ICSE Class 10 Physics Previous Year Question Paper 2010

PHYSICS
Science Paper - 1

Maximum Marks: 80 **Time: One hour and a half**

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** questions from this Section)

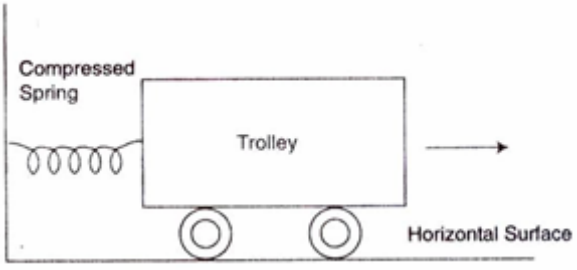
Question 1.

(a) Name the device used for measuring:
(i) mass
(ii) weight. [2]

(b) A boy weighs 360 N on the earth : [2]
(i) What would be his approximate weight on the moon?
(ii) What is the reason for your answer?

(c) A body is acted upon by a force. State two conditions under which the work done could be zero. [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 :



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) Name the subjective property :
(i) of sound related to its frequency.
(ii) of light related to its wavelength. [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]

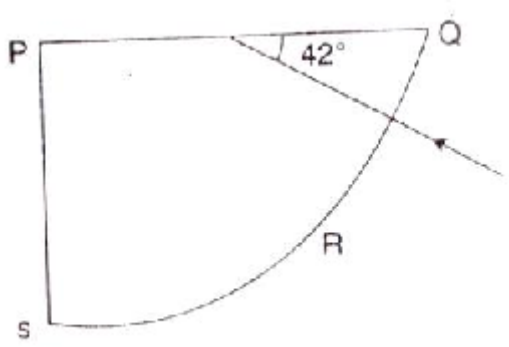
(b) (i) What is meant by refraction of light?
(ii) What is the cause of refraction of light? [2]

(c) 'The refractive index of diamond is 2.42'.
What is meant by this statement? [2]

(d) We can burn a piece of paper by focusing the sun rays by using a particular type of lens.
(i) Name the type of lens used for the above purpose.
(ii) Draw a ray diagram to support your answer. [2]

(e) 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]



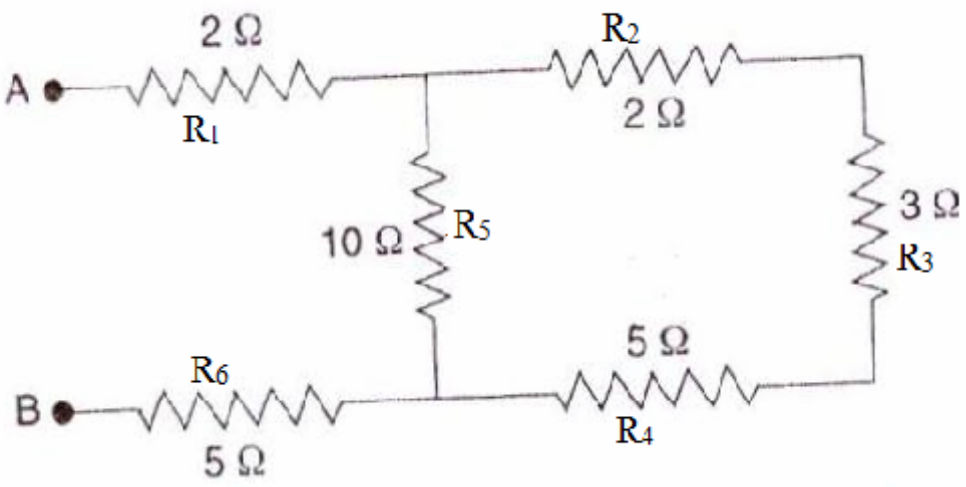
Question 3.

(a) 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) Name a metal that is used as an electron emitter.
(ii) Give one reason for using this metal. [2]

(d) Complete the following nuclear changes:

(i) $^{24}_{11}Na \rightarrow {}_{.....}Mg^{.....} + {}^{0}_{-1}\beta$

(ii) $^{238}_{92}U \rightarrow {}^{234}_{90}Th + ... + Energy$ [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) Define the term momentum.

(ii) How is force related to the momentum of a body?

(iii) State the condition when the change in momentum of a body depends only on the change in its velocity. [3]

(b) A body of mass 50 kg has a momentum of 3000 kg ms^{-1}. Calculate:

(i) the kinetic energy of the body.

(ii) the velocity of the body. [3]

(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 tour 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.

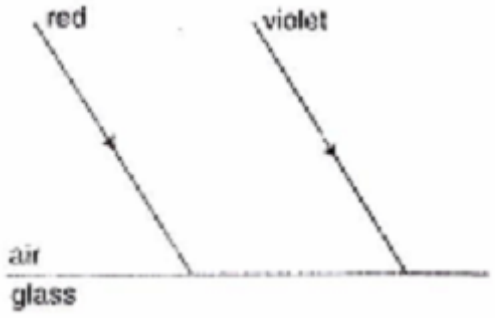
(ii) Draw a ray diagram to show the formation of the image with the above stated characteristics. [4]

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.

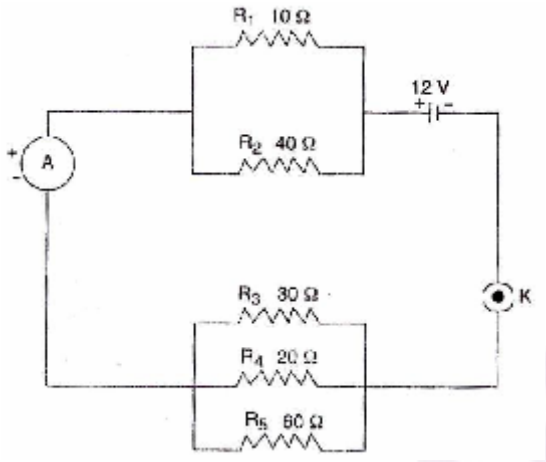
(a) Calculate the quantity of heat that will be produced in a coil of resistance 75Ω if a current of 2A is passed through it for 2 minutes. [3]

(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:

(i) the total resistance in the circuit.
(ii) the total current flowing in the circuit. [4]



Question 9.

(a) (i) Define the term 'specific latent heat of fusion' of a substance.
(ii) Name the liquid which has the highest specific heat capacity.
(iii) Name two factors on which the heat absorbed or given out by a body depends. [3]

(b) (i) 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?

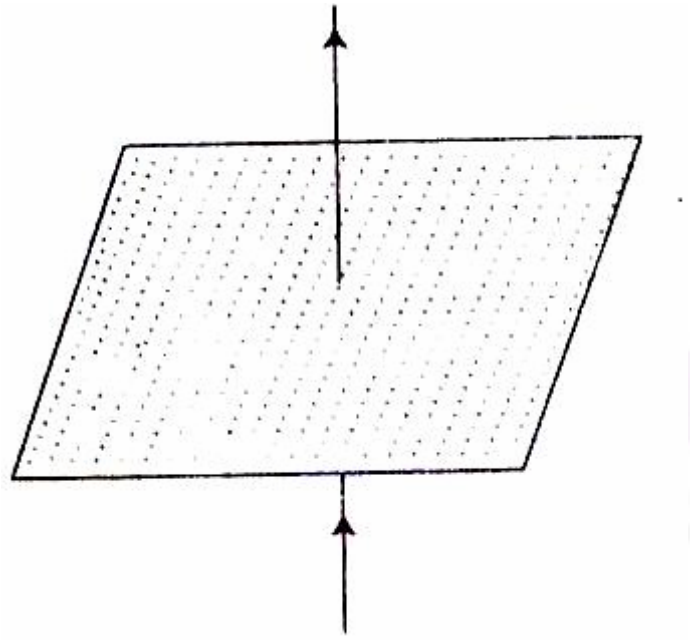
(ii) What energy change would you expect to take place in the molecules of a substance when it undergoes:
1. a change in its temperature ?
2. a change in its state without any change in its temperature? [3]

(c) 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.

(a) (i) Name the radioactive radiations which which have the least penetrating power.
(ii) Give one use of radio isotopes.
(iii) 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. [4]