

**ICSE BOARD
CLASS X
PHYSICS**

Maximum Marks: 80

Time: 2 hrs

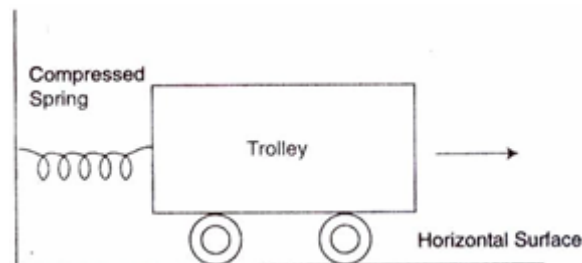
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1. Answer to this Paper must be written on the paper provided separately.
 2. You will **not** be allowed to write during the first **15** minutes. This time is to be spent in reading the Question Paper.
 3. The time given at the head of this Paper 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 [].
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SECTION-I (40 Marks)

(Attempt **all** questions from this Section)

Question 1.

- (a) How much work is done by coolie carrying load on friction less surface
State reason. [2]
- (b) Potential difference between live wire and neutral wire in
domestic electric circuit is_____. [2]
- (c) Resistances 2ohm 3 ohm and 4ohm are connected in parallel. What is the ratio of potential
difference. [2]
- (d) A spring is kept compressed by a small trolley of mass 0.5 kg lying on
a smooth horizontal surface as shown in the figure given below : [2]



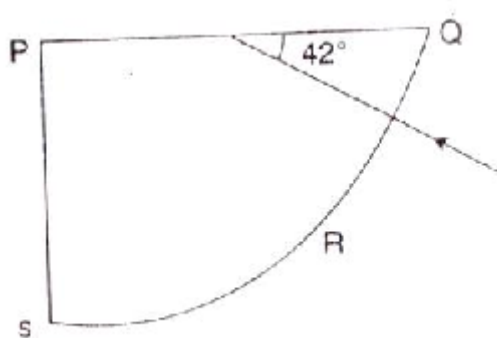
When the trolley is released, it is found to move at a speed of 2 ms^{-1} .

What potential energy did the spring possess when compressed? [2]

- (e) i. A uniform metal wire of 1000 ohm is divided into 4 equal parts.
Find the equivalent resistance both in series and parallel when all 4 are connected.
ii. Define centre of gravity and centripetal force [2]

Question 2.

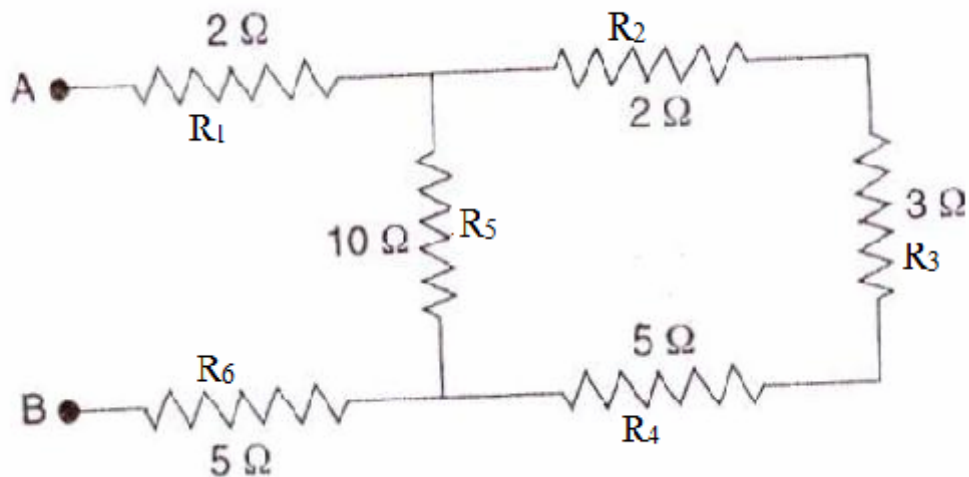
- (a) (i) Why is the mechanical advantage of a lever of the second order always greater than one?
(ii) Name the type of single pulley that has a mechanical advantage greater than one? [2]
- (b) (i) What is meant by refraction of light?
(ii) What is the cause of refraction of light? [2]
- (c) i. To use machine as force multiplier which lever to be used. Draw the diagram.
ii. Which contains more heat. 1g of water at 0 C 1g of ice at 0 C. [2]
- (d) i. Handle of grinding stone is always placed at the rim. Why?
ii. An electric toaster 740W, 230V is used for 12 hours in a day. Calculate the bill for using toaster in day if charge is Rs 5 per unit. [2]
- (e) i. A ray of light enters a glass slab PQRS, as shown in the diagram. The critical angle of the glass is 42° . Copy this diagram and complete the path of the ray till it emerges from the glass slab.
Mark the angles in the diagram wherever necessary. [2]



- ii. State two conditions for a body acted upon by several forces in equilibrium.

Question 3.

- i. State the condition for total internal reflection.
- (a) ii. State two differences between light waves and sound waves. [2]
- (b) Two waves of the same pitch have their amplitudes in the ratio 2:3.
 (i) What will be the ratio of their loudness?
 (ii) What will be the ratio of their frequencies? [2]
- (c) Give two differences between a d.c. motor and an a.c. generator. [2]
- (d) Six resistances are connected together as shown in the figure. Calculate the equivalent resistance between the points A and B. [2]



- (e) (i) Which part of an electrical appliance is earthed ?
 (ii) State a relation between electrical power, resistance and potential difference in an electrical circuit. [2]

Question 4.

- (a) A device is used to transform 12V a.c. to 200 V a.c.
 (i) What is the name of this device ?
 (ii) Name the principle on which it works. [2]
- (b) (i) Which material is the calorimeter commonly made of ?
 (ii) Give one reason for using this material. [2]
- (c) (i). Calculate the heat capacity of the metal block of 500 g if 2000 J is required to raise its temperature from 323K to 423K. [2]
 (ii). Radio active substance is oxidized what changes are occurred in its radioactivity. Explain your answer.

- (d) Complete the following nuclear changes:
- (i) ${}_{11}^{24}\text{Na} \rightarrow \dots \text{Mg} + {}_{-1}^0\beta$
- (ii) ${}_{92}^{238}\text{U} \rightarrow {}_{90}^{234}\text{Th} + \dots + \text{Energy}$ [2]
- (e) (i) Which radiation produces maximum biological damage ?
- (ii) What happens to the atomic number of an element when the radiation named by you in part (i) above, are emitted? [2]

Section-II (40 Marks)
(Attempt any **four** questions from this Section)

Question 5.

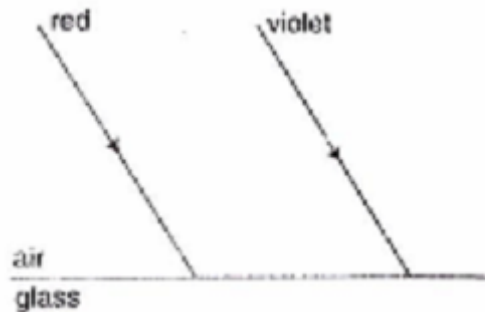
- (a) (i) Guitarist tightens the string before playing. Which parameter is he changing. What property will be shown in the sound by doing this.
- (ii) Give the energy transformation in each a. Bore left from arrow. B . Microphone
- (iii) 9. State the factors affecting the loudness and pitch of sound. [3]
- (b) (i) Draw the labeled diagram to show incident ray at 90 to one of the surface of the equilateral prism. If the critical angle is 42. [3]
- (ii) How much mass of ice is required to put in 300 g of water at 40 C to bring the resultant temperature to 0 C . Latent heat of ice is 336 J/g specific heat capacity of water 4.2 J/g/C.
- (c) (i) Write a relation expressing mechanical advantage of a lever?
- (ii) Write an expression for the mechanical advantage of an inclined plane.
- (iii) Give two reasons as to why the efficiency of a single movable pulley system is always less than 100%. [4]

Question 6.

- (a) A stick partly immersed in water appears to be bent. Draw a ray diagram to show the bending of the stick when placed in water and viewed obliquely from above. [3]
- (b) A ray of monochromatic light is incident from air on a glass slab:
- (i) Draw a labelled ray diagram showing the change in the path of the ray till it emerges from the glass slab.
- (ii) Name the two rays that are parallel to each other.
- (iii) Mark the lateral displacement in your diagram. [3]
- (c) An erect, magnified and virtual image is formed, when an object is placed between the optical centre and principal focus of a lens.
- (i) Name the lens.
- (ii) Draw a ray diagram to show the formation of the image with the above stated characteristics. [4]

Question 7.

- (a) Two parallel rays of Red and Violet travelling through air, meet the air-glass boundary as shown in the above figure:
- (i) Will their paths inside the glass be parallel?
Give a reason for your answer.
 - (ii) Compare the speeds of the two rays inside the glass. [3]

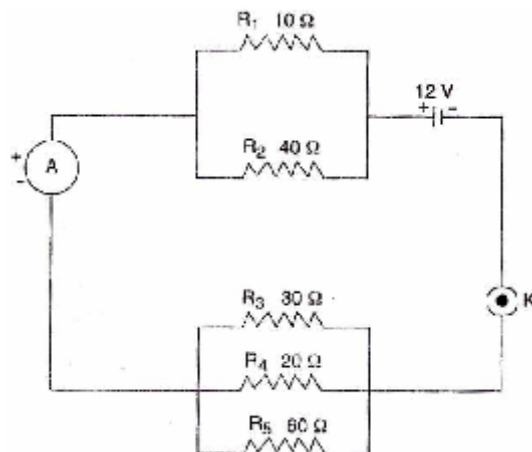


- (b)
 - (i) A man stands at a distance of 68 m from a cliff and fires a gun. After what time interval will he hear the echo, if the speed of sound in air is 340 ms^{-1} ?
 - (ii) If the man had been standing at a distance of 12 m from the cliff would he have heard a clear echo? [3]
- (c)
 - (i) In what unit does the domestic electric meter measure the electrical energy consumed ? State the value of this unit in S.I. Unit.
 - (ii) Why should switches always be connected to the live wire?
 - (iii) Give one precaution that should be taken while handling switches. [4]

Question 8.

- (a) Calculate the quantity of heat that will be produced in a coil of resistance 75Ω if a current of 2A is passed through it for 2 minutes. [3]
- (b)
 - (i) A substance has nearly zero resistance at a temperature of 1K. What is such a substance called?
 - (ii) State any two factors which affect the resistance of a metallic wire. [3]

- (c) Five resistors of different resistances are connected together as shown in the figure. A 12 V battery is connected to the arrangement. Calculate:
- the total resistance in the circuit.
 - the total current flowing in the circuit.
- [4]



Question 9.

- Define the term 'specific latent heat of fusion' of a substance.
 - Name the liquid which has the highest specific heat capacity.
 - Name two factors on which the heat absorbed or given out by a body depends.

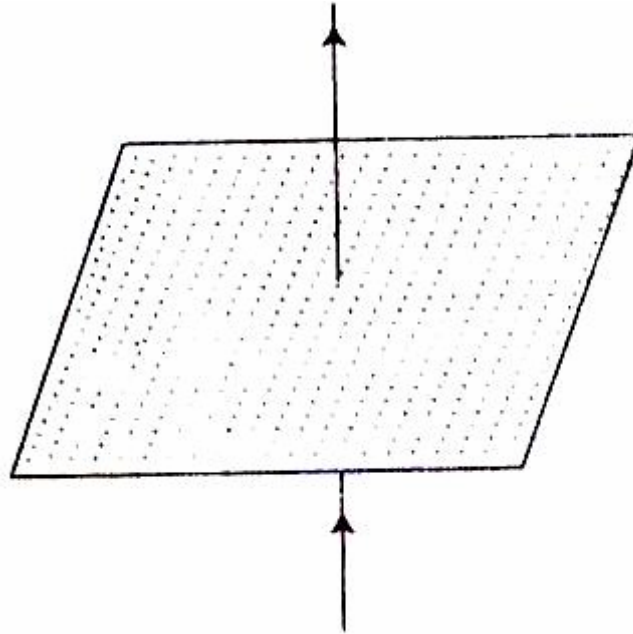
[3]
- An equal quantity of heat is supplied to two substances A and B. The substance A shows a greater rise in temperature. What can you say about the heat capacity of A as compared to that of B?
 - What energy change would you expect to take place in the molecules of a substance when it undergoes:
 - a change in its temperature ?
 - a change in its state without any change in its temperature? [3]
- 50 g of ice at 0°C is added to 300 g of a liquid at 30°C. What will be the final temperature of the mixture when all the ice has melted ? The specific heat capacity of the liquid is 2.65 J g⁻¹ °C⁻¹ while that of water is 4.2 J g⁻¹ °C⁻¹. Specific latent heat of fusion of ice = 336 J g⁻¹. [4]

Question 10.

- Name the radioactive radiations which have the least penetrating power.
 - Define Radio isotope. Give one use and disadvantage of using radio isotopes.
 - What is meant by background radiation ?

[3]

- (b) (i) A straight wire conductor passes vertically through a piece of cardboard sprinkled with iron filings. Copy the diagram and show the setting of iron filings when a current is passed through the wire in the upward direction and the cardboard is tapped gently. Draw arrows to represent the direction of the magnetic field lines. [3]



- (ii) Name the law which helped you to find the direction of the magnetic field lines.
- (c) (i) State two ways by which the magnetic field of a solenoid can be made stronger.
- (ii) What material is used for making the armature of an electric bell? Give a reason for using this material.
- (iii) Power of lens is $+2D$. What is the focal length of the lens?. Tell its concave or convex?
- (iv) Relate angle of deviation with angle of emergence for minimum deviation through a prism.

[4]