

**ICSE BOARD
CLASS X
PHYSICS**

Maximum Marks: 80

Time: 2 hr

-
1. Answer to this Paper must be written on the paper provided separately.
 2. You will **not** be allowed to write during the first **15** minutes. This time is to be spent in reading the Question Paper.
 3. The time given at the head of this Paper is the time allowed for writing the answers.
 4. **Section I** is compulsory. Attempt **any four** questions from **Section II**.
 5. The intended marks for questions or parts of questions are given in brackets [].
-

SECTION-I (40 MARKS)

(Attempt all question from this section)

Question 1.

- (a) A wasp of mass 20kg flies vertically up at a speed of 50m/s
What is the power in its wings. [2]
The particles of mud fly off tangentially from the wheel of
moving vehicle. Why ?
- (b) (i) With reference to the terms mechanical advantage,
velocity ratio and efficiency of a machine, name the
term that will not change for a machine of a given
design.
- (ii) Define the term stated by you in part (i). [2]
- (c) Two wires of equal mass and material , but one has length half of other.
Calculate the ratio between their resistances

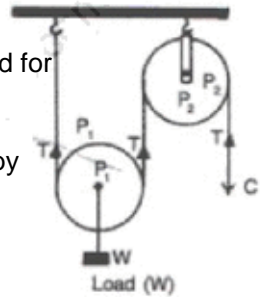
[2]

- (d) State the energy changes that take place in the following when they are in use :
- (i) a photovoltaic cell.
(ii) an electromagnet. [2]
- (e) A body of mass 5 kg is moving with a velocity of 10 ms^{-1} . What will be the ratio of its initial kinetic energy and final kinetic energy, if the mass of the body is doubled and its velocity is halved? (2 marks)

Question 2.

- (a) A ray of light strikes the surface of a rectangular glass block such that the angle of incidence is (i) 0° (ii) 42° . Sketch a diagram to show the approximate path taken by the ray in each case as it passes through the glass block and emerges from it. [2]
- (b) State the conditions required for total internal reflection of light to take place. [2]

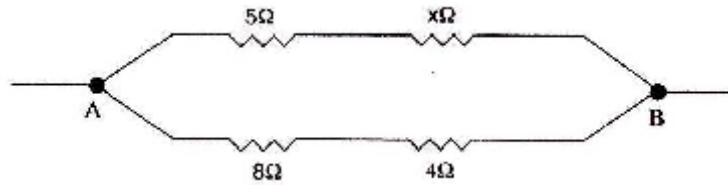
- (c) Figure shows the combination of movable pulley P1 with fixed pulley P2 used for lifting up a load W.
- State the function of the fixed pulley P2
 - If the free end of the string moves through a distance x , find the distance by which load W is raised.
 - Calculate the force to be applied at C to raise the load of $W = 20\text{kg}$
Note: No friction and weight of pulley to be considered



- (d) Differentiate between infra red rays and ultra violet rays in terms of their
- action on photographic plate
 - uses
- [2]
- (e) An ultrasonic wave is sent from a ship towards the bottom of the sea. It is found that the time interval between the sending and the receiving of the wave is 1.5 seconds. Calculate the depth of the sea if the the velocity of sound in sea water is 1400 ms^{-1} . [2]

Question 3.

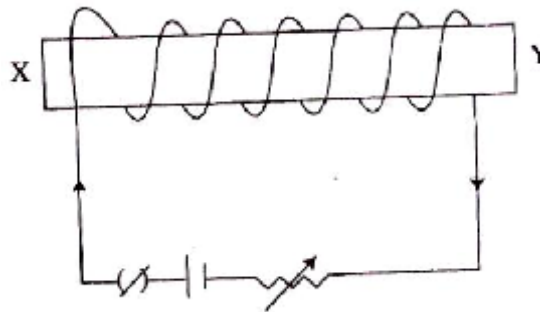
- (a) A stringed musical instrument, such as the Sitar, is provided with a number of wires of different thicknesses. Explain the reason for this. [2]
- (b) What is meant by noise pollution? Write the name of one source of sound that causes noise pollution. [2]
- (c) The equivalent resistance of the following circuit diagram is 4Ω . Calculate the value of x . [2]



- (d) An electric heater is rated 1000W–200V. Calculate:
 (i) the resistance of the heating element.
 (ii) the current flowing through it. [2]
- (e) (i) Give two characteristic properties of copper wire which make it unsuitable for use as fuse wire.
 (ii) Name the material which is used as a fuse wire? [2]

Question 4.

- (a) The figure below shows an electromagnet.
 (i) What will be the polarity at the end X?
 (ii) Suggest a way by which the strength of the electromagnet referred to in the question, may be increased. [2]

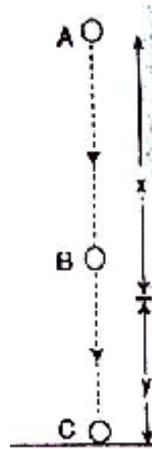


- (b) Why do pieces of ice added to a drink cool it much faster than ice cold water added to it? [2]
- (c) 40 g of water at 60°C is poured into a vessel containing 50 g of water at 20°C. The final temperature recorded is 30°C. Calculate the thermal capacity of the vessel. (Take specific heat capacity of water as 4.2 J g⁻¹°C⁻¹). [2]
- (d) Give two important precautions that should be taken while handling radioactive materials. [2]
- (e) (i) What is the name given to atoms of a substance which have the same atomic number but different mass numbers?
 (ii) State the energy change which takes place when magnet is moved inside a coil having galvanometer at it ends. Name the phenomenon

SECTION-II (40 Marks)
(Attempt any four questions from this section)

Question 5.

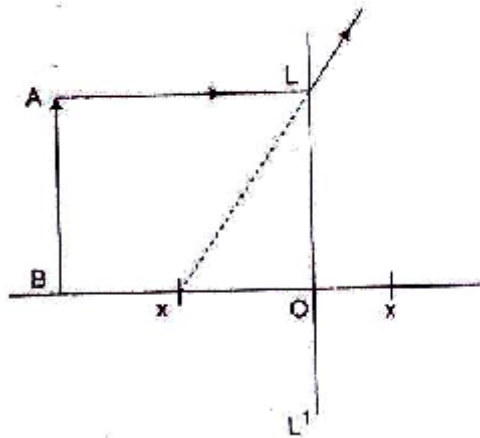
- (a) 6.4 kJ of energy causes a displacement of 64 m in a body in the direction of force in 2.5 seconds. Calculate (i) the force applied (ii) power in horse power (hp). (Take 1 hp= 746 W). [3]
- (b) A pulley system comprises two pulleys, one fixed and the other movable.
(i) Draw a labelled diagram of the arrangement and show clearly the directions of all the forces acting on it.
(ii) What change can be made in the movable pulley of this system to increase the mechanical advantage of the system? [3]
- (c) An object of mass 'm' is allowed to fall freely from point A as shown in the figure. Calculate the total mechanical energy of the object at:
(i) Point A (ii) Point B (iii) Point C
(iv) State the law which is verified by your calculations in parts (i), (ii) and (iii). [4]



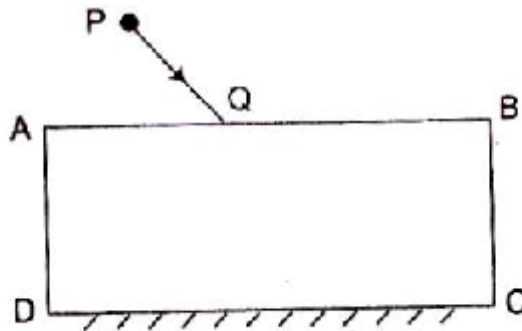
Question 6.

- (a) How does the value of angle of deviation produced by a prism change with an increase in the :

- (i) value of angle of incidence
(ii) wave-length of incident of light ? [3]
- (b) (i) Copy and complete the diagram to show the formation of the image of the object AB.
(ii) What is the name given to x ? [3]



- (c) (i) The diagram below shows a ray of white light PQ coming from an object P and incident on the surface of a thick glass plane mirror. Copy the diagram and complete it to show the formation of three images of the object P as formed by the mirror.



- (ii) Which image will be the brightest image ? [4]

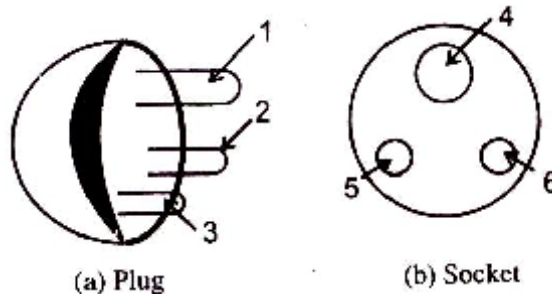
Question 7.

- (a) (i) What is the principle on which sonar is based ?

- (ii) Calculate the minimum distance at which a person should stand in front of a reflecting surface so that he can hear a distance echo. (Take speed of sound in air = 350 ms^{-1} .) [3]
- (b) (i) Name the characteristic of sound which enables a person to differentiate between two sounds with equal loudness but having different frequencies.
(ii) Define the characteristic named by you in (i).
(iii) Name the characteristic of sound which enables a person to differentiate between two sounds of the same loudness and frequency but produced by different instruments. [3]
- (c) (i) A person is tuning his radio set to particular station. What is the person trying to do to tune it ?
(ii) Name the phenomenon involved in tuning the radio set.
(iii) Define the phenomenon named by you in part (ii). [4]

Question 8.

- (a) (i) State ohm's Law.
(ii) Diagrammatically illustrate how you would connect a key, a battery, a voltmeter, an ammeter, an unknown resistance R and a rheostat so that it can be used to verify the above law. [3]
- (b) (i) Draw a neat and labeled diagram to show the structure of an a.c. generator.
(ii) State the energy conversion taking place in the generator when it is working. [3]
- (c) (i) The diagrams (a) and (b) given below are of a plug and a socket with arrows marked as 1, 2, 3 and 4, 5, 6 respectively on them. Identify and write Live (L), Neutral (N) and Earth (E) against the correct number.



- (ii) Calculate the electrical energy consumed when a bulb of 40 W is used for 12.5 hours everyday for 30 days. [4]

Question 9.

- (a) State in brief, the meaning of each of the following :

- (i) The heat capacity of a body is $50 \text{ J}^\circ\text{C}^{-1}$.
(ii) The specific latent heat of fusion of ice is 336000 J kg^{-1} .
(iii) The specific heat capacity of copper is $0.4 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$. [3]
- (b) 65 g of ice at 0°C is added to 150g of water at 50°C and the mixture attains the temperature of 10°C . What is the value of the latent heat of fusion of ice. [3]
- (c) (i) Calculate the amount of ice which is required to cool 150 g of water contained in a vessel of mass 100 g at 30°C , such that the final temperature of the mixture is 5°C . (Take specific heat capacity of material of vessel as $0.4 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$, specific latent heat of fusion of ice = 336 J g^{-1} , specific heat capacity of water = $4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$) [4]

Question 10.

- (a) An electric bulb is marked 200V , 100W
i. What do the markings mean?
ii. Another bulb is marked 50W, 200V which one has coil of higher resistance.
iii. What will be energy used by the 1st bulb, if used for 10hrs a day for 10days
iv. What is the cost of the energy used. if 1kwh is priced at Rs1.60? [3]
- (b) What is the function of step up transformer? Draw a labelled diagram to show the various components of step up transformer. Name one device, where both step up and step down transformers are implemented. [3]
- (c) A nucleus ${}^A_Z\text{X}$ emits an alpha particle followed by γ emission, thereafter it emits two β particles to form X_3 .
- (i) Copy and complete the values of A and Z for X_3 :

$${}^A_Z\text{X} \xrightarrow{-\alpha} \text{X}_2 \xrightarrow{-2\beta} \dots \text{X}_3$$
- (ii) Out of alpha (α) beta (β) and gamma (γ) radiations :
(i) Which radiation is the most penetrating ?
(ii) Which radiations are negatively charged? [4]