii) The time given at the head of this paper is the time allowed for writing the answers.
- (iv) **Section A** is compulsory. Attempt **any four** questions from **Section B**.
- (v) The intended marks for questions or parts of questions are given in brackets [].

SECTION - A

(Attempt all questions from this Section.)

- 1. Choose the correct answers to the questions from the given options: [15]**
- (i) Factor affecting the turning of a body is/ are:
 - (a) Magnitude of force applied
 - (b) Perpendicular distance of the line of actions of the force from axis of rotation.
 - (c) Both (a) and (b)
 - (d) None of these
 - (ii) If the force applied and the displacement are perpendicular to each other than work done is:
 - (a) Positive
 - (b) Zero
 - (c) Negative
 - (d) Maximum
 - (iii) While charging a battery, the energy conversion taking place is:
 - (a) Solar energy to electrical energy
 - (b) Chemical energy to electrical energy
 - (c) Electrical energy to chemical energy
 - (d) None of these
 - (iv) An element X having atomic number 7 and atomic mass is emits 1 proton and 2 β particles and forms element Y. Atomic number and atomic mass y will be respectively:
 - (a) 7, 15
 - (b) 7, 14
 - (c) 6, 17
 - (d) 8, 14
 - (v) A ray of light incident on a lens parallel to its principal focus after refraction passes through or appears to come from:
 - (a) its first focus
 - (b) its optical centre
 - (c) its second focus
 - (d) the centre of curvature

- Vi) Work done is positive When.....
- Distance is positive
 - Maximum distance is travelled along direction of force applied
 - displacement is in direction of force applied
 - Distance is Negative

- (vii) What does word SONAR stands For
- Sound navigation and ranging
 - Sound navigation and reaching
 - Free Vibrations
 - Damped Vibrations

- (viii) It is possible to recognise a person by hearing his voice even if he is hidden behind a solid wall. This is due to the fact that his voice:

- Has a definite pitch
- Has a definite quality
- Has a definite loudness
- Can penetrate the wall

- (ix) How many joules are there is one watt hour?

- 3600 J
- 3.6×10^6 J
- 1000 J
- 1800 J

- (x) Two fuse wires are rates 5 A and 15 A. Which one is thicker?

- 15 A fuse wire
- 5 A fuse wire
- same thickness
- cannot be determined

- (xi) What is the nature of the lines of force of the magnetic field due to straight current carrying wire?

- concentric circles centred on the wire
- line parallel to wire
- helical
- none of these

- (xii) The principle of calorimetry is based on the law of:

- conservation of energy
- conservation of temperature
- conservation of charge
- conservation of heat tost

- (xiii) The process of converting solid directly into gas is called:

- solidification
- sublimation
- boiling
- melting

- (xiv) For an object placed 20 cm in front of a convex lens, the image is at a distance of

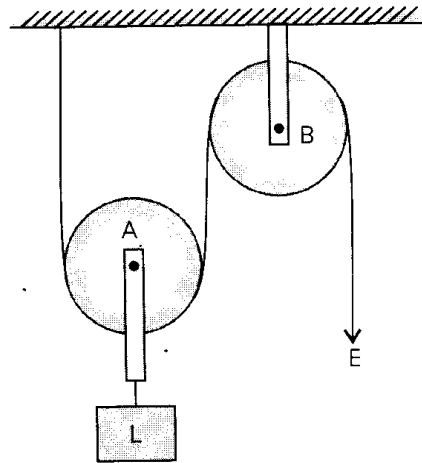
20 cm behind the lens. The focal length of the convex lens is:

- 20 cm
- 10 cm
- 15 cm
- 40 cm

- (xv) A radiation R is focused by a proper device on the bulb of a thermometer. mercury in the thermometer shows a rapid increase. The radiation R is:

- infrared radiations
- visible light
- ultraviolet radiations
- x-rays

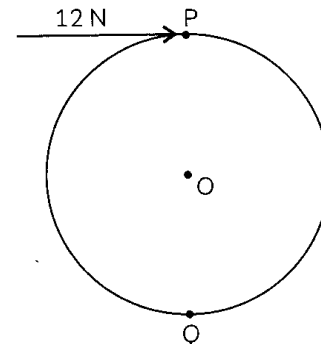
2. (i) The diagram alongside shows a pulley arrangement. [3]



- Name the pulleys A and B
- In the diagram mark the direction of tension on each strand of string
- What is the purpose of pulley B?

- (ii) It is easier to turn the steering wheel of a large diameter than that of a small diameter. Give reason. [2]

- (iii) A wheel of diameter 3 m with centre O is shown. A force $F = 12$ N is applied at P. Calculate the moment of force about: [2]



- O
- Q

- (iv) What is the position of the centre of gravity of a: [2]

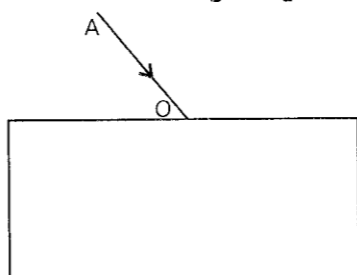
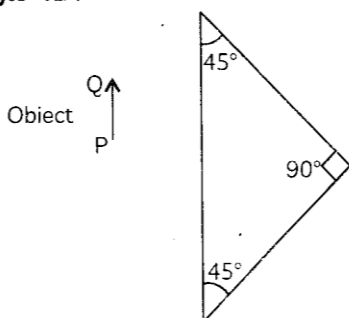
- rectangular lamina
- cylinder

- (v) If the speed of a car is halved, how does its kinetic energy change? [2]
- (vi) (a) When a troop crosses a suspension bridge, the soldiers are asked to break their steps. Why? [2]
- (b) Why are stringed instrument like guitar provided with a hollow sound box?
- (vii) (a) State Ohm's law. [2]
- (b) A metal wire of resistance 6Ω is stretched so that its length is increased to twice its original length. Calculate its new resistance.
3. (i) A lens forms an upright and diminished image of an object placed at its focal point. Name the lens and draw a ray diagram to show the formation of the image. [2]
- (ii) Give any two situations that can cause electrical hazards in domestic circuits. [2]
- (iii) When a current carrying conductor is placed in a magnetic field, it experiences a mechanical force. What should be the angle between the magnetic field and the length of the conductor so that the force experienced is: [2]
- (a) Zero
- (b) maximum
- (iv) How much heat energy is required to bring 3 kg of water at 25°C to its boiling point? [Specific heat capacity of water is $4200 \text{ J kg}^{-1} \text{ }^\circ\text{C}^{-1}$] [2]
- (v) (a) Explain α -decay and β -decay
- (b) Suggest one effective way for the safe disposal of nuclear waste. [2]

SECTION - B

(Attempt any four questions from this Section.)

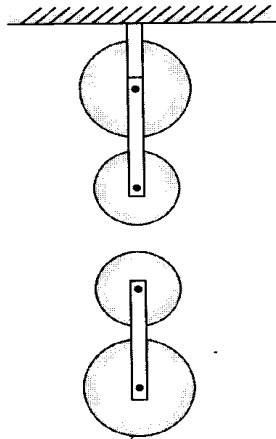
4. (i) A glass slab is placed over a piece of paper on which VIBGYOR is printed with each letter into its corresponding colour. [3]
- (a) When viewed from above, will the image of all the letters be in the same plane?
- (b) The letter of which colour will appear to be raised maximum? Explain your answer.
- (ii) Redraw and complete the diagram for the object PQ and a glass prism of critical angle 42° . [3]
- (iii) In the diagram AO is a ray of light incident on a rectangular glass slab. [4]
- (a) Complete the path of the ray till it emerges out of the slab.
- (b) In the diagram, mark i , r , and e .
- (c) How are i and e related to each other?
5. (i) A convex lens forms an image 16 cm long of an object 4 cm long kept at a distance 6 cm from the lens. The object and the image are on the same side of the lens. [3]
- (a) What is the nature of image?
- (b) Find the position of the image.
- (c) Find focal length of the lens.
- (ii) A wave has a wavelength of 10^{-3} nm . [3]
- (a) Name the wave.
- (b) State two properties of this wave which are different from light.
- (iii) The diagram below shows object AB placed on the principal axis of a lens L. The two foci of the lens are F_1 and F_2 . The image formed by the lens is erect virtual and diminished. [4]



- (a) Draw the outline of the lens L used and name it.
- (b) Draw a ray of light starting from B and passing through O. Show the same ray after refraction by the lens.

- (c) Draw another ray from B which is incident parallel to the principal axis and show how does it emerge after refraction from the lens.
- (d) Locate the final image formed.

6. (i) Figure shows a four pulley system. The upper two pulleys are fixed and the lower two are movable. [3]

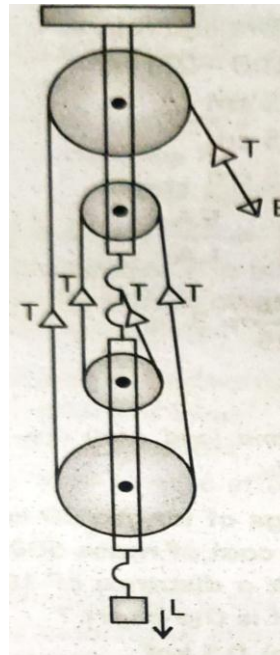


- (a) Draw a string around the pulleys. Also show the point of application and direction in which the effort E is applied.
- (b) What is the velocity ratio of the system?
- (c) How are load and effort of the pulley system related?
- (ii) On a see-saw two children of masses 30 kg and 50 kg are sitting on one side of it at a distances 2 m and 2.5 m respectively from its middle. Where should a man of mass 74 kg sit to balance it? [3]
- (iii) A boy of mass 40 kg climbs up a flight of 30 steps each 20 cm high in 2 minutes and a girl of mass 30 kg does the same in 1.5 minute. Compare: [4]
- (a) the work done
- (b) the power developed by them.
- $(g = 10 \text{ ms}^{-2})$

7. (i) A pendulum has a frequency of 5 vibrations per second. An observer starts the pendulum and fires a gun simultaneously. He hears echo from the cliff after 8 vibrations of the pendulum. If the velocity of sound in air is 340 ms^{-1} . Find the distance between the cliff and the observer. [3]
- (ii) An atomic nucleus A is composed of 84 protons and 128 neutrons. The nucleus A emits an alpha particle and is transformed into a nucleus B. [3]

- (a) What is the composition of B?
- (b) The nucleus B emits a beta particle and is transformed into a nucleus C. What is the composition of C?
- (c) What is mass number of the nucleus A?
- (d) Does the composition of C change if it emits gamma radiations?

- iii) The Diagram given shows a system of Pulleys are fixed and the lower are movable



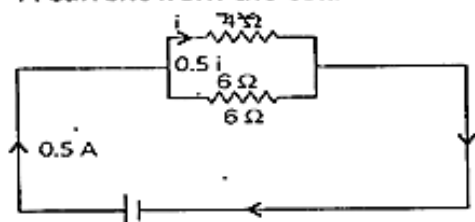
- a) The velocity ratio of the system is:
- a) 2 b) 3 c) 4 d) 5
- b) The load and effort of the given pulley system are related as (considering ideal case) :

(a) $L = \frac{E}{4}$ (b) $E = \frac{L}{4}$

(c) $L = E + 4$ (d) $E = L + 4$

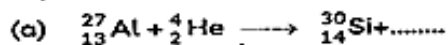
- c) The effort needed to lift a load of 360 N if efficiency is 90% is:
- (a) 400 N (b) 200 N (c) 150 N (d) 100 N
- d) A pulley system works as:
- a) Energy gainer b) force multiplier
- c) Friction reducer d) energy conservator

8. (i) Two resistors of $4\ \Omega$ and $6\ \Omega$ are connected in parallel to a cell to draw $0.5\ \text{A}$ current from the cell. [3]



- (a) Draw a labelled circuit diagram showing the above arrangement.
 (b) Calculate the current in each resistor.

- (ii) Complete the following nuclear reaction equations: [3]



- (iii) (a) A fuse is rated $8\ \text{A}$. Can it be used with an electrical appliance rated $5\ \text{KW}$, $200\ \text{V}$. Give a reason. [4]
 (b) Name two safety devices which are connected to the live wire of a household electric circuit.

9. (i) In a laboratory experiment to measure specific heat capacity of copper $0.02\ \text{kg}$ of water at 70°C was poured into a copper calorimeter with a stirrer of mass $0.16\ \text{kg}$ initially at 15°C after stirring the final temperature reached to 45°C . Specific heat of water is taken as $4200\ \text{J Kg}^{-1}\ ^\circ\text{C}^{-1}$. [3]

- (a) What is the quantity of heat released per kg of water per 1°C fall in temperature.
 (b) Calculate the heat energy released by water in the experiment in cooling from 70°C to 45°C .
 (c) Assuming that the heat released by water is entirely used to raise the temperature of calorimeter from 15°C to 45°C . Calculate the specific heat capacity of copper.

- (ii) Some ice is heated at a constant rate and its temperature is recorded after every few seconds, till steam is formed at 100°C . Draw a temperature time graph

to represent the change. Label the two phase changes in your graph. [3]

- (iii) You have been provided with a solenoid AB. [4]

- (a) What is the polarity at end A?
 (b) Give one advantage of an electromagnet over a permanent magnet.

