



# PHYSICS

## BOOKS - SELINA PHYSICS (ENGLISH)

### SAMPLE PAPER 2

#### Section I

1. Define one newton.



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2. Write the relation between S.I. unit and C.G.S. unit of force.



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3. Where does the position of centre of gravity lie for

(1) A circular lamina

(2) A triangular lamina



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4. Where does the position of centre of gravity lie for

(1) A circular lamina

(2) A triangular lamina



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5. A man opens a nut by applying a force of 150 N by using a lever handle of length  $0.4\text{m}$ . What should be the length of the handle if he wants to open it by applying a force of 60 N?



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6. Name a machine which is used to :

(a) multiply force,

(ii) multiply speed, and

(c) change the direction of force applied.

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7. Name a machine which can be used to :  
change the direction of force applied.

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8. The diagram below shows a lever in use.

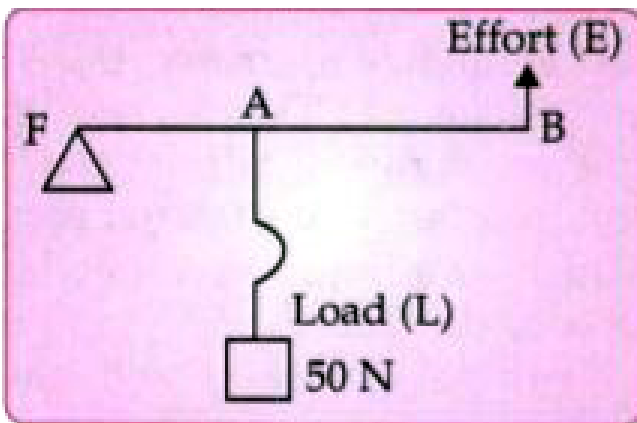


(a) To which class of lever does it belong ? Give one example of this class.

(b) How will the mechanical advantage of lever change if load is shifted towards the fulcrum without changing it's dimensions.

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9. The diagram below shows a lever in use.



If  $FA = 40$  cm,  $AB = 60$  cm, then find the mechanical advantage of the lever.



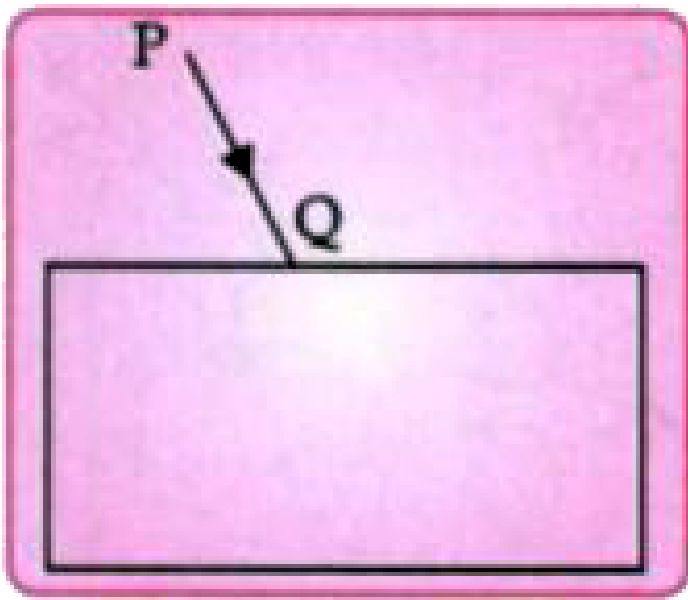
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**10.** A ball of mass 200 g falls from a height of 5 m. What will be its kinetic energy when it just reaches the ground ? ( $g = 9.8ms^{-2}$ )



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**11.** In the diagram below, PQ is a ray of light incident on a rectangular glass block.

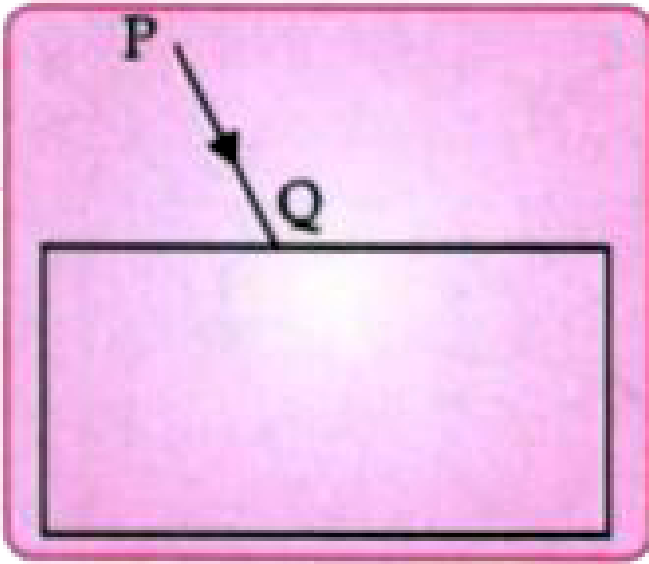


Copy the diagram and complete the path of the ray of light through the glass block. In your diagram, mark the angle of incidence by letter 'i' and the angle of emergence by the letter 'e'.



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12. In the diagram below, PQ is a ray of light incident on a rectangular glass block.



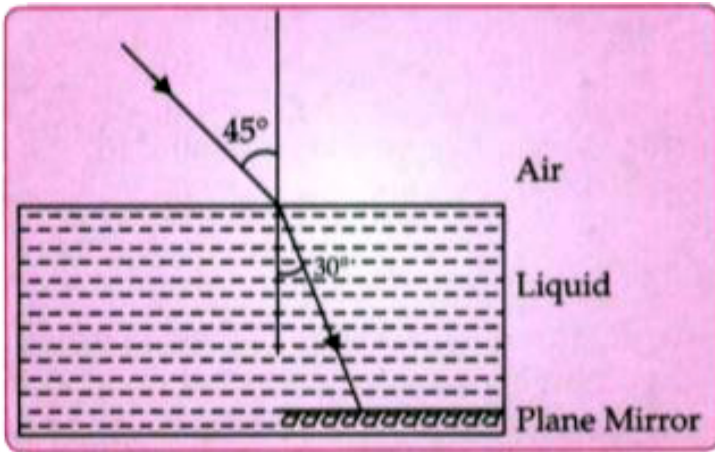
How are the angles  $i$  and  $e$  related to each other?



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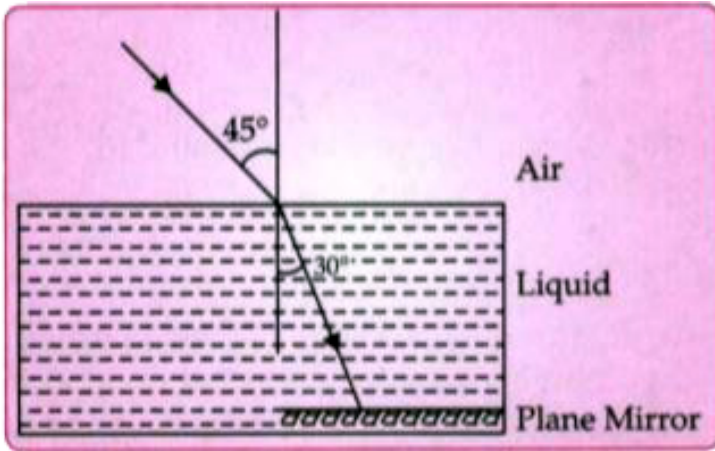
13. A ray of monochromatic light enters a liquid from air as shown in the diagram given below:



Copy the diagram and show in the diagram the path of the ray of light after it strikes the mirror and reenters the medium of air.

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14. A ray of monochromatic light enters a liquid from air as shown in the diagram given below:



Copy the diagram and show in the diagram the path of the ray of light after it strikes the mirror and reenters the medium of air.

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**15.** When does a ray of light falling on a lens pass through it undeviated ?



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**16.** Which lens can produce a real and inverted image of an object ?



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**17.** How is the refractive index of a medium related to the real and apparent depths of an object in that medium ?



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**18.** Which characteristic property of light is responsible for the blue colour of the sky ?



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**19.** When acoustic resonance takes place, a loud sound is heard. Why does this happen ? Explain.



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**20.** Three musical instruments give out notes at the frequencies listed below. Flute : 400 Hz, Guitar : 200 Hz, Trumpet : 500 Hz. Which one of these has the highest pitch ?



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**21.** With which of the following frequencies does a tuning fork of 256 Hz resonate : 288 Hz, 314 Hz, 333 Hz, 512 Hz ?



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**22.** Two bulbs are marked 100 W, 220 V and 60 W, 110 V. Calculate the ratio of their resistances.

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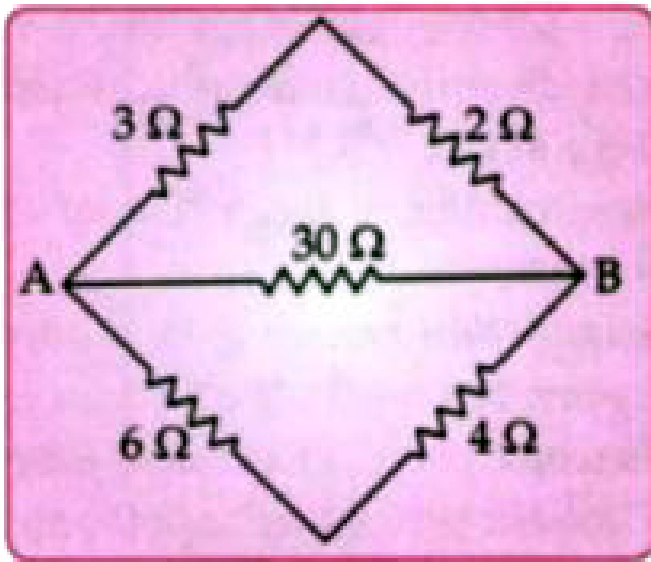
**23.** What is the colour code for the insulation on the earth wire ?

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**24.** Write an expression for calculating electrical power in terms of current and resistance.

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25. Calculate the equivalent resistance between A and B from the following diagram :



A. 5

B. 3

C. 8

D. 4

**Answer: 3**

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**26.** Write the difference between heat and temperature .

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**27.** Define Calorimetry.

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**28.** What is meant by Energy degradation ?



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**29.** 200 g of hot water at  $80^{\circ}C$  is added to 300 g of cold water at  $10^{\circ}C$ . Calculate the final temperature of the mixture of water. Consider the heat taken by the container to be negligible. [specific heat capacity of water is  $4200 Jkg^{-1}^{\circ}C^{-1}$ ]



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**30.** Fill in the blanks in the following sentences with appropriate words:

During the emission of a beta particle, the \_\_\_\_\_ number remains the same.



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**31.** Fill in the blanks in the following sentences with appropriate words:

The minimum amount of energy required to emit an electron from a metal surface is called \_\_\_\_\_ .



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**32.** A mixture of radioactive substances gives off three types of radiations :

Name the radiation which travels with the speed of light



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**33.** A mixture of radioactive substances gives off three types of radiations :

Name the radiation which has the highest ionizing power.



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**34.** Define 1 kgf.



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**35.** How is it related to the S.I. unit of force ?



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**36.** What are non-contact forces ?



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**37.** How does the distance of separation between two bodies affect the magnitude of the non-contact force between them ?



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**38.** A boy of mass 30 kg is sitting at a distance of 2 m from the middle of a see-saw. Where should a boy of mass 40 kg sit so as to balance the see-saw ?



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**39.** What is meant by the term 'moment of force' ?



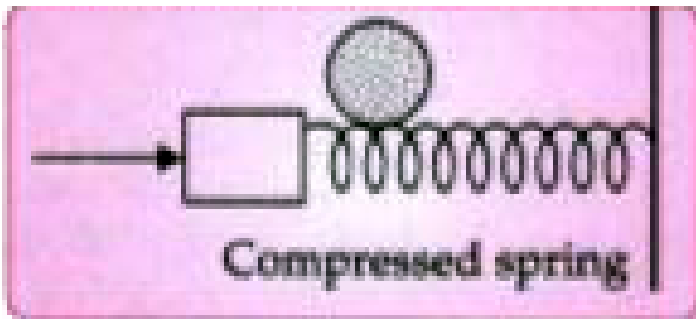
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40. If the moment of force is assigned a negative sign then will the turning tendency of the force be clockwise or anti-clockwise ?



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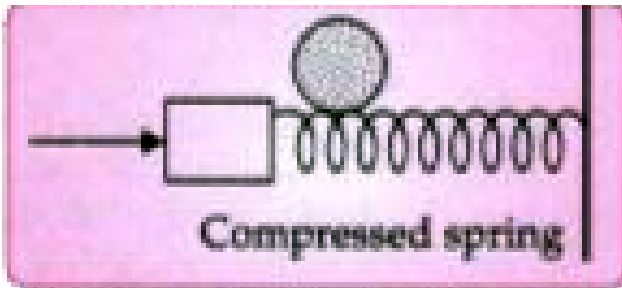
41. A ball is placed on a compressed spring. When the spring is released, the ball is observed to fly away.



What form of energy does the compressed spring possess ?

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42. A ball is placed on a compressed spring. When the spring is released, the ball is observed to fly away.



Why does the ball fly away?

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**43.** State the energy conversion taking place in a solar cell.



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**44.** What is a solar cell? State two uses of solar cells. State whether solar cell produces a.c. or d.c. Give one disadvantage of using a solar cell.



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**45.** A body of mass 0.2 kg falls from a height of 10 m to a height of 6 m above the ground. Find the loss in



potential energy taking place in the body.

$$[g = 10ms^{-2}]$$



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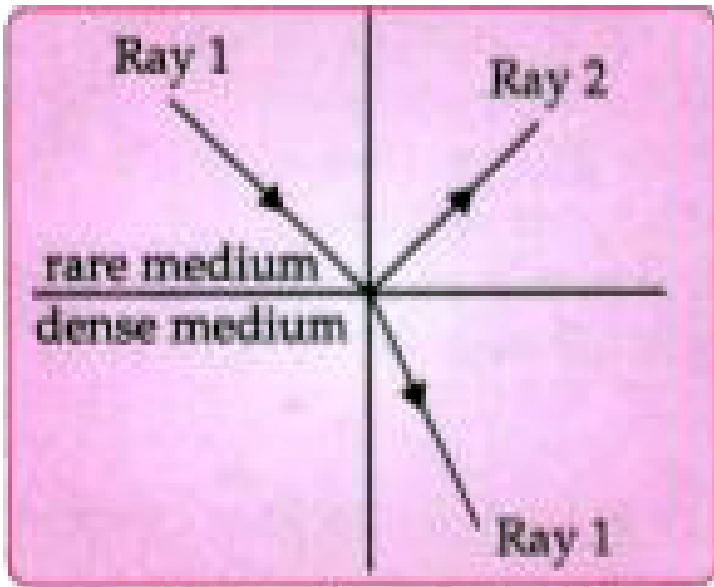
**46.** Define the term refractive index of a medium in terms of velocity of light.



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**47.** A ray of light moves from a rare medium to a dense medium as shown in the diagram below. Write down the number of the ray which represents the

partially reflected ray.



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48. You are provided with a printed piece of paper. Using this paper how will you differentiate between a convex lens and a concave lens ?

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**49.** A ray of light incident at an angle of incidence ' $i$ ' passes through an equilateral glass prism such that the refracted ray inside the prism is parallel to its base and emerges from the prism at an angle of emergence ' $e$ '.

How is the angle of emergence ' $e$ ' related to the angle of incidence ' $i$ ' ?



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**50.** A ray of light incident at an angle of incidence ' $i$ ' passes through an equilateral glass prism such that

the refracted ray inside the prism is parallel to its base and emerges from the prism at an angle of emergence 'e'.

What can you say about the value of the angle of deviation in such a situation ?



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51. What do you mean by dispersion of light?



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52. In the atmosphere which colour of light gets scattered the least ?



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**53.** Which characteristics of sound will change if there is a change in its amplitude



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**54.** Which characteristics of sound will change if there is a change in its waveform.



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**55.** Name one factor which affects the frequency of sound emitted due to vibrations in an air column.



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**56.** Name the unit used for measuring the sound level.



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**57.** An electrical appliance is rated at 1000 KVA, 220 V. If the appliance is operated for 2 hours, calculate the

energy consumed by the appliance in :

kWh



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**58.** An electrical appliance is rated at 1000 KVA, 220 V.

If the appliance is operated for 2 hours, calculate the energy consumed by the appliance in :

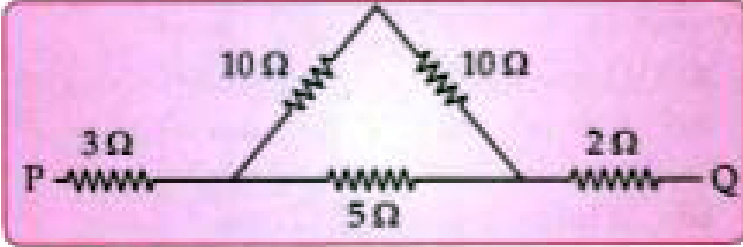
joule



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**59.** Calculate the equivalent resistance between P and

Q from the following diagram:



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60. What is an a.c. generator or Dynamo used for ?

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61. Name the principle on which it works.

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**62.** Differentiate between heat capacity and specific heat capacity.

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**63.** A hot solid of mass 60 g at  $100^{\circ}C$  is placed in 150 g of water at  $20^{\circ}C$ . The final steady temperature recorded is  $25^{\circ}C$ . Calculate the specific heat capacity of the solid. [Specific heat capacity of water =  $4200 \text{ kg}^{-1} \text{ }^{\circ}C^{-1}$ ]

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**64.** What is the value of the speed of gamma radiations in air or vacuum ?



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**65.** Name a material which exhibits fluorescence when cathode rays fall on it.



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**66.** Give any two important sources of background radiation.



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67. Give any two effects of a force on a non-rigid body.

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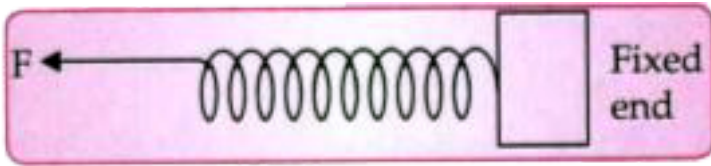
68. One end of a spring is kept fixed while the other end is stretched by a force as shown in the diagram.



Copy the diagram and mark on it the direction of the restoring force.

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69. One end of a spring is kept fixed while the other end is stretched by a force as shown in the diagram.



Name one instrument which works on the above principle.

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70. Where is the centre of gravity of a uniform ring situated ?

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71. The position of the centre of gravity of a body remains unchanged even when the body is deformed'.

State whether the statement is true or false.



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72. A force is applied on a body of mass 20 kg moving with a velocity of  $40\text{ms}^{-1}$ . The body attains a velocity of  $50\text{ms}^{-1}$  in 2 second. Calculate the work done by the body.



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**73.** Name the pulley which has no gain in mechanical advantage. Explain, why is such a pulley then used ?



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**74.** A type of single pulley is very often used as a machine even though it does not give any gain in mechanical advantage.

For what purpose is such a pulley used ?



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**75.** What do you understand by an ideal machine ?

How does it differ from a practical machine ?



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**76.** When does a machine act as (a) a force multiplier,

(b) a speed multiplier. Can a machine act as a force multiplier and a speed multiplier simultaneously ?



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**77.** A girl of mass 35 kg climbs up from the first floor of a building at a height 4 m above the ground to the

third floor at a height 12 m above the ground. What will be the increase in her gravitational potential energy? [ $g = 10ms^{-2}$ ]

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**78.** Which class of lever found in the human body is being used by a boy:  
when he holds a load on the palm of his hand.

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**79.** What type of lever is formed by a human body while (a) raising a load on the palm, and (b) raising

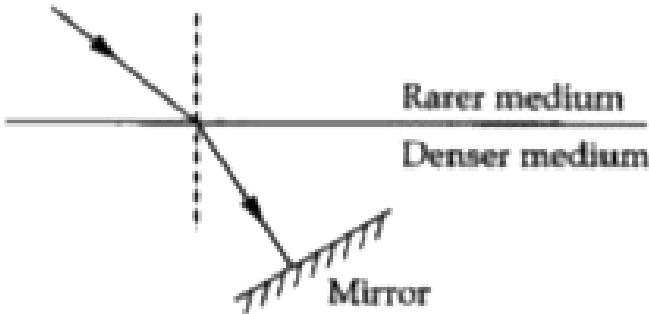


the weight of body on toes ?



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80. A ray of light is moving from a rarer medium to a denser medium and strikes a plane mirror placed at  $90^\circ$  to the direction of the ray as shown in the diagram.

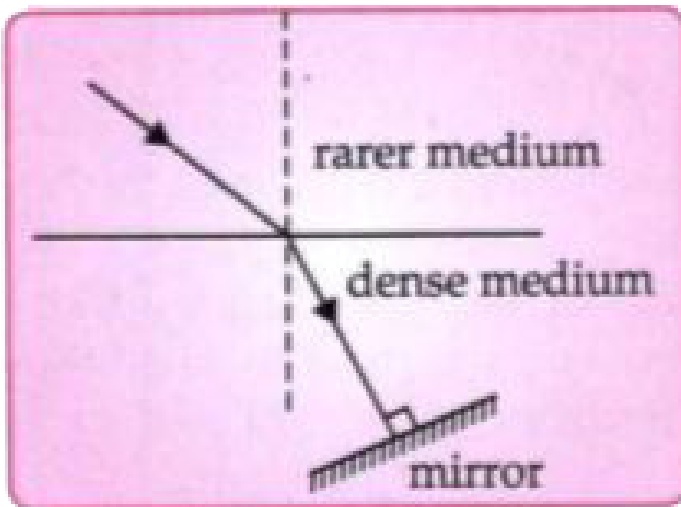


Copy the diagram and mark arrows to show the path of the ray of light after it is reflected from the mirror.



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**81.** A ray of light is moving from a rarer medium to a denser medium and strikes a plane mirror placed at  $90^\circ$  to the direction of the ray as shown in the diagram.



Name the principle you have used to mark the arrows to show the direction of the ray.

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**82.** The refractive index of glass with respect to air is 1.5. What is the value of the refractive index of air with respect to glass?

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**83.** 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 ?

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**84.** A bucket kept under a running tap is getting filled with water. A person sitting at a distance is able to get an idea when the bucket is about to be filled.

What change takes place in the sound to give this idea ?

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**85.** A bucket kept under a running tap is getting filled with water. A person sitting at a distance is able to get an idea when the bucket is about to be filled.

What causes the change in the sound ?

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**86.** A sound made on the surface of a lake takes 3 s to reach a boatman.

How much time will it take to reach a diver inside the water at the same depth ?

Velocity of sound in air =  $330\text{ms}^{-1}$

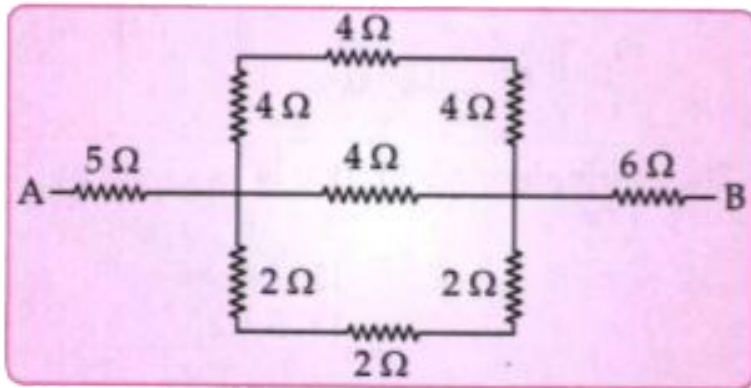
Velocity of sound in water =  $1450\text{ms}^{-1}$



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**87.** Calculate the equivalent resistance between the points A and B for the following combination of

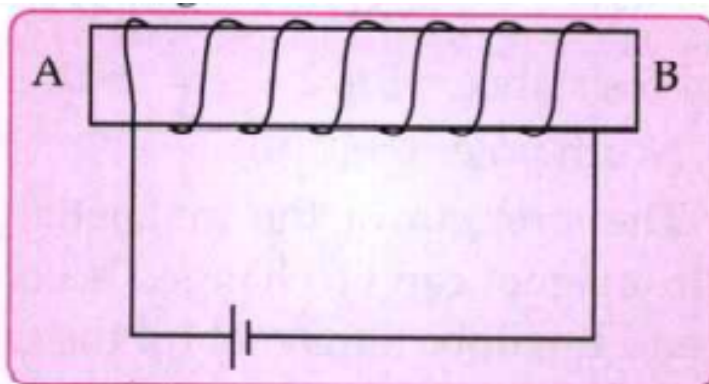
resistors :



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88. You have been provided with a solenoid AB.

What is the polarity at end A ?

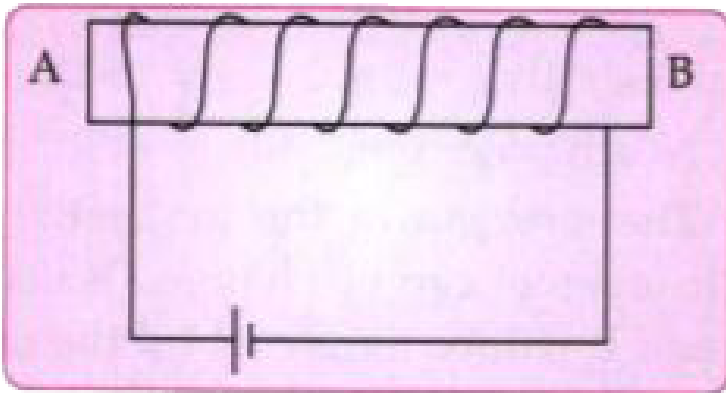




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89. You have been provided with a solenoid AB.

Give one advantage of an electromagnet over a permanent magnet.



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**90.** Name the device used to protect the electric circuits from overloading and short circuits.



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**91.** Name the device used to protect the electric circuits from overloading and short circuits. On what effect of electricity does the above device work ?



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**92.** Define heat capacity and state its SI unit.



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**93.** What do you mean by global warming?



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**94.** How much heat energy is released when 5 g of water at  $20^{\circ}C$  changes to ice at  $0^{\circ}C$ ?

[Specific heat capacity of water =  $4.2Jg^{-1}^{\circ}C^{-1}$

Specific latent heat of fusion of ice =  $336Jg^{-1}$ ]



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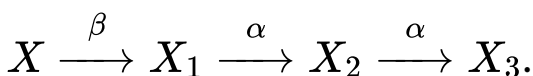
**95.** Which of the radioactive radiations :  
can cause severe genetical disorders.

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**96.** Which of the radioactive radiations :  
are deflected by an electric field ?

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**97.** A radioactive nucleus undergoes a series of decays  
according to the sequence



If the mass number and atomic number of  $X_3$  are 172 and 69 respectively. What is the mass number and atomic number of X ?

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**98.** A force is applied on (i) a non-rigid body and (ii) a rigid body. How does the effect of the force differ in the above two cases ?

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**99.** A ball is hanging by string from the ceiling of the roof. Draw a neat labelled diagram showing the

forces acting on the ball and the string.



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**100.** The weight of a body at the centre of the earth is



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**101.** What is the principle of an ideal machine ?



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**102.** Is it possible to have an accelerated motion with a constant speed? Name such type of motion.



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**103.** When does a force do work ?



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**104.** What is the work done by the moon when it revolves around the earth?



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**105.** Calculate the change in the Kinetic energy of a moving body if its velocity is reduced to  $1/3^{rd}$  of the initial velocity.



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**106.** State the energy changes in the following cases while in use:

(a) loudspeaker (b) a steam engine

(c) microphone (d) washing machine

(e) a glowing electric bulb (f) burning coal

(g) a solar cell (h) bio-gas burner

(i) an electric cell in a circuit (j) a petrol engine of a

running car (k) an electric iron (l) a ceiling fan

(m) an electromagnet



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**107.** State the energy changes in the following cases while in use:

(a) loudspeaker (b) a steam engine

(c) microphone (d) washing machine

(e) a glowing electric bulb (f) burning coal

(g) a solar cell (h) bio-gas burner

(i) an electric cell in a circuit (j) a petrol engine of a

running car (k) an electric iron (l) a ceiling fan

(m) an electromagnet



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**108.** What is nuclear energy ?



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**109.** What is nuclear energy? Name the process used for producing electricity using the nuclear energy



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**110.** State one important advantage and disadvantage each of using nuclear energy for producing electricity.





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**111.** The conversion of part of the energy into an undesirable form is called \_\_\_\_\_



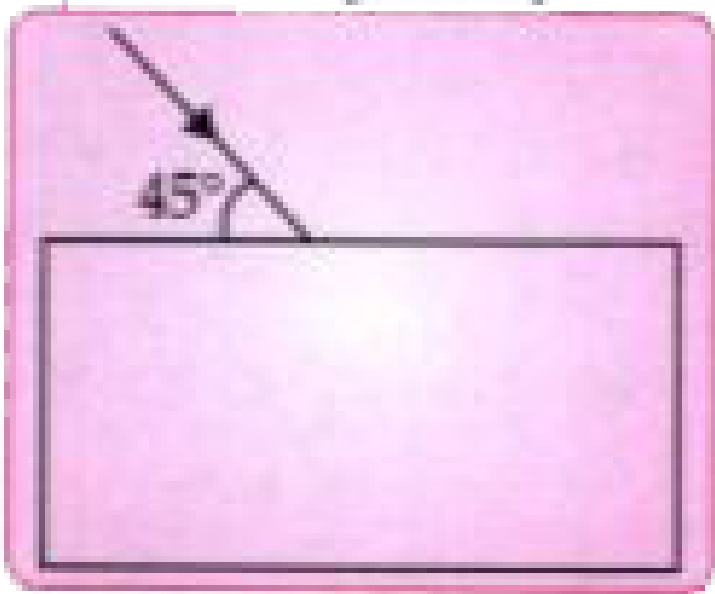
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**112.** For a given height  $h$ , \_\_\_\_\_ the length  $l$  of the inclined plane, lesser will be the effort required.



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**113.** Draw the diagram given below and clearly show the path taken by the emergent ray:



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**114.** What is consumed using different electrical appliances, for which electricity bills are paid ?



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**115.** Name a common device that uses electro magnets.



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**116.** A ray of light passes from water to air, How does the speed of light change ?



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**117.** Which colour of light travels fastest in any medium except air ?

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**118.** Name the factors affecting the critical angle for the pair of media.

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**119.** Name a prism required for obtaining a spectrum of ultraviolet light.

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**120.** Name the radiations which can be detected by a thermopile.



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**121.** Why is the colour red used as a sign of danger ?



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**122.** What are mechanical waves ?

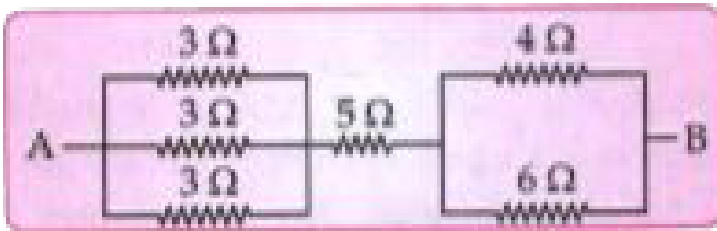


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123. Name one property of waves that do not change when the wave passes from one medium to another.

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124. Find the equivalent resistance between points A and B



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**125.** 50 g of metal piece at  $27^{\circ}C$  requires 2400 J of heat energy so as to attain a temperature of  $327^{\circ}C$ . Calculate the specific heat capacity of the metal.

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**126.** An electrons emitter must have \_\_\_\_\_ work function and \_\_\_\_\_ melting point.

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**127.** Rishi is surprised when he sees water boiling at  $115^{\circ}C$  in a container. Give reasons as to why water

can boil at the above temperature.



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**128.** Why does a current carrying, freely suspended solenoid rest along a particular direction ?



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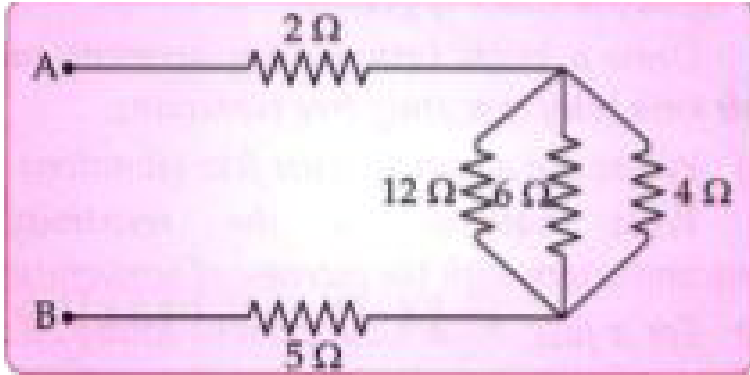
**129.** A freely suspended magnet rests in :



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**130.** Find the equivalent resistance between points A and B.



[▶ Watch Video Solution](#)

**131.** Give two similarities between an A.C. generator and a D.C. motor.

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**132.** Why is a cathode ray tube evacuated to a low pressure ?



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**133.** What happens if the negative potential is changed on a grid ?



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**134.** A ball is hanging by string from the ceiling of the roof. Draw a neat labelled diagram showing the forces acting on the ball and the string.



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**135.** The distance between two bodies is doubled. How is the magnitude of gravitational force between them affected ?



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**136.** A jack screw is provided with a long arm. Explain why?



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**137.** If the power of a motor be 100 kW, at what speed can it raise a load of 50,000 N ?

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**138.** Which class of lever will always have  $M. A. > 1$  and why ?

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**139.** Define heat capacity and state its SI unit.

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**140.** Why is the base of a cooking pan made thick and heavy ?

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**141.** A mass of 50 g of a certain metal at  $150^{\circ}\text{C}$  is immersed in 100 g of water at  $11^{\circ}\text{C}$ . The final temperature is  $20^{\circ}\text{C}$ . Calculate the specific heat capacity of the metal. Assume that the specific heat capacity of water is  $4.2 \text{ g}^{-1} \text{ K}^{-1}$

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**142.** How is the refractive index of a medium related to the real and apparent depths of an object in that medium ?



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**143.** Define the term refractive index of a medium in terms of velocity of light.



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**144.** State the conditions required for total internal reflection of light to take place.



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**145.** Draw a ray diagram to show the refraction of a monochromatic ray through a prism when it suffers minimum deviation. How is the angle of emergence related to the angle of incidence in the position.



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**146.** The human ear can detect continuous sounds in the frequency range from 20 Hz to 20000 Hz. Assuming that the speed of sound in air is  $330 \text{ m s}^{-1}$  for all frequencies, calculate the wavelengths

corresponding to the given extreme frequencies of the audible range.

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**147.** An enemy plane is at a distance of 300 km from a radar. In how much time the radar will be able to detect the plane ? Take velocity of radio waves as  $3 \times 10^8 \text{ m.s}^{-1}$ .

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**148.** How is the frequency of a stretched string related to:



Its length?



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**149.** How is the frequency of a stretched string related to:

Its tension?



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**150.** Define the term "specific resistance and state its S.I. unit.



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**151.** An electric bulb of resistance  $500\Omega$ , draws a current of 0.4 A. Calculate the power of the bulb and the potential difference at its end.



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**152.** Name any two types of energy losses in a transformer. State how any one of them can be minimized.



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**153.** State two characteristics of a good thermion emitter.

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**154.** State two factors upon which the rate of emission of thermions depends.

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**155.** When does the nucleus of an atom tend to be radioactive ?

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**156.** State and define the S.I. unit of power.



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**157.** How is the unit horse power related to the S.I. unit of power ?



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**158.** State the energy changes in the following cases while in use :

An electric iron



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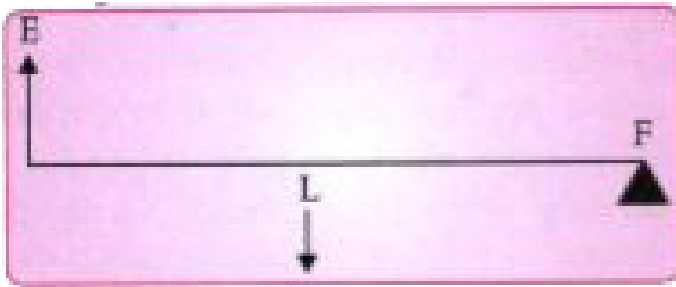
**159.** State the energy changes in the following cases while in use :

A ceiling fan



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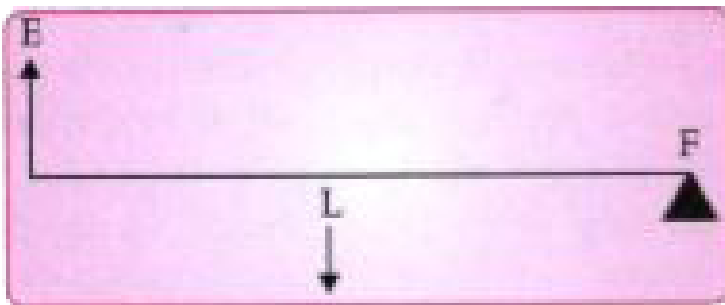
**160.** The diagram below shows a lever in use :



To which class of levers does it belong ?

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**161.** The diagram below shows a lever in use :



Without changing the dimensions of the lever, if the

load is shifted towards the fulcrum what happens to the mechanical advantage of the lever ?

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**162.** Why is the ratio of the velocities of light of wavelengths  $4000 \text{ \AA}$  and  $8000 \text{ \AA}$  in vacuum  $1 : 1$ ?

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**163.** (a) Write the approximate wavelength for (i) blue, and (ii) red light

(b) The wavelength of violet and red light are  $4000 \text{ \AA}$

and  $8000\text{\AA}$  respectively. Which of the two has higher frequency?



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**164.** Why is the motion of a body moving with a constant speed around a circular path said to be accelerated ?



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**165.** Name the unit of physical quantity obtained by the formula  $\frac{2K}{v^2}$ .

where  $K$  : kinetic energy,  $v$  : linear velocity.





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**166.** The power of a lens is  $-5\text{ D}$ .

Find its focal length.



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**167.** The power of a lens is  $-5\text{ D}$ .

Name the type of lens.



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**168.** State the position of the object in front of a converging lens if :

It produces a real and same size image of the object.



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**169.** State the position of the object in front of a converging lens if :

It is used as a magnifying lens.



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**170.** (i) What is the relation between critical angle and refractive index of a material ?

(ii) Does critical angle depend on the color of light ?

Explain.



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**171.** Which colour of light has a higher critical angle?

Red light or Green light.



**Watch Video Solution**

**172.** (i) Define scattering.

(ii) The smoke from a fire looks white.

Which of the following statements is true ?

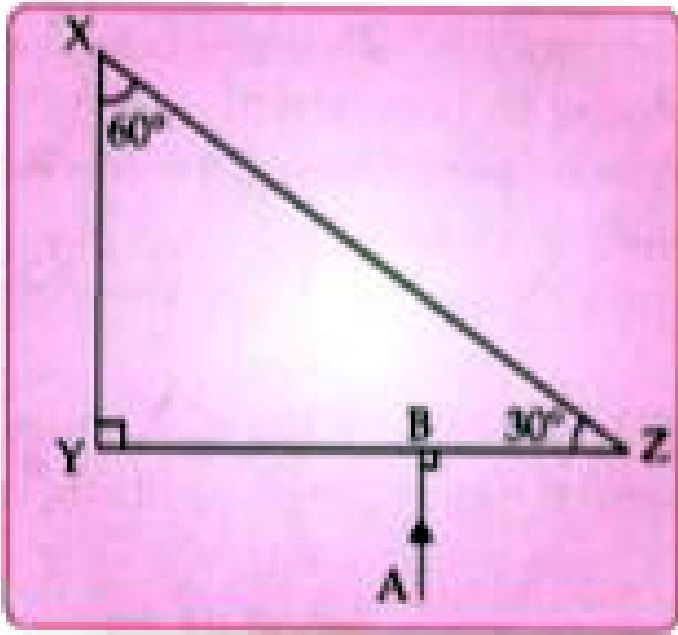
(1) Molecules of the smoke are bigger than the wavelength of light.

(2) Molecules of the smoke are smaller than the wavelength of light.

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**173.** The following diagram shows a  $60^\circ$ ,  $30^\circ$ ,  $90^\circ$  glass prism of critical angle  $42^\circ$ . Copy the diagram and complete the path of incident ray AB emerging

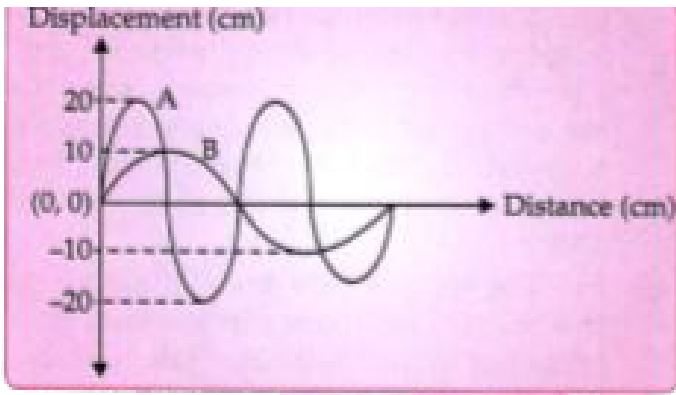
out of the prism marking the angle of incidence on each surface.



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**174.** Displacement distance graph of two sound waves A and B, travelling in a medium, are as shown in the

diagram below:

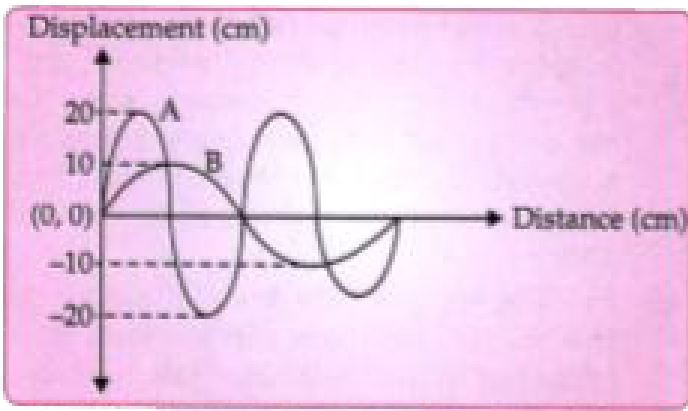


Study the two sound waves and compare their :

Amplitudes

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**175.** Displacement distance graph of two sound waves A and B, travelling in a medium, are as shown in the diagram below:



Study the two sound waves and compare their :

Wavelengths



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**176.** You have three resistors of values  $2\Omega$ ,  $3\Omega$  and  $5\Omega$ . How will you join them so that the total resistance is more than  $7\Omega$ ?

Draw a diagram for the arrangement.



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**177.** You have three resistors of values  $2\Omega$ ,  $3\Omega$  and  $5\Omega$ . How will you join them so that the total resistance is more than  $7\Omega$ ?

Calculate the equivalent resistance.



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**178.** What do you understand by the term nuclear fusion ?



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**179.** Nuclear power plants use the nuclear fission reaction to produce electricity. What is the advantage of producing electricity by fusion reaction ?



**Watch Video Solution**

**180.** What do you understand by free vibrations of a body?



**Watch Video Solution**

**181.** Why does the amplitude of a vibrating body continuously decrease during damped vibrations ?



**Watch Video Solution**

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**182.** How is the e.m.f. across primary and secondary coils of a transformer related with the number of turns of coil in them?

 [Watch Video Solution](#)

**183.** On which type of current do transformers work ?

 [Watch Video Solution](#)

**184.** How can a temperature in degree Celsius be converted into S.I. unit of temperature ?

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**185.** A liquid X has the maximum specific heat capacity and is used as a coolant in car radiators. Name the liquid X.

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**186.** A solid metal weighing 150 g melts at its melting point of  $800^{\circ}C$  by providing heat at the rate of 100

W. The time taken for it to completely melt at the same temperature is 4 min. What is the specific latent heat of fusion of the metal ?

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**187.** Identify the following wires used in a household circuit :

The wire is also called as the phase wire.

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**188.** Identify the following wires used in a household circuit :

The wire is connected to the top terminal of a three pin socket.



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**189.** Two atoms are said to be isobars if



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**190.** Give one example of isobars.



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**191.** State two advantages of an electromagnet over a permanent magnet.



**Watch Video Solution**

**192.** Define moment of force and its unit.



**Watch Video Solution**

**193.** Write the relationship between the SI and CGS unit of moment of force.



**Watch Video Solution**

**194.** Define kilowatt hour. How is it related to joule?



**Watch Video Solution**

**195.** A satellite revolves around a planet in a circular orbit. What is the work done by the satellite at any instant? Give a reason.



**Watch Video Solution**

**196.** Identify the class of the lever shown in the diagram below:



[▶ Watch Video Solution](#)

**197.** How is it possible to increase the M. A. of the above lever without increasing its length ?

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**198.** Give one example of each when :

Chemical energy changes into electrical energy.

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**199.** Give one example of each when :

Electrical energy changes into sound energy.



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**200.** A crane 'A' lifts a heavy load in 5 seconds, whereas another crane 'B' does the same work in 2 seconds. Compare the power of crane 'A' to that of crane 'B'.



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**201.** A ray of light falls normally on a rectangular glass slab.

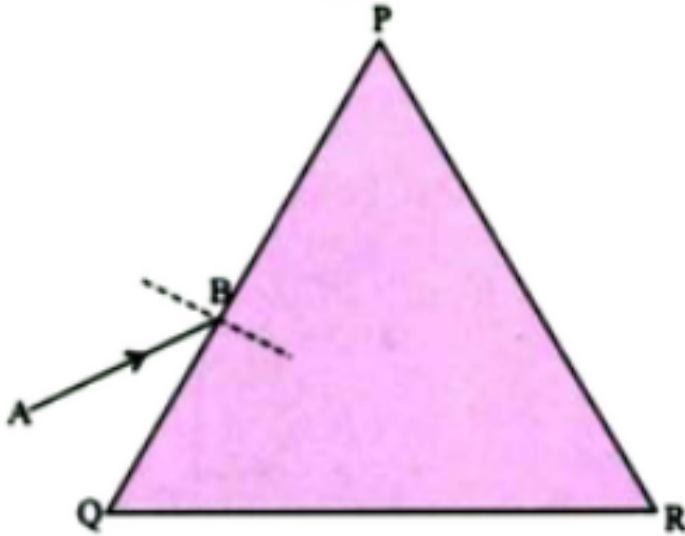
Draw a ray diagram showing the path of the ray till it emerges out of the slab.



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**202.** Complete the path of the monochromatic light ray AB incident on the surface PQ of the equilateral glass prism PQR till it emerges out of the prism due

to refraction.



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203. Where should an object be placed in front of a convex lens in order to get :  
an enlarged real image

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**204.** Where should an object be placed in front of a convex lens in order to get :  
enlarged virtual image ?

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**205.** A pond appears to be 2.7 m deep. If the refractive index of water is  $\frac{4}{3}$ , find the actual depth of the pond.

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**206.** The wave lengths for the light of red and blue colours are nearly  $7.8 \times 10^{-7}m$  and  $4.8 \times 10^{-7}m$  respectively.

Which colour has the greater speed in a vacuum ?

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**207.** The wave lengths for the light of red and blue colours are nearly  $7.8 \times 10^{-7}m$  and  $4.8 \times 10^{-7}m$  respectively.

Which colour has the greater speed in a vacuum ?

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**208.** Draw a graph between displacement from mean position and time for a body executing free vibration in a vacuum.



**Watch Video Solution**

**209.** A sound wave travelling in water has wavelength 0.4 m.

Is this wave audible in air ? (The speed of sound in water =  $1400\text{ms}^{-1}$ )



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**210.** Why does stone lying in the sun get heated up much more than water lying for the same duration of time ?



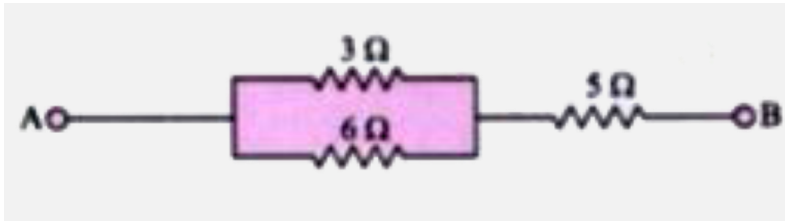
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**211.** Why is it not advisable to use a piece of copper wire as fuse wire in an electric circuit ?



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**212.** Calculate the total resistance across AB:



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**213.** Two metallic blocks P and Q having masses in ratio 2 : 1 are supplied with the same amount of heat. If their temperatures rise by same degree, compare their specific heat capacities.

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**214.** 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 :

(i) Zero

(ii) Maximum ?



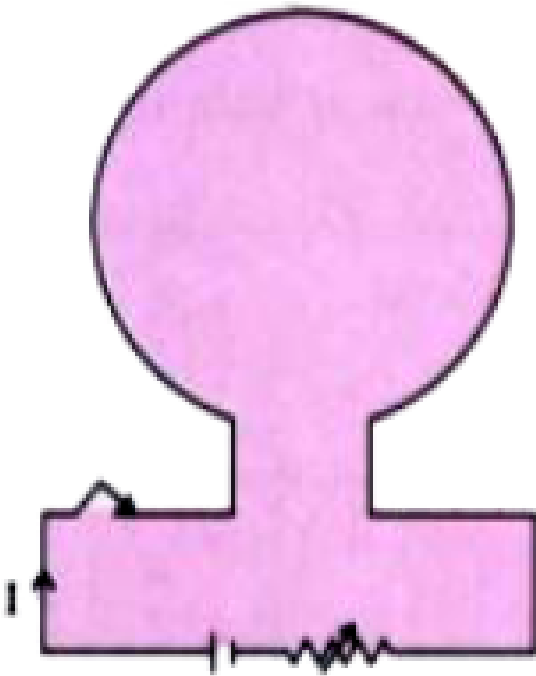
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**215.** A nucleus  ${}_{84}\text{X}^{202}$  of an element emits an alpha particle followed by a beta particle. The final nucleus is  ${}_a\text{Y}^b$ . Find a and b.



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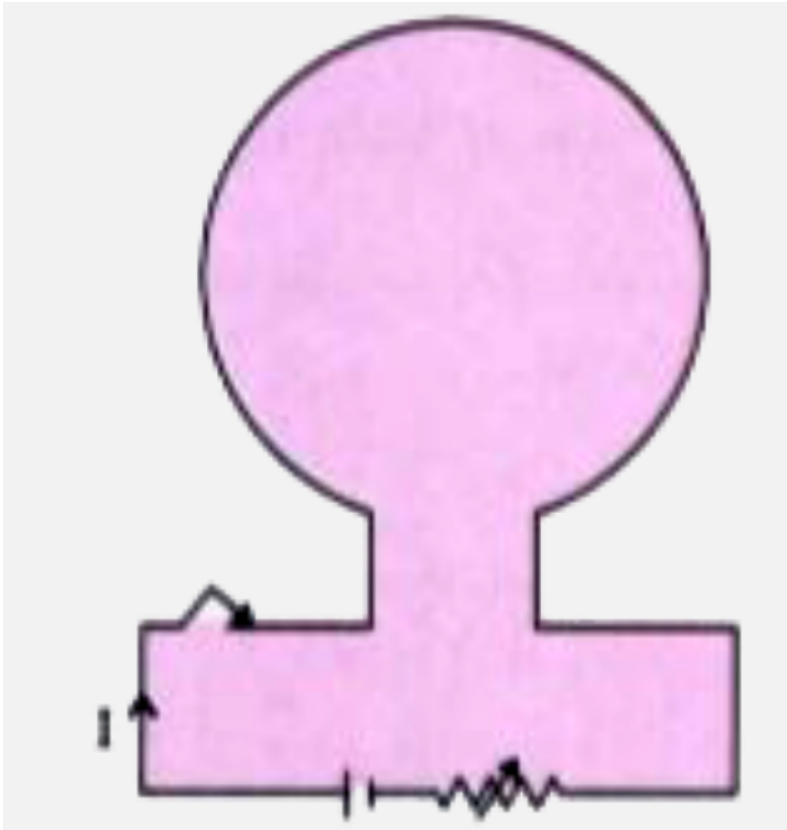
**216.** The diagram below shows a loop of wire carrying current  $I$ :



What is the magnetic polarity of the loop that faces us?

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217. The diagram below shows a loop of wire carrying current  $I$ :



With respect to the diagram how can we increase the strength of the magnetic field produced by this loop

?



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**218.** Write the SI unit of heat capacity.



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**219.** What is the relationship between heat capacity and specific heat capacity of a substance ?



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**220.** The diagram below shows the change of phases of a substance on a temperature vs time graph on

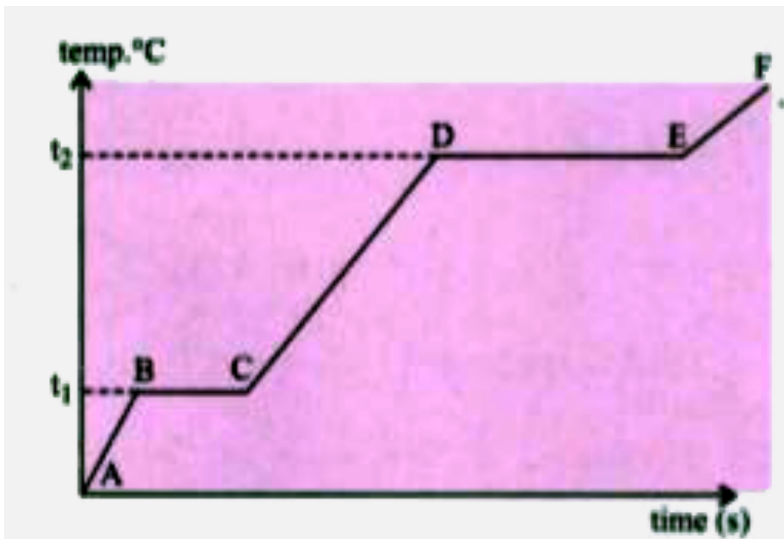
heating the substance at a constant rate.



Why is the slope of CD less than slope of AB ?

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**221.** The diagram below shows the change of phases of a substance on a temperature vs time graph on heating the substance at a constant rate.



What is the boiling and melting point of the substance ?

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**222.** A piece of ice of mass 60 g is dropped into 140 g of water at  $50^{\circ}C$ .

Calculate the final temperature of water when all the ice has melted.

(Assume no heat is lost to the surrounding)

Specific heat capacity of water =  $4.2Jg^{-1}k^{-1}$

Specific latent heat of fusion of ice =  $336Jg^{-1}$

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**223.** Draw neat labeled diagram of a d.c. motor.



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**224.** Write any one use of a d.c motor.



**Watch Video Solution**

**225.** Differentiate between nuclear fusion and nuclear fission.



**Watch Video Solution**

**226.** State one safety precaution in the disposal of nuclear waste.



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**227.** 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.

(i) What is the composition of B ?

(ii) The nucleus B emits a beta particle and is transformed into a nucleus C. What is the composition of C?

(iii) What is the mass number of the nucleus A ?



(iv) Does the composition of C change if it emits gamma radiations ?



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## Section II

1. What do you understand by an ideal machine ? How does it differ from a practical machine ?



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2. Write a relationship between the mechanical advantage (M. A.) and velocity ratio (V. R.) of an ideal machine.



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3. A coolie carrying a load on his head and moving on a frictionless horizontal platform does no work. Explain the reason why.



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4. Draw a diagram to show the energy changes in an oscillating simple pendulum. Indicate in your diagram how the total mechanical energy in it remains constant during the oscillation.

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5. A uniform metre scale can be balanced at the 70.0 cm mark when a mass of 0.05 kg is hung from the 94.0 cm mark.

Draw a diagram of the arrangement.

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6. A uniform metre scale can be balanced at the 70.0 cm mark when a mass of 0.05 kg is hung from the 94.0 cm mark.

Find the mass of the metre scale.



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7. State the laws of refraction of light. State at least three examples of refraction of light.



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8. Write a relation between the angle of incidence

(i), angle of emergence (e), angle of prism (A) and angle of deviation (d) for a ray of light passing through an equilateral prism.



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9. Suggest one way, in each case, by which we can detect the presence of:

(1) Infra-red radiations

(2) Ultraviolet radiations



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**10.** State any one use of infrared radiations.



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**11.** An object is placed in front of a lens between its optical centre and the focus and forms a virtual, erect and diminished image.

Name the lens which formed this image.



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**12.** An object is placed in front of a lens between its optical centre and the focus and forms a virtual, erect

and diminished image.

Draw a ray diagram to show the formation of the image with the above stated characteristics.

 [Watch Video Solution](#)

**13.** Name the type of waves which are used for sound ranging.

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**14.** Why are these waves mentioned in (i) above, not audible to us?

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 [Watch Video Solution](#)

**15.** Give one use of sound ranging.

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**16.** A man standing 25 m away from a wall produces a sound and receives the reflected sound.

Calculate the time after which he receives the reflected sound if the speed of sound in air is  $350\text{ms}^{-1}$ .

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**17.** A man standing 25 m away from a wall produces a sound and receives the reflected sound.

Will the man be able to hear a distinct echo ? Give a reason for your answer.



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**18.** Name two safety devices which are connected to the live wire of a household electric circuit.



**Watch Video Solution**

**19.** Give one important function of each of these two devices. i) Switch ii) Fuse



**Watch Video Solution**

**20.** Draw a graph of Potential difference ( $V$ ) versus Current ( $I$ ) for an ohmic resistor.



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**21.** How can you find the resistance of the resistor from this graph?



**Watch Video Solution**

22. What is a non-ohmic resistor ?



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23. An electric bulb is marked 100 W, 250 V. What information does this convey?



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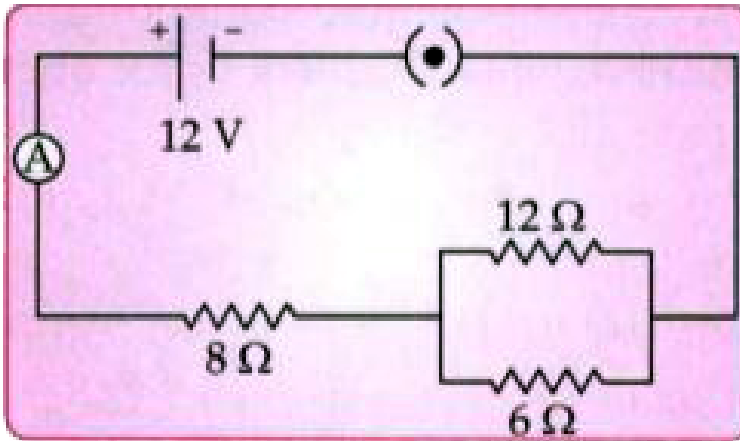
24. How much current will the bulb draw, if connected to a 250 V supply?



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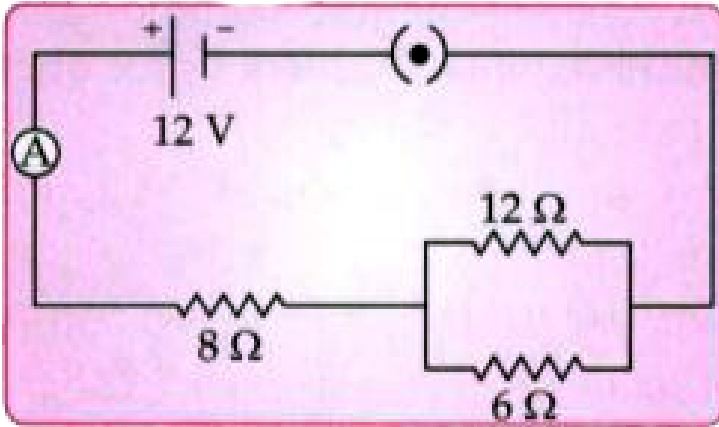
25. Three resistors are connected to a 12 V battery as shown in the figure given below :



What is the current through the 8 ohm resistor ?

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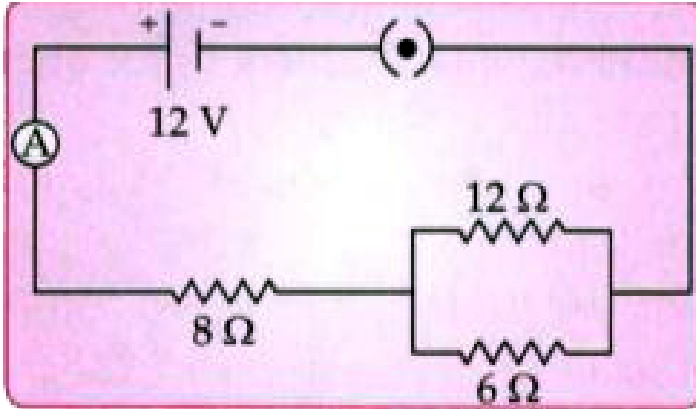
26. Three resistors are connected to a 12 V battery as shown in the figure given below :



What is the potential difference across the parallel combination of 6 ohm and 12 ohm resistor ?

 [Watch Video Solution](#)

27. Three resistors are connected to a 12 V battery as shown in the figure given below :



What is the current through the 6 ohm resistor ?

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28. Explain why the weather becomes very cold after a hail storm.

[▶ Watch Video Solution](#)

29. What happens to the heat supplied to a substance when the heat supplied causes no change in the temperature of the substance ?

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30. When 1 g of ice at  $0^{\circ}C$  melts to form 1 g of water at  $0^{\circ}C$  then, is the latent heat absorbed by the ice or given out by it?

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**31.** Give one example where high specific heat capacity of water is used as a heat reservoir.

 [Watch Video Solution](#)

**32.** Give one example where high specific heat capacity of water is used for cooling purposes.

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**33.** 250 g of water at  $30^{\circ}C$  is present in a copper vessel of mass 50 g. Calculate the mass of ice required to bring down the temperature of the vessel



and its contents to  $5^{\circ}C$ .

Specific latent heat of fusion of ice =  $336 \times 10^3 Jkg^{-1}$

Specific heat capacity of copper vessel =  
 $400 Jkg^{-1}^{\circ}C^{-1}$

Specific heat capacity of water =  $4200 Jkg^{-1}^{\circ}C^{-1}$ .



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**34.** State two properties which a substance should possess when used as a thermionic emitter.



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**35.** When an alpha particle gains two electrons it becomes neutral and becomes an atom of an element which is a rare gas. What is the name of this rare gas?



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**36.** Define radioactivity. Name various radioactive elements.



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**37.** What happens inside the nucleus that causes the emission of beta particle ?



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**38.** What happens inside the nucleus that causes emission of beta particle?

Express the above change in the form of an equation.



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**39.** Name a device which is commonly used to convert an electrical signal into a visual signal.



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40. The nucleus  ${}_{84}^{202}\text{X}$  emits an alpha particle and forms the nucleus Y. Represent this change in the form of an equation.



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41. What happens to the mass number and atomic number of an element when it emits gamma-radiation



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**42.** Which of the following remains constant in uniform circular motion. Speed or Velocity or both ?



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**43.** Name the force required for circular motion. State its direction.



**Watch Video Solution**

**44.** State the class of levers and the relative positions of load (L), effort (E) and fulcrum (F) in each of the following cases.

(1) A bottle opener

(2) Sugar tongs.



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**45.** Why is less effort needed to lift a load over an inclined plane as compared to lifting the load directly ?



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**46.** A moving body weighing 400 N possesses 500 J of kinetic energy. Calculate the velocity with which the body is moving. ( $g = 10ms^{-2}$ )



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**47.** Under what condition will a set of gears produce :

(1) a gain in speed

(2) a gain in torque.



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**48.** What is meant by the term 'critical angle'?



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**49.** How is it related to the refractive index of the medium ?

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**50.** A tank of water is viewed normally from above.

(a) State how does the depth of the tank appear to change.

(b) Draw a labelled ray diagram to explain your answer.

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**51.** A ray of light PQ is incident normally on the hypotenuse of a right angled prism ABC as shown in the diagram given below:

Copy the diagram and complete the path of the ray PQ till it emerges from the prism.

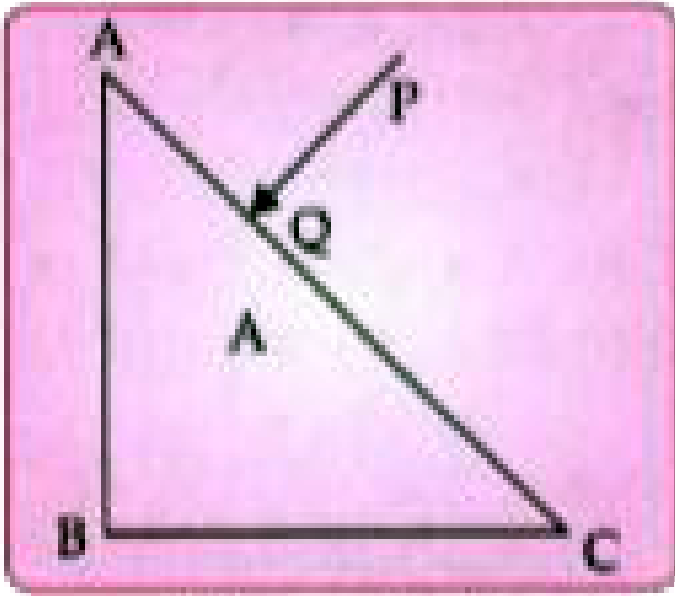


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**52.** A ray of light PQ is incident normally on the hypotenuse of a right angled prism ABC as shown in the diagram given below:

What is the value of the angle of deviation of the ray

?



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**53.** A ray of light PQ is incident normally on the hypotenuse of a right angled prism ABC as shown in the diagram given below:

Name an instrument where this action of the prism is used.



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**54.** A converging lens is used to obtain an image of an object placed in front of it. The inverted image is formed between  $F_2$  and  $2F_2$  of the lens.

Where is the object placed ?



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**55.** A converging lens is used to obtain an image of an object placed in front of it. The inverted image is

formed between  $F_2$  and  $2F_2$  of the lens.

Draw a ray diagram to illustrate the formation of the image obtained.

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**56.** What is meant by Resonance ?

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**57.** State two ways in which Resonance differs from Forced vibrations.

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**58.** A man standing between two cliffs produces a sound and hears two successive echoes at intervals of 3 s and 4 s respectively. Calculate the distance between the two cliffs.

The speed of sound in the air is  $330\text{m s}^{-1}$ .



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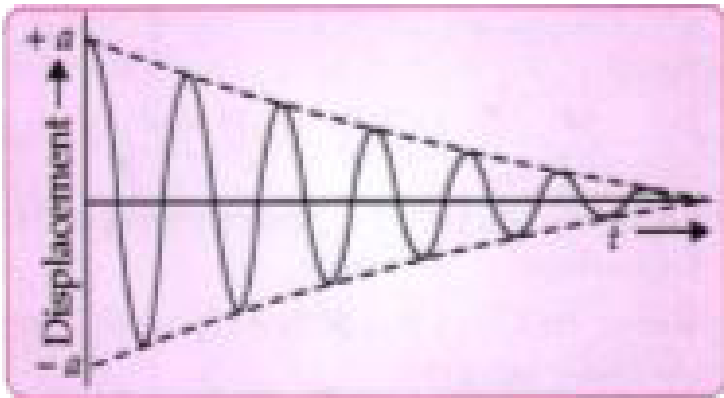
**59.** Why will an echo not be heard when the distance between the source of sound and the reflecting surface is 10 m ?



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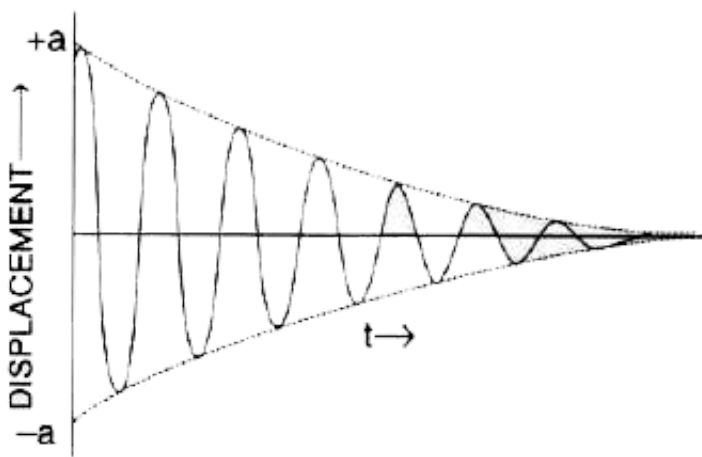
**60.** The diagram below shows the displacement-time graph for a vibrating body.

Name the type of vibrations produced by the vibrating body.



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**61.** The diagram in Fig. shows the displacement time graph of a vibrating body.

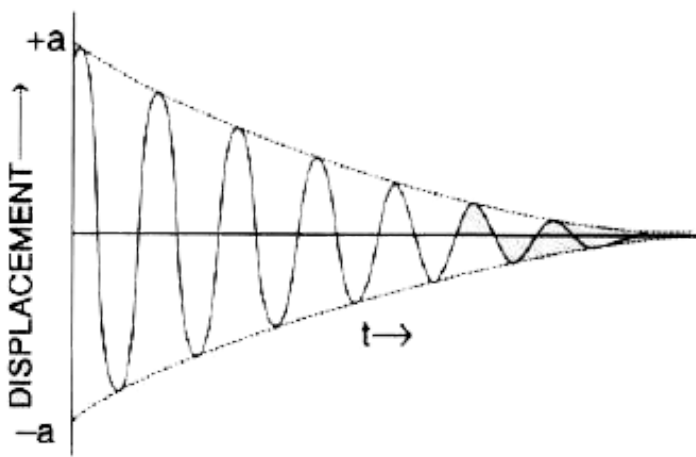


Give one example of such vibrations.



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**62.** The diagram in Fig. shows the displacement time graph of a vibrating body.



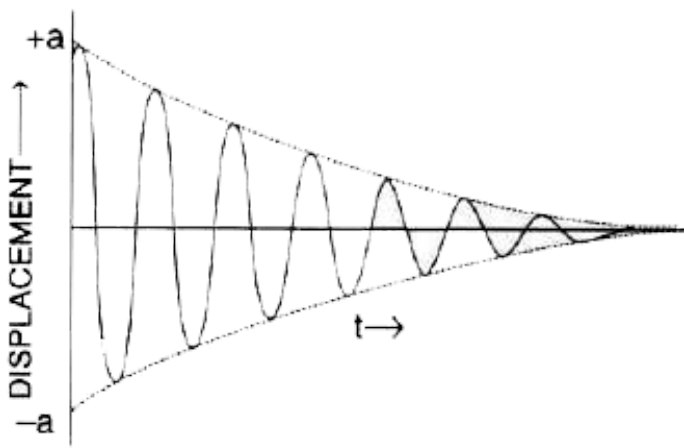
Why is the amplitude of vibrations gradually decreasing ?



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**63.** The diagram in Fig. shows the displacement time graph of a vibrating body.





What happens to the vibrations of the body after some time?

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**64.** A cell is sending current in an external circuit. How does the terminal voltage compare with the e.m.f. of the cell ?

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**65.** What is the role of fuse, used in series with any electrical appliance? Why should a fuse with defined rating not be replaced by one with a larger rating?



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**66.** What are the characteristic properties of fuse wire ?



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**67.** Write an expression for the electrical energy spent in the flow of current through an electrical appliances in terms of  $I$ ,  $R$  and  $t$ .



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**68.** At what voltage is the alternating current supplied to our houses ?



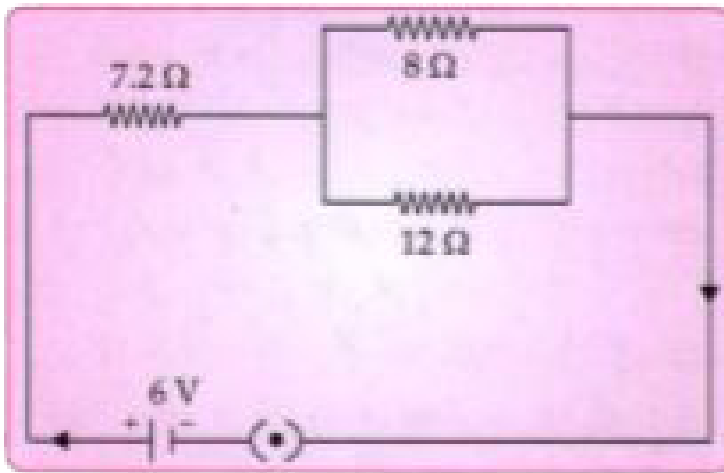
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**69.** How should the electric lamps in a building be connected ?



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70. Three resistors are connected to a 6 V battery as shown in the figure given below :



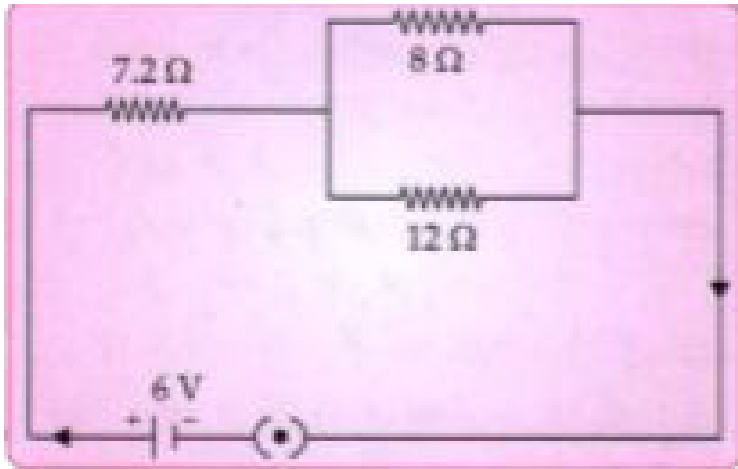
Calculate :

the equivalent resistance of the circuit.



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71. Three resistors are connected to a 6 V battery as shown in the figure given below :

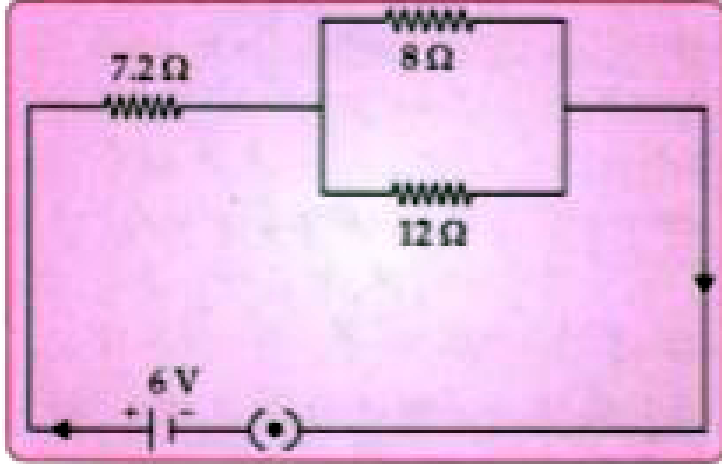


Calculate :

total current in the circuit.

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72. Three resistors are connected to a 6 V battery as shown in the figure given below :



Calculate :

potential difference across the  $7.2\Omega$  resistor.

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73. Write an expression for the heat energy liberated by a hot body.

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**74.** Some heat is provided to a body to raise its temperature by  $25^{\circ}C$ . What will be the corresponding rise in temperature of the body as shown on the Kelvin scale ?



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**75.** What happens to the average kinetic energy of the molecules as ice melts at  $0^{\circ}C$  ?



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**76.** A piece of ice at  $0^{\circ}C$  is heated at a constant rate and its temperature recorded at regular intervals till steam is formed at  $100^{\circ}C$ . Draw a temperature-time graph to represent the change in phase. Label the different parts of your graph.



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**77.** 40 g of ice at  $0^{\circ}C$  is used to bring down the temperature of a certain mass of water at  $60^{\circ}C$  to  $10^{\circ}C$ . Find the mass of water used.

[Specific heat capacity of water =  $4200 Jkg^{-1}^{\circ}C^{-1}$ ]

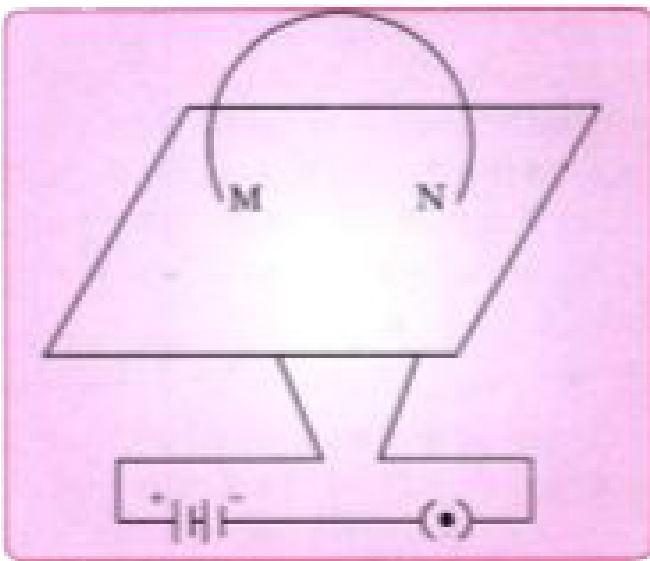


[Specific latent heat of fusion of ice =  $336 \times 10^3 \text{ Jkg}^{-1}$ ]



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**78.** The diagram below shows a current carrying loop or a circular coil passing through a sheet of cardboard at the points M and N. The sheet of cardboard is sprinkled uniformly with iron filings.

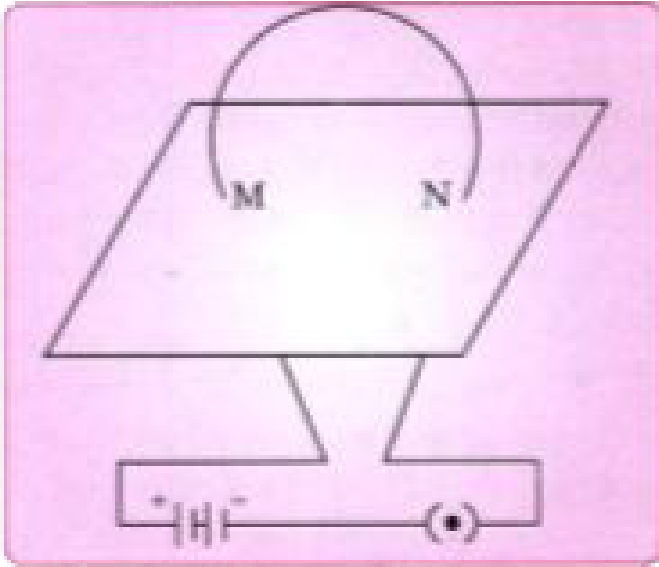


Copy the diagram and draw an arrow on the circular coil to show the direction of current flowing through it.

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**79.** The diagram below shows a current carrying loop or a circular coil passing through a sheet of

cardboard at the points M and N. The sheet of cardboard is sprinkled uniformly with iron filings.



Draw the pattern of arrangement of the iron filings when current is passed through the loop.

[▶ Watch Video Solution](#)

**80.** Draw a simplified labelled diagram of a hot cathode ray tube.

 [Watch Video Solution](#)

**81.** Name a common device where a hot cathode ray tube is used.

 [Watch Video Solution](#)

**82.** A certain nucleus X has a mass number 14 and atomic number 6. The nucleus X changes to  ${}_7Y^{14}$

after the loss of a particle.

Name the particle emitted.



Watch Video Solution

**83.** A certain nucleus X has a mass number 14 and atomic number 6. The nucleus X changes to  ${}_7Y^{14}$  after the loss of a particle.

Represent this change in the form of an equation.



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**84.** A certain nucleus X has a mass number 14 and atomic number 6. The nucleus X changes to  ${}_7Y^{14}$

after the loss of a particle.

A radioactive substance is oxidized. What change would you expect to take place in the nature of its radioactivity ? Give a reason for your answer.



[Watch Video Solution](#)

**85.** With reference to the direction of action, how does a centripetal force differ from a centrifugal during uniform circular motion ?



[Watch Video Solution](#)

**86.** State the principle of conservation of energy.



[Watch Video Solution](#)

**87.** Name the form of energy which a body may possess even when it is not in motion. Give an example to support your answer.



[Watch Video Solution](#)

**88.** A coolie is pushing a box weighing 1500 N up an inclined plane 7.5 m long on to a platform, 2.5 m above the ground.

Calculate the mechanical advantage of the inclined plane.



[Watch Video Solution](#)

**89.** A coolie is pushing a box weighing 1500 N up an inclined plane 7.5 m long on to a platform, 2.5 m above the ground.

Calculate the effort applied by the coolie.



[Watch Video Solution](#)

**90.** A coolie is pushing a box weighing 1500 N up an inclined plane 7.5 m long on to a platform, 2.5 m above the ground.

In actual practice, the coolie needs to apply more



effort than what is calculated. Give one reason why you think the coolie needs to apply more effort.



**Watch Video Solution**

**91.** A block and tackle system of pulleys has velocity ratio 4.

Draw a neat labelled diagram of the system indicating clearly the points of application and direction of load and effort.



**Watch Video Solution**

**92.** A block and tackle system of pulleys has a velocity ratio 4.

What is the value of the mechanical advantage of the given pulley system if it is an ideal pulley system?



**Watch Video Solution**

**93.** Name the radiations :

that are used for photography at night.



**Watch Video Solution**

**94.** Name the radiations :

used for detection of fracture in bones.



**Watch Video Solution**

**95.** Name the radiations :

whose wavelength range is from  $100 \text{ \AA}$  to  $4000 \text{ \AA}$  (or  $10 \text{ nm}$  to  $400 \text{ nm}$ ).



**Watch Video Solution**

**96.** Define the term refractive index of a medium. Can it be less than 1 ?



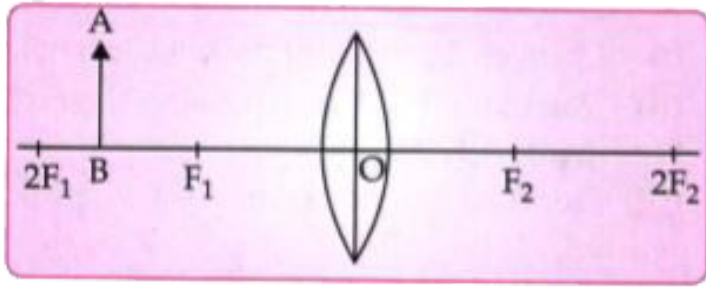
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**97.** A coin placed at the bottom of a beaker appears to be raised by 4.0 cm. If the refractive index of water is  $\frac{4}{3}$ , find the depth of the water in the beaker.



[Watch Video Solution](#)

**98.** An object AB is placed between  $2F_1$  and  $F_1$  on the principal axis of a convex lens as shown in the diagram :



Copy the diagram and using three rays starting from point A, obtain the image of the object formed by the lens.

 [Watch Video Solution](#)

99. What is the principle on which SONAR is based ?

 [Watch Video Solution](#)

**100.** An observer stands at a certain distance away from a cliff and produces a loud sound. He hears the echo of the sound after 1.8 s. Calculate the distance between the cliff and the observer if the velocity of sound in air is  $340\text{m.s}^{-1}$ .



**Watch Video Solution**

**101.** A vibrating tuning fork is placed over the mouth of a burette filled with water. The tap of the burette is opened and the water level gradually starts falling. It is found that the sound from the tuning fork becomes very loud for a particular length of the

water column.

Name the phenomenon taking place when this happens.



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**102.** A vibrating tuning fork is placed over the mouth of a burette filled with water. The tap of the burette is opened and the water level gradually starts falling. It is found that the sound from the tuning fork becomes very loud for a particular length of the water column.

Why does the sound become very loud for this length of the water column?



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**103.** What is meant by the terms (1) amplitude (2) frequency, of a wave ?



[Watch Video Solution](#)

**104.** Explain, why stringed musical instruments, like the guitar, are provided with a hollow box



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**105.** It is observed that the temperature of the surroundings starts falling when the ice in a frozen lake starts melting. Give a reason for the observation.



**Watch Video Solution**

**106.** How is the heat capacity of the body related to its specific heat capacity ?



**Watch Video Solution**

**107.** Why does a bottle of soft drink cool faster when surrounded by ice cubes than by ice cold water, both

at  $0^{\circ}C$ ?



Watch Video Solution

**108.** A certain amount of heat  $Q$  will warm 1 g of material X by  $3^{\circ}C$  and 1 g of material Y by  $4^{\circ}C$ . Which material has a higher specific heat capacity?



Watch Video Solution

**109.** A calorimeter of mass 50 g and specific heat capacity  $0.42Jg^{-1}^{\circ}C^{-1}$  contains some mass of water at  $20^{\circ}C$ . A metal piece of mass 20 g at  $100^{\circ}C$  is dropped into the calorimeter. After stirring, the final

temperature of the mixture is found to be  $22^{\circ}C$ . Find the mass of water used in the calorimeter.

[specific heat capacity of the metal piece =  $0.3Jg^{-1}^{\circ}C^{-1}$

specific heat capacity of water =  $4.2Jg^{-1}^{\circ}C^{-1}$ ]



[Watch Video Solution](#)

**110.** State Ohm's law and draw a neat labelled circuit diagram containing a battery, a key, a voltmeter, an ammeter, a rheostat and an unknown resistance to verify it.



[Watch Video Solution](#)

**111.** A metal wire of resistance  $6\Omega$  is stretched so that its length is increased to twice its original length. Calculate its new resistance.



**Watch Video Solution**

**112.** An electrical gadget can give an electric shock to its user under certain circumstances. Mention any two of these circumstances.



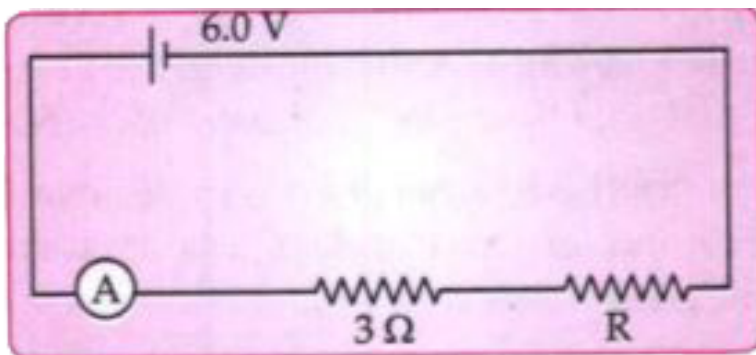
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113. What preventive measure provided in a gadget can protect a person from an electric shock?

 [Watch Video Solution](#)

114. The figure shows a circuit.

When the circuit is switched on, the ammeter reads 0.5A.



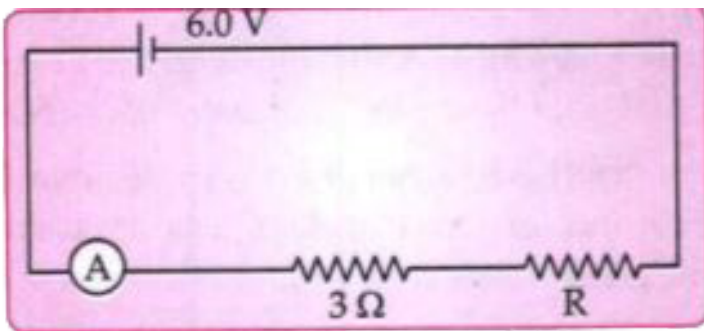
Calculate the value of the unknown resistor R.

 [Watch Video Solution](#)

[Watch Video Solution](#)

**115.** The figure shows a circuit.

When the circuit is switched on, the ammeter reads 0.5A.

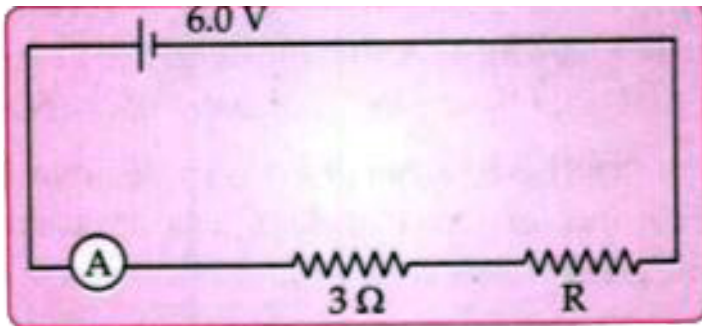


Calculate the charge passing through the  $3\Omega$  resistor in 120 s.

[Watch Video Solution](#)

**116.** The figure shows a circuit.

When the circuit is switched on, the ammeter reads 0.5A.



Calculate the power dissipated in the  $3\Omega$  resistor.

[▶ Watch Video Solution](#)

**117.** Name the three main parts of a Cathode Ray Tube.

[▶ Watch Video Solution](#)

**118.** What is meant by Radioactivity ?



**Watch Video Solution**

**119.** What is meant by nuclear waste ? State one way for the safe disposal of nuclear waste.



**Watch Video Solution**

**120.** Suggest one effective way for the safe disposal of nuclear waste.



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**121.** Draw neat labeled diagram of a d.c. motor.

 [Watch Video Solution](#)

**122.** What is the function of the split rings in a d.c. motor ?

 [Watch Video Solution](#)

**123.** State one advantage of a.c. over d.c.

 [Watch Video Solution](#)

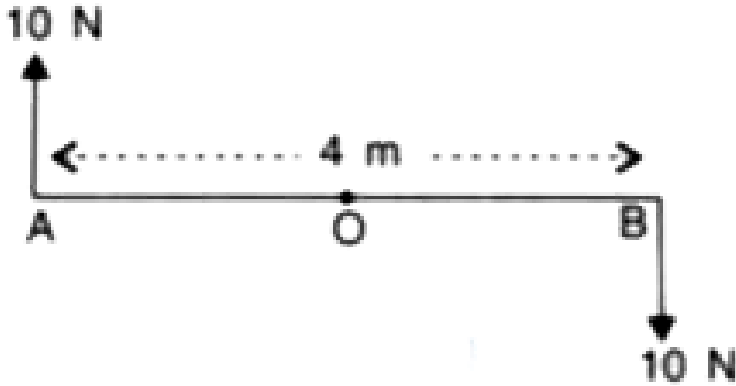
**124.** A man having a box on his head, climbs up a slope and another man having an identical box walks the same distance on a levelled road. Who does more work against the force of gravity and why?



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**125.** The forces each of magnitude  $10\text{N}$  act vertically upwards and downwards respectively at the two ends A and B of a uniform rod of length  $4\text{m}$  which is pivoted at its mid point O as shown in fig. 1.30, Determine the magnitude of the resultant moment of

forces about the pivot O.



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**126.** A body is thrown vertically upwards. Its velocity keeps on decreasing. What happens to its kinetic energy as its velocity becomes zero ?

[Watch Video Solution](#)

**127.** Draw a diagram to show how a single pulley can be used so as to have its ideal M.A. = 2.



**Watch Video Solution**

**128.** Derive a relationship between mechanical advantage, velocity ratio and efficiency of a machine.



**Watch Video Solution**

**129.** Light passes through a rectangular glass slab and through a triangular glass prism. In what way

does the direction of the two emergent beams differ and why?



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**130.** Ranbir claims to have obtained an image twice the size of the object with a concave lens. Is he correct? Give a reason for your answer.



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**131.** A lens forms an erect, magnified and virtual image of an object.

Name the lens.



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**132.** A lens forms an erect, magnified and virtual image of an object.

Draw a labelled ray diagram to show the image formation.



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**133.** Define the power of a lens.



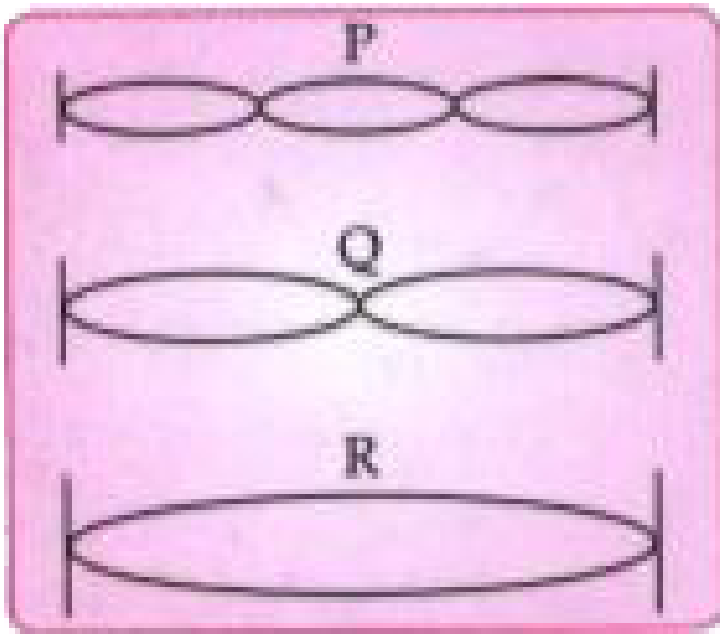
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**134.** The lens mentioned in 6 (b) above is of focal length 25 cm. Calculate the power of the lens.



**Watch Video Solution**

**135.** The adjacent diagram shows three different modes of vibrations P, Q and R of the same string.

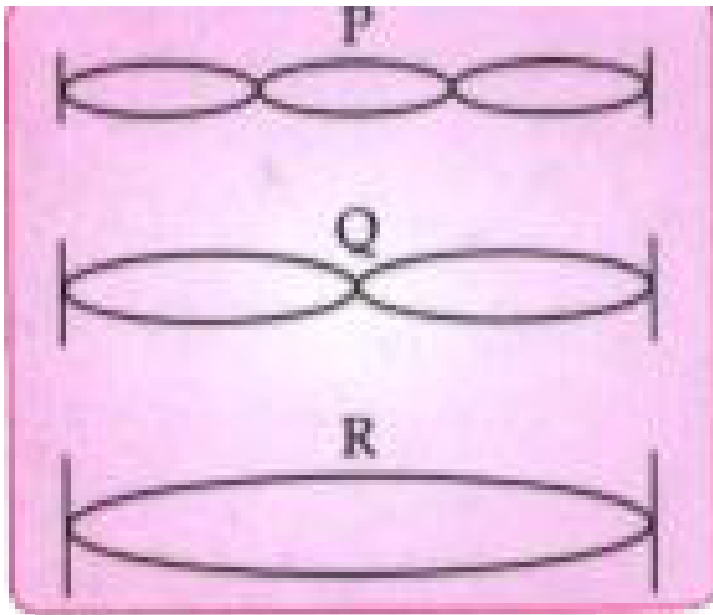


Which vibration will produce a louder sound and why?



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**136.** The adjacent diagram shows three different modes of vibrations P, Q and R of the same string.

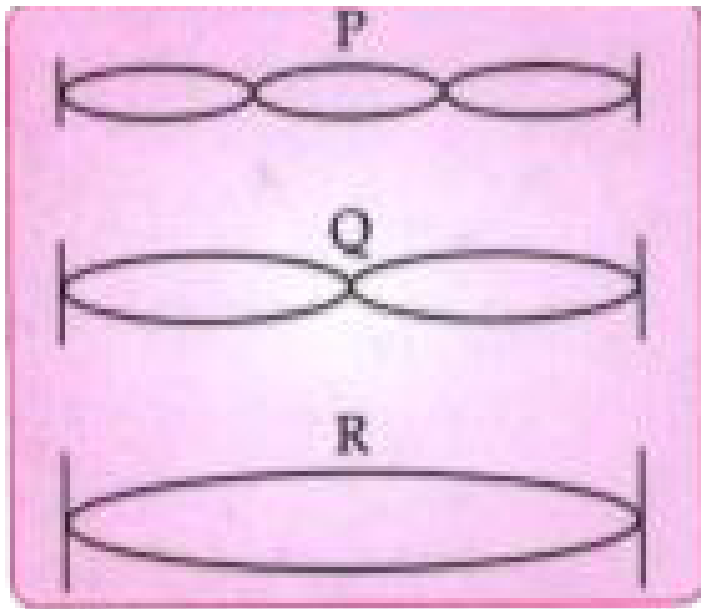




The sound of which string will have maximum shrillness?

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**137.** The adjacent diagram shows three different modes of vibrations P, Q and R of the same string.



State the ratio of wavelengths of P and R.



[Watch Video Solution](#)

**138.** A type of electromagnetic wave has wavelength  $50 \text{ \AA}$ .

Name the wave.



[Watch Video Solution](#)

**139.** A type of electromagnetic wave has wavelength  $50 \text{ \AA}$ .

What is the speed of the wave in vacuum ?



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**140.** A type of electromagnetic wave has wavelength 50 Å.

State one use of this type of wave.



[Watch Video Solution](#)

**141.** State one important property of waves used for echo depth sounding.



[Watch Video Solution](#)

**142.** A radar sends a signal to an aircraft at a distance of 30 km away and receives it back after  $2 \times 10^{-4}$

second. What is the speed of the signal ?



[Watch Video Solution](#)

**143.** Two resistors of  $4\Omega$  and  $6\Omega$  are connected in parallel to a cell to draw 0.5 A current from the cell.

Draw a labelled circuit diagram showing the above arrangement.



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**144.** Two resistors of  $4\Omega$  and  $6\Omega$  are connected in parallel to a cell to draw 0.5 A current from the cell.

Calculate the current in each resistor.



[Watch Video Solution](#)

**145.** What is an Ohmic resistor ?



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**146.** Two copper wires are of the same length, but one is thicker than the other.

(1) Which wire will have more resistance ?

(2) Which wire will have more specific resistance ?



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**147.** Two sets A and B, of three bulbs each, are glowing in two separate rooms. When one of the bulbs in set A is fused, the other two bulbs also cease to glow. But in set B, when one bulb fuses, the other two bulbs continue to glow. Explain why this phenomenon occurs.



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**148.** Two sets A and B, of three bulbs each, are glowing in two separate rooms. When one of the bulbs in set A is fused, the other two bulbs also cease to glow. But in set B, when one bulb fuses, the other

two bulbs continue to glow. Why do we prefer arrangements of Set B for house circuiting?



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**149.** Heat energy is supplied at a constant rate to 100 g of ice at  $0^{\circ}C$ . The ice is converted into water at  $0^{\circ}C$  in 2 minutes. How much time will be required to raise the temperature of water from  $0^{\circ}C$  to  $20^{\circ}C$  ? [Given : sp. Heat capacity of water  $4.2g^{-1}^{\circ}C^{-1}$ , sp. latent heat of ice =  $336Jg^{-1}$ ]



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**150.** The specific heat capacity of a substance A is  $3,800 Jkg^{-1}K^{-1}$  and that of a substance B is  $400 Jkg^{-1}K^{-1}$ . Which of the two substances is a good conductor of heat ? Give a reason for your answer.

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**151.** Specific heat capacity of substance A is  $3.8 Jg^{-1}K^{-1}$  whereas the specific heat capacity of substance B is  $0.4 Jg^{-1}K^{-1}$ .

How is one led to the above conclusion ?

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**152.** Specific heat capacity of substance A is  $3.8Jg^{-1}K^{-1}$  whereas the specific heat capacity of substance B is  $0.4Jg^{-1}K^{-1}$ .

If substances A and B are liquids then which one would be more useful in car radiators ?

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**153.** State two ways to minimise the impact of global warming.

 [Watch Video Solution](#)

**154.** What is the greenhouse effect?



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**155.** Name two factors on which the magnitude of an induced e.m.f. in the secondary coil depends.

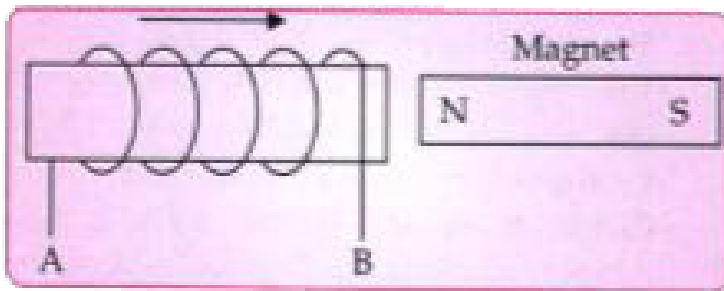


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**156.** In the following diagram an arrow shows the motion of the coil towards the bar magnet.

(1) State in which direction the current flows, A to B or B to A ?

(2) Name the law used to come to the conclusion.



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157. A nucleus  ${}_{11}\text{Na}^{24}$  emits a beta particle to change into Magnesium (Mg).

Write the symbolic equation for the process.

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**158.** A nucleus  ${}_{11}\text{Na}^{24}$  emits a  $\beta$ -particle to change into magnesium (Mg).

What are numbers 24 and 11 called?



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**159.** A nucleus  ${}_{11}\text{Na}^{24}$  emits a beta particle to change into Magnesium (Mg).

What is the general name  ${}_{12}^{24}\text{Mg}$  with respect to  ${}_{11}^{24}\text{Na}$

?



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**160.** In a cathode ray tube state :

the purpose of covering cathode by thorium and carbon.



**Watch Video Solution**

**161.** In a cathode ray tube state :

the purpose of the fluorescent screen.



**Watch Video Solution**

**162.** In a cathode ray tube state :

How is it possible to increase the rate of emission of

electrons.



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**163.** Draw a simplified diagram of a lemon crusher, indicating direction of load and effort.



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**164.** Name the physical quantity measured in terms of horse power.



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**165.** A nut is opened by a wrench of length 20 cm. If the least force required is 2 N, find the moment of force needed to loosen the nut.



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**166.** Explain briefly why the work done by a fielder when he takes a catch in a cricket match is negative.



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**167.** A block and tackle system has V.R. = 5.

Draw a neat labelled diagram of a system indicating

the direction of its load and effort.



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**168.** A block and tackle system has V.R. = 5.

Rohan exerts a pull of 150 kgf. What is the maximum load he can raise with this pulley system if its efficiency = 75% ?



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**169.** Where should an object be placed so that a real and inverted image of the same size as the object is obtained using a convex lens ?



A.  $f$

B.  $2f$

C.  $f/2$

D. centre

**Answer:  $2f$**



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**170.**

- (a) (i) *Where should an object be placed so that a real and inverted image of the same size as the object is obtained using a convex lens ?*

Draw a ray diagram to show the formation of the image as specified in the part a.



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**171.** Why does the Sun appear reddish early in the morning?



**Watch Video Solution**

**172.** Name the subjective property of light related to its wavelength.



**Watch Video Solution**

**173.** Jatin puts a pencil into a glass container having water and is surprised to see the pencil in a different state.

What change is observed in the appearance of the pencil?

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**174.** Jatin puts a pencil into a glass container having water and is surprised to see the pencil in a different state.

Name the phenomenon responsible for the change.

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**175.** Jatin puts a pencil into a glass container having water and is surprised to see the pencil in a different state.

Draw a ray diagram showing how the eyes saw the pencil.

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**176.** State the safe limit of sound level in terms of decibel for human hearing.

 [Watch Video Solution](#)

**177.** Name the characteristic of sound in relation to its waveform.



**Watch Video Solution**

**178.** A person standing between two vertical cliffs and 480 m from the nearest cliff shouts. He hears the first echo after 3 s and the second echo 2 s later.

Calculate :

The speed of sound.



**Watch Video Solution**

**179.** A person standing between two vertical cliffs and 480 m from the nearest cliff shouts. He hears the first echo after 3 s and the second echo 2 s later.

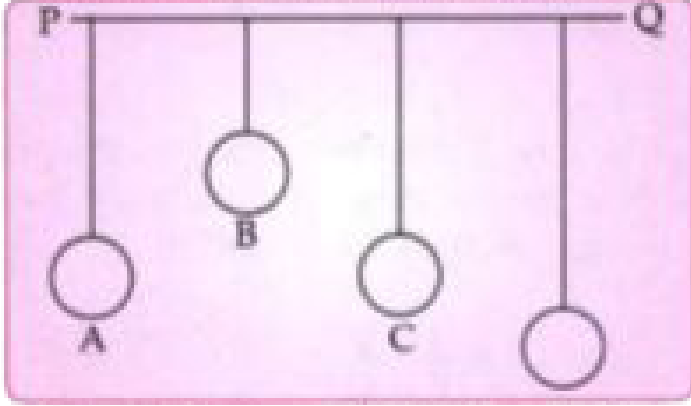
Calculate :

The distance of the other cliff from the person.



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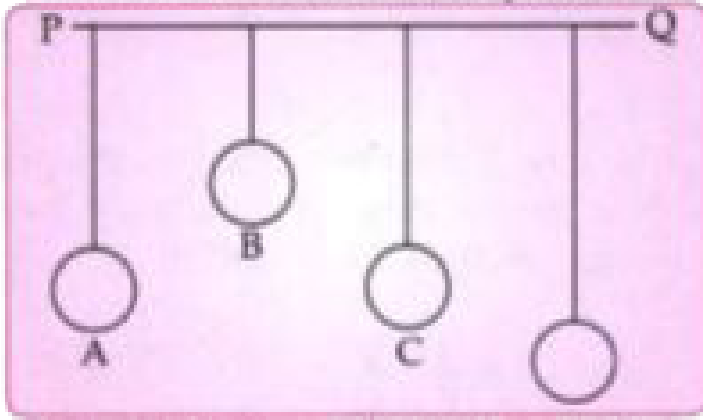
**180.** In the diagram below, A, B, C, D are four pendulums suspended from the same elastic string PQ. The length of A and C are equal to each other while the length of pendulum B is smaller than that of D. Pendulum A is set into a mode of vibrations.



Name the type of vibrations taking place in pendulums B and D?

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**181.** In the diagram below, A, B, C, D are four pendulums suspended from the same elastic string PQ. The length of A and C are equal to each other while the length of pendulum B is smaller than that of D. Pendulum A is set into a mode of vibrations.

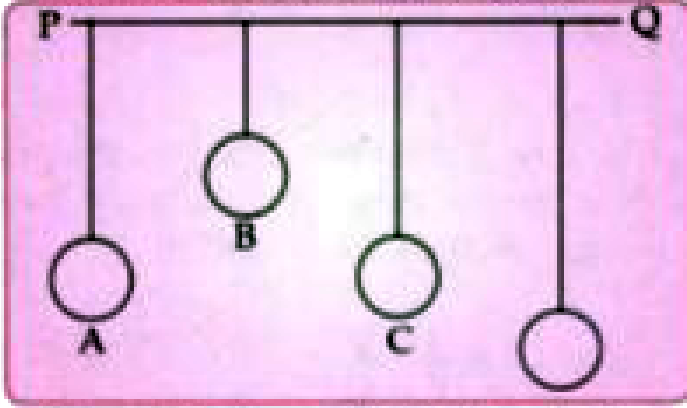


What is the state of pendulum C?

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**182.** In the diagram below, A, B, C, D are four pendulums suspended from the same elastic string PQ. The length of A and C are equal to each other while the length of pendulum B is smaller than that of D. Pendulum A is set into a mode of vibrations.





State the reason for the type of vibrations in pendulums B and C.

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**183.** Name the device used to increase the voltage at a generating station.

[▶ Watch Video Solution](#)

**184.** At what frequency is A.C. supplied to residential houses ?



**Watch Video Solution**

**185.** Name the wire in a household electrical circuit to which the switch is connected.



**Watch Video Solution**

**186.** The relationship between the potential difference and the current in a conductor is stated in

the form of a law.

Name the law.



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**187.** The relationship between the potential difference and the current in a conductor is stated in the form of a law.

What does the slope of V-I graph for a conductor represent?



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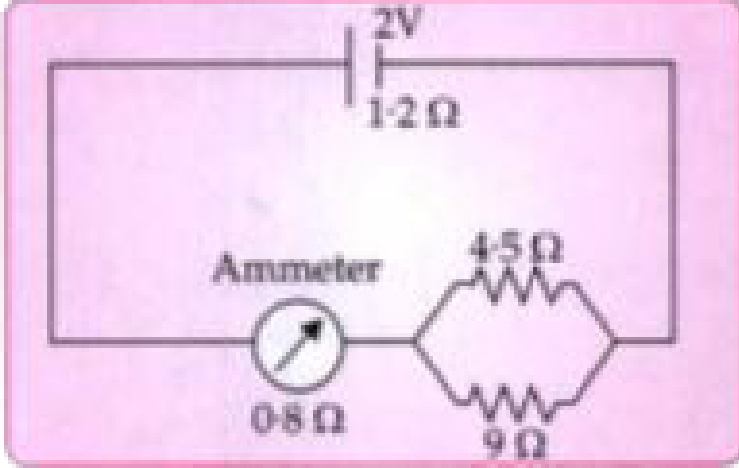
**188.** The relationship between the potential difference and the current in a conductor is stated in the form of a law.

Name the material used for making the connecting wire.



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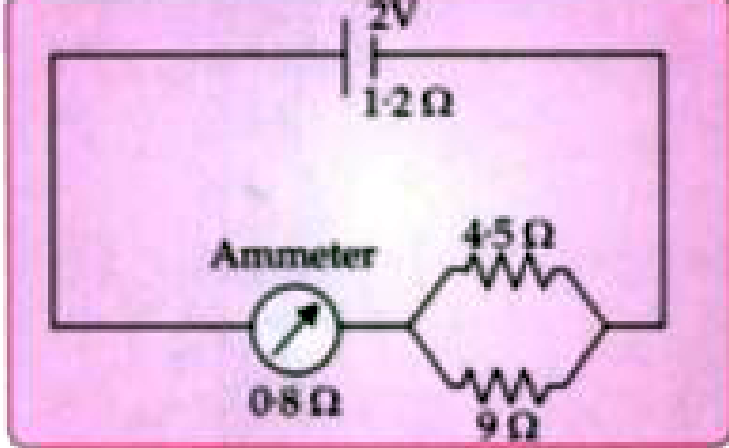
**189.** A cell of emf 2 V and internal resistance  $1.2\Omega$  is connected with an ammeter of resistance  $0.8\Omega$  and two resistors of  $4.5\Omega$  and  $9\Omega$  as shown in the diagram below:



What would be the reading on the Ammeter ?

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**190.** A cell of emf 2 V and internal resistance  $1.2\ \Omega$  is connected with an ammeter of resistance  $0.8\ \Omega$  and two resistors of  $4.5\ \Omega$  and  $9\ \Omega$  as shown in the diagram below:



What is the potential difference across the terminals of the cell ?

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191. Name a gas caused by the Greenhouse effect.

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**192.** Which property of water makes it an effective coolant ?

- A. latent heat
- B. specific heat
- C. melting point
- D. boiling point

**Answer: specific heat**



**Watch Video Solution**

**193.** Water in lakes and ponds do not freeze at once in cold countries. Give a reason in support of your answer.



**Watch Video Solution**

**194.** What is the principle of Calorimetry?



**Watch Video Solution**

**195.** Name the law on which this principle is based.



**Watch Video Solution**



**196.** State the effect of an increase of impurities on the melting point of ice.

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**197.** A refrigerator converts 100 g of water at  $20^{\circ}C$  to ice at  $-10^{\circ}C$  in 35 minutes.

Calculate the average rate of heat extraction in terms of watts.

Given : Specific heat capacity of ice =  $2.1Jg^{-1}^{\circ}C^{-1}$

Specific heat capacity of water =  $4.2Jg^{-1}^{\circ}C^{-1}$

Specific Latent heat of fusion of ice =  $336Jg^{-1}$

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**198.** Thermionic emissions are related to



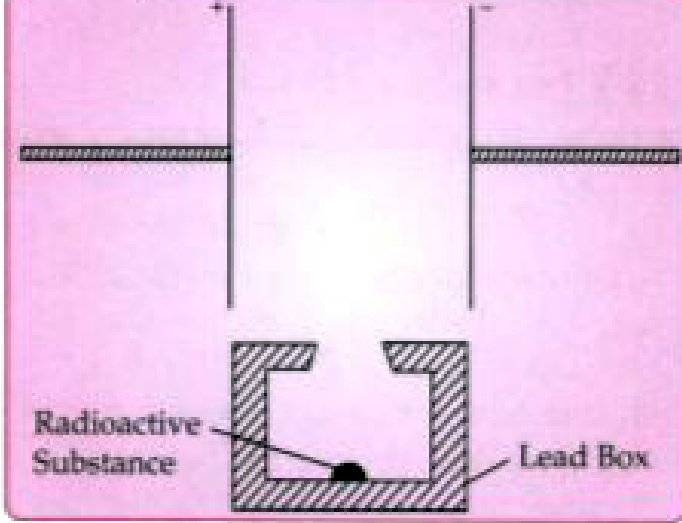
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**199.** Name the unit in which the work function of a metal is expressed.



**Watch Video Solution**

**200.** Complete the diagram by drawing the deflection of radioactive radiations in an electric field.



[▶ Watch Video Solution](#)

**201.** Mention two important precautions that should be taken while handling radioactive materials

[▶ Watch Video Solution](#)

**202.** 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.

(i) What is the composition of B ?

(ii) The nucleus B emits a beta particle and is transformed into a nucleus C. What is the composition of C?

(iii) What is the mass number of the nucleus A ?

(iv) Does the composition of C change if it emits gamma radiations ?



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**203.** 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.

(i) What is the composition of B ?

(ii) The nucleus B emits a beta particle and is transformed into a nucleus C. What is the composition of C?

(iii) What is the mass number of the nucleus A ?

(iv) Does the composition of C change if it emits gamma radiations ?



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**204.** An atomic nucleus A is composed of 84 protons and 128 neutrons.

Does the composition of nucleus C change if it emits gamma radiations ?



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**205.** A uniform half metre rule balances horizontally on a knife edge at 29 cm mark when a weight of 20 gf is suspended from one end.

Draw a diagram of the arrangement.



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**206.** A uniform half metre rule balances horizontally on a knife edge at 29 cm mark when a weight of 20 gf is suspended from one end.

What is the weight of the half metre rule ?



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**207.** 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.



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**208.** How does uniform circular motion differ from uniform linear motion ?

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**209.** Name the process used for producing electricity using nuclear energy.

 [Watch Video Solution](#)

**210.** 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.

$$(g = 10Nkg^{-1})$$

Calculate :

Distance moved by the effort.



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**211.** 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.

$$(g = 10Nkg^{-1})$$

Calculate :

Work done by the effort.



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**212.** 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.

$$(g = 10 \text{ Nkg}^{-1})$$

Calculate :

M.A. of the pulley system.



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**213.** 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.

$$(g = 10Nkg^{-1})$$

Calculate :

Efficiency of the pulley system.



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**214.** How is the transference of heat energy by radiation prevented in a calorimeter ?



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**215.** You have a choice of three metals A, B and C, of specific heat capacities

$900Jkg^{-1} \circ C^{-1}$ ,  $380Jkg^{-1} \circ C^{-1}$  and  $460Jkg^{-1} \circ C^{-1}$

respectively, to make a calorimeter. Which material will you select ? Justify your answer.

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**216.** Calculate the mass of ice needed to cool 150 g of water contained in a calorimeter of mass 50 g at  $32^{\circ}\text{C}$  such that the final temperature is  $5^{\circ}\text{C}$ . Specific heat capacity of calorimeter =  $0.4 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$ , specific heat capacity of water =  $4.2 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$ , latent heat capacity of ice =  $330 \text{ J g}^{-1}$ .

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**217.** Name the radiations which are absorbed by the green house gases in the earth's atmosphere.



**Watch Video Solution**

**218.** A radiation X is focused by a particular device on the bulb of a thermometer and mercury in the thermometer shows a rapid increase. Name the radiation X.



**Watch Video Solution**

**219.** Name two factors on which the heat energy liberated by a body depends.



**Watch Video Solution**

**220.** A lens forms an upright and diminished image of an object when the object is placed at the focal point of the given lens.

Name the lens.



**Watch Video Solution**

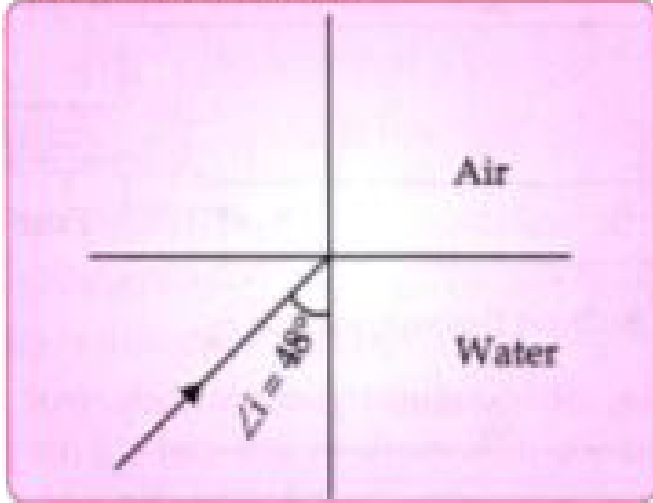
**221.** A lens forms an upright and diminished image of an object when the object is placed at the focal point of the given lens.

Draw a ray diagram to show the image formation.



**Watch Video Solution**

**222.** A ray of light travels from water to air as shown in the diagram given below:



Copy the diagram and complete the path of the ray.

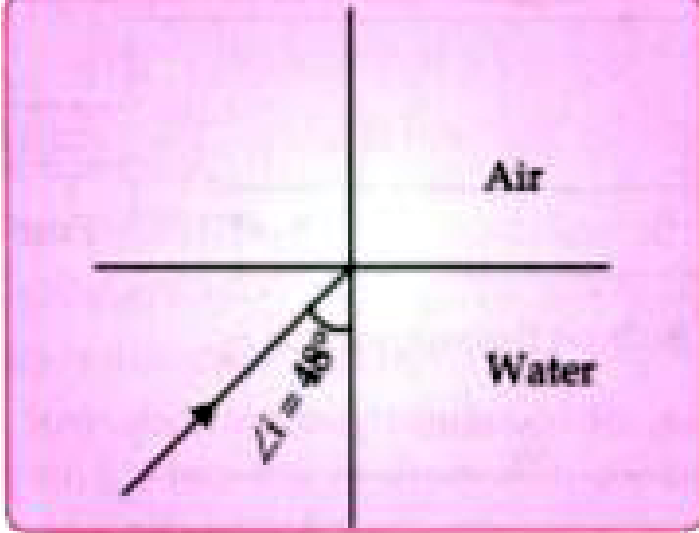
Given the critical angle for water is  $48^\circ$ .



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**223.** A ray of light travels from water to air as shown in the diagram given below:

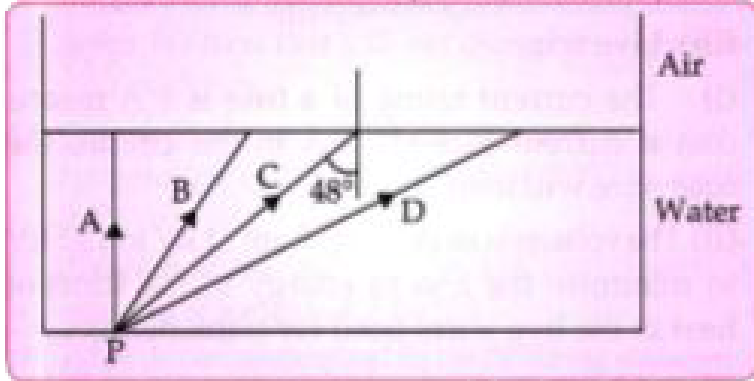




State the condition so that total internal reflection occurs in the above diagram.

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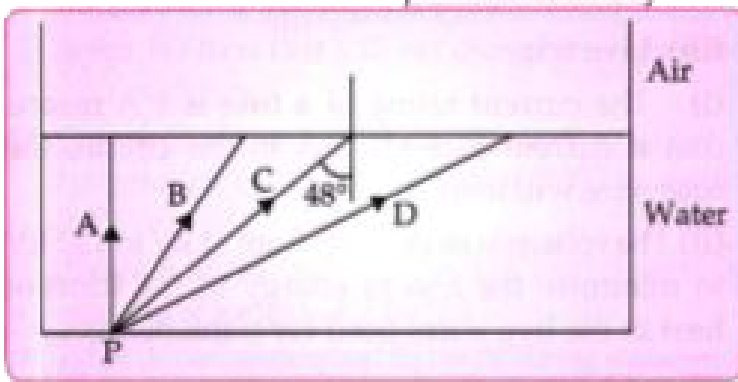
**224.** The diagram below shows a point source P inside a water container. Four rays A, B, C, D starting from the source P are shown up to the water surface.



Show in the diagram the path of these rays after striking the water surface. The critical angle for water air surface is  $48^\circ$ .

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**225.** The diagram below shows a point source P inside a water container. Four rays A, B, C, D starting from the source P are shown up to the water surface.



Name the phenomenon which the rays B and D exhibit.

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**226.** State two physical factors which determine loudness of sound.

[Watch Video Solution](#)

**227.** Name the factor that determines :

Quality of the note.



**Watch Video Solution**

**228.** Name the factor that determines :

Pitch of the note.



**Watch Video Solution**

**229.** What are damped vibrations ?



**Watch Video Solution**

**230.** Give examples of damped oscillation.



**Watch Video Solution**

**231.** Name the phenomenon that cause a loud sound when the stem of a vibration tuning fork is kept pressed on the surface of a table.



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**232.** A certain sound has a frequency of 256 hertz and a wavelength of 1.3 m.

(a) Calculate the speed with which this sound travels.

(b) What difference would be felt by a listener between the above sound and another sound travelling at the same speed, but of wavelength 2.6 m?



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**233.** Derive a relationship between S.I. and C.G.S. unit of work.



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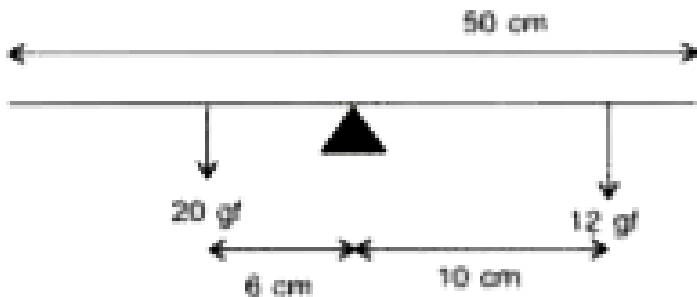
**234.** A Force  $F$  acts on a body and displaces it by a distance  $S$  in direction at an angle  $\theta$  with the

direction of force ,(a) Write the expression for the work done by the force,(b)What should be the angle between the force and displacement so that the work done is (i)zero ,(ii)Maximum ?



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**235.** A half metre rod is pivoted at the centre with two weights of 20 gf and 12 gf suspended at a perpendicular distance of 6 cm and 10 cm from the pivot respectively as shown below.

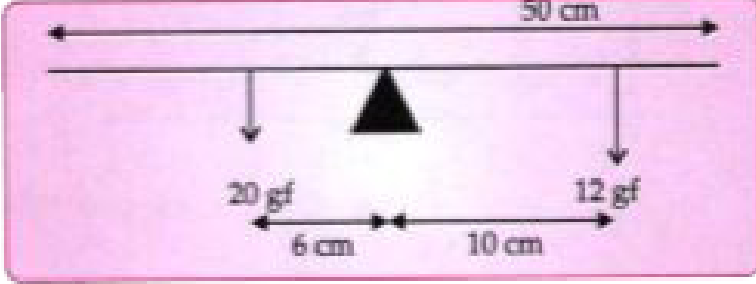


Which of the two forces acting on the rigid rod causes clockwise moment?

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**236.** A half metre rod is pivoted at the centre with two weights of 20 gf and 12 gf suspended at a perpendicular distance of 6 cm and 10 cm from the pivot respectively as shown below:

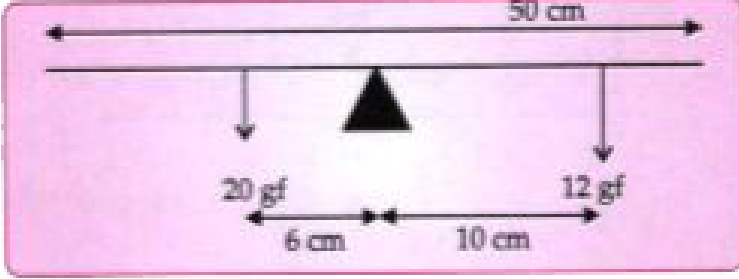




Is the rod in equilibrium ?

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**237.** A half metre rod is pivoted at the centre with two weights of 20 gf and 12 gf suspended at a perpendicular distance of 6 cm and 10 cm from the pivot respectively as shown below:

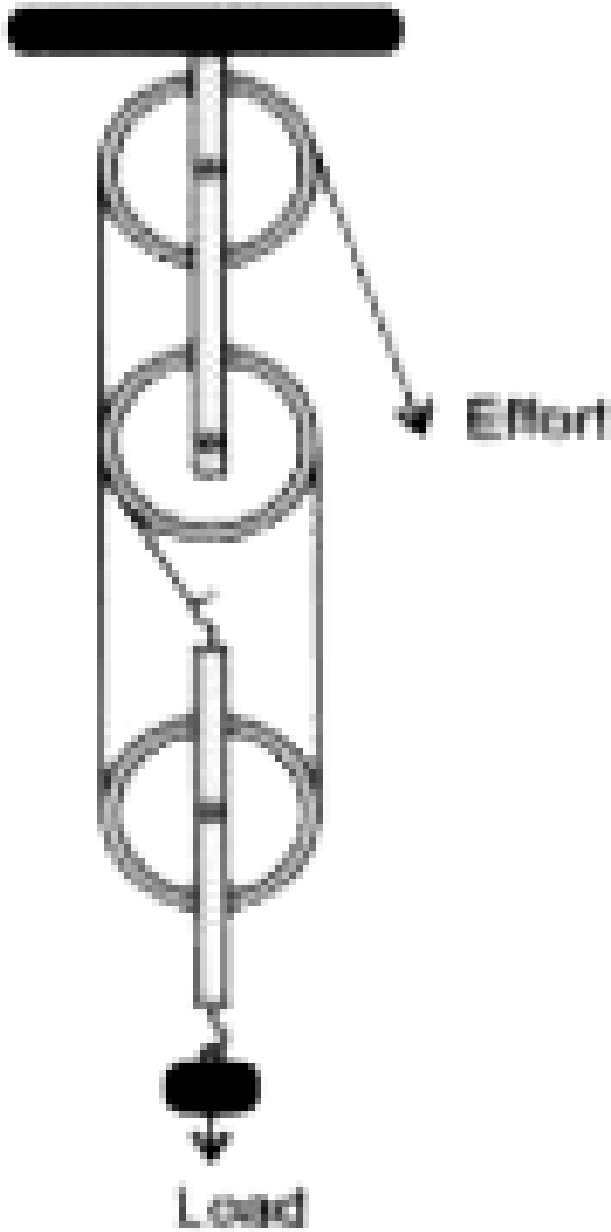


The direction of 20 kgf force is reversed. What is the magnitude of the resultant moment of the forces on the rod ?

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**238.** Draw a diagram to show a block and tackle pulley system having a velocity ratio of 3 marking the

direction of load (L), effort (E) and tension (T).



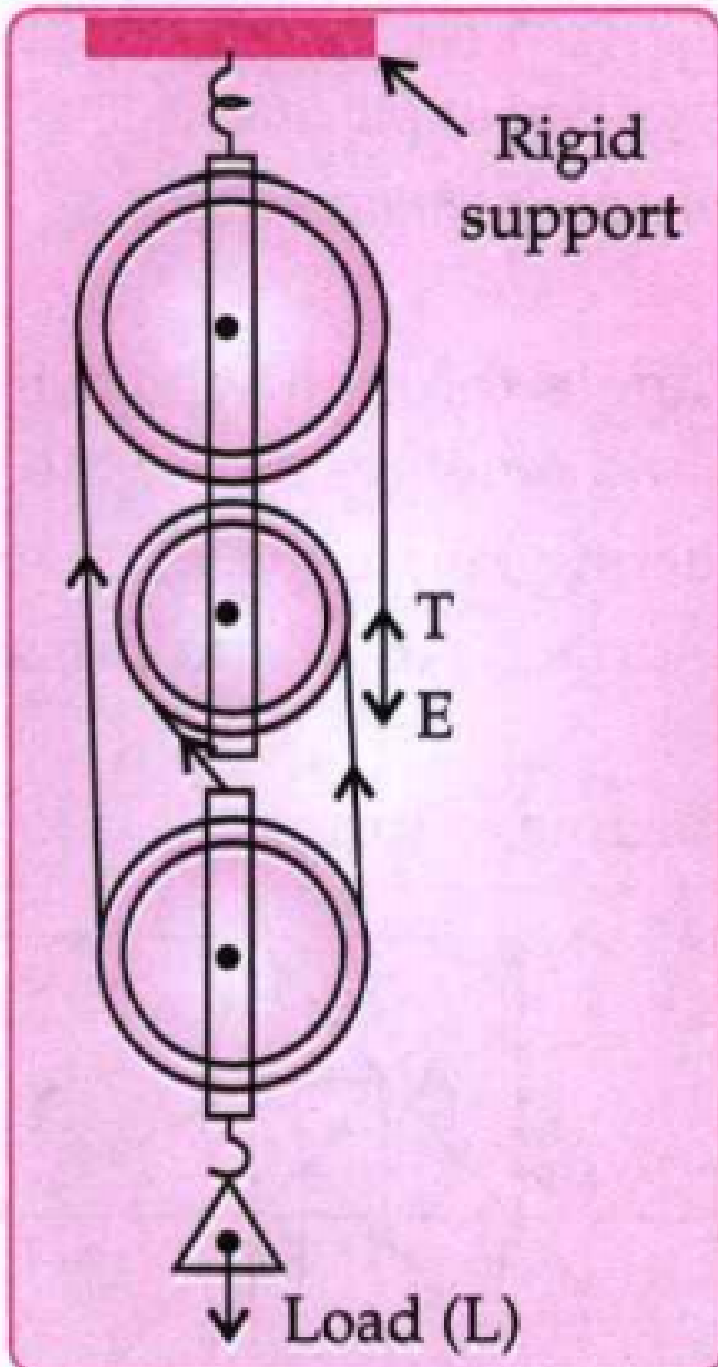
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**239.** A pulley system has a velocity ratio 3. draw a diagram showing the point of application and direction of load (L), effort (E) and tension (T). It lifts a load of 150 N by an effort of 60 N. calculate its mechanical advantage. Is the pulley system ideal ? Give reason.



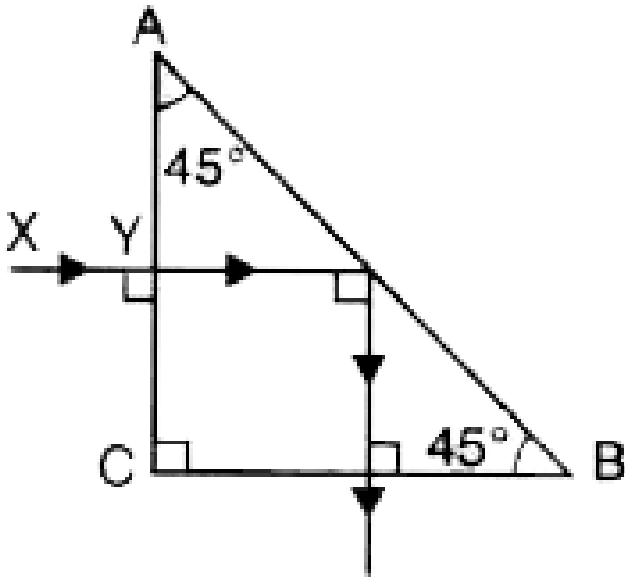
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240.



Is the above pulley system an ideal machine or not ?

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241.

A ray of light XY passes through a right angled isosceles prism as shown alongside Figure.

(a) What is the angle through which the incident ray

deviates and emerges out of the prism?

9b) Name the instrument where this action of prism is put into use.

(c) Which prism surface will behave as a mirror ?

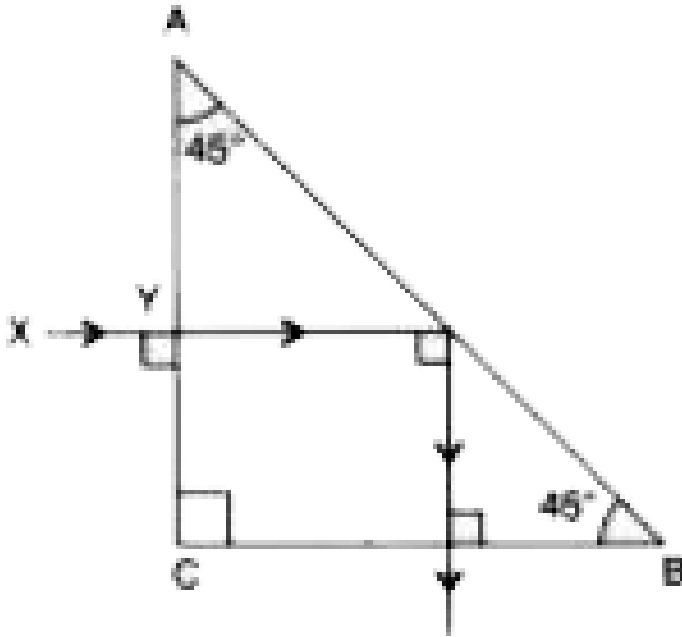


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**242.** A ray of light XY passes through a right angled isosceles prism as shown alongside.

Name the instrument where this action of prism is

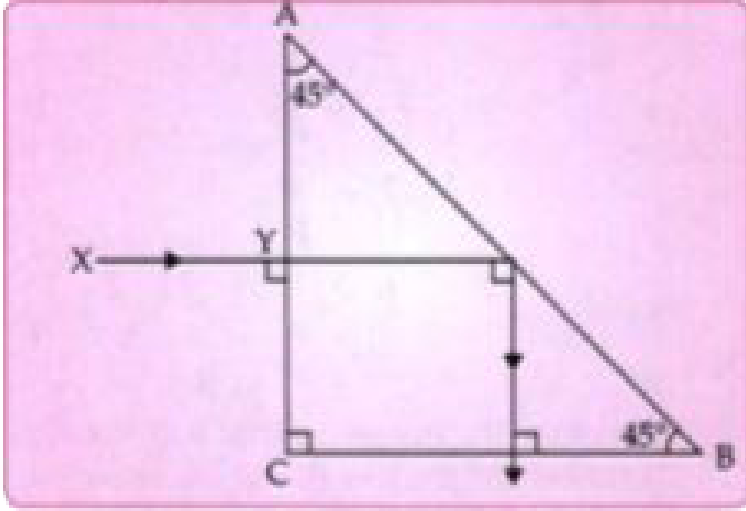
put into use.



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**243.** A ray of light XY passes through a right angled isosceles prism as shown below:

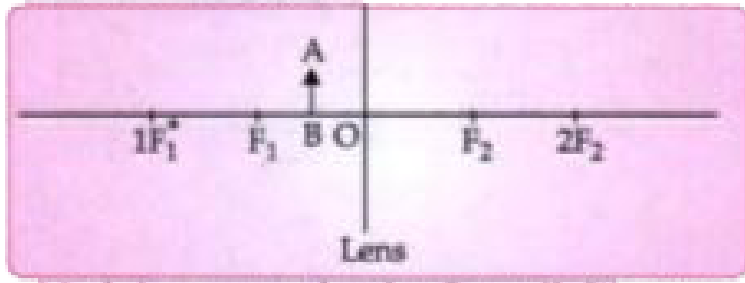




Which prism surface will behave as a mirror ?

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**244.** An object AB is placed between O and  $F_1$  on the principal axis of a converging lens as shown in the diagram.



Mark is an error by the Council. We suggest you to use ' $2F_1$ ' instead of ' $1F_1$ '.

Copy the diagram and by using three standard rays starting from point A, obtain an image of the object AB.

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**245.** An object is placed at a distance of 12 cm from a convex lens of focal length 8 cm. Find :  
the position of the image



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**246.** An object is placed at a distance of 12 cm from a convex lens of focal length 8 cm. Find :  
nature of the image



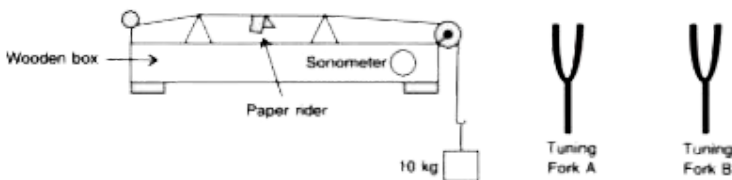
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**247.** Draw a diagram of a right angled isosceles prism which is used to make an inverted image erect.

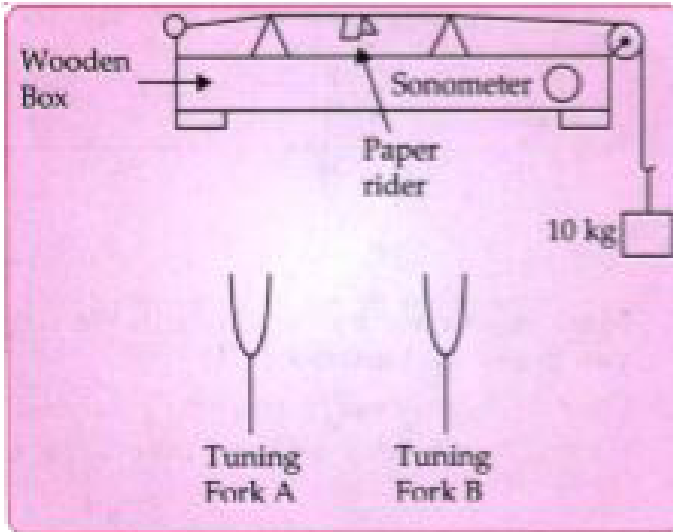


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**248.** The diagram below shows a wire stretched over a sonometer. Stems of two vibrating tuning forks A and B are touched in turn to the wooden box of the sonometer. It is observed that the paper rider (a small piece of paper folded at the centre) present on the wire flies off when the stem of vibrating tuning fork B is touched to the wooden box but the paper just vibrates when the stem of vibrating tuning fork A is touched to the wooden box.



Name the phenomenon when the paper rider just vibrates.



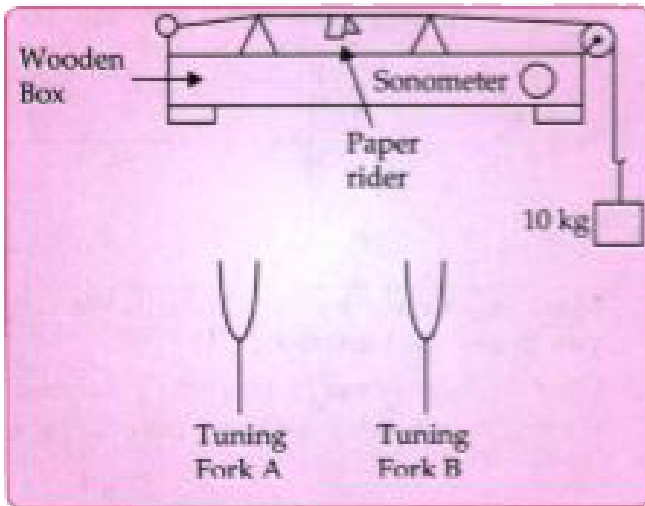
249.

The diagram above shows a wire stretched over a sonometer. Stems of two vibrating tuning forks A and B are touched to the wooden box of the sonometer. It is observed that the paper rider (a small piece of paper folded at the centre) present on the wire flies off when the stem of vibrating tuning fork B is

touched to the wooden box but the paper just vibrates when the stem of vibrating tuning fork A is touched to the wooden box.

Name the phenomenon when the paper rider flies off.

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250.

The diagram above shows a wire stretched over a

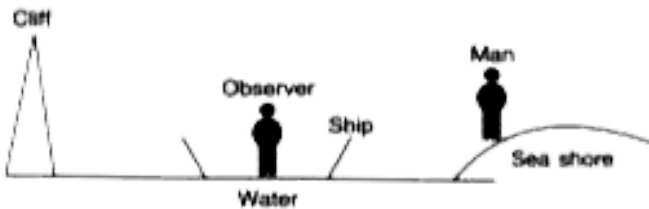
sonometer. Stems of two vibrating tuning forks A and B are touched to the wooden box of the sonometer. It is observed that the paper rider (a small piece of paper folded at the centre) present on the wire flies off when the stem of vibrating tuning fork B is touched to the wooden box but the paper just vibrates when the stem of vibrating tuning fork A is touched to the wooden box.

Why does the paper rider fly off when the stem of tuning fork B is touched to the box ?



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**251.** A person is standing at the sea shore. An observer on the ship which is anchored in between a vertical cliff and the person on the shore fires a gun. the person on the shore hears two sounds, 2 seconds and 3 seconds after seeing the smoke of the fired gun. If the speed of sound in the air is  $320 \text{ m s}^{-1}$ , then calculate :

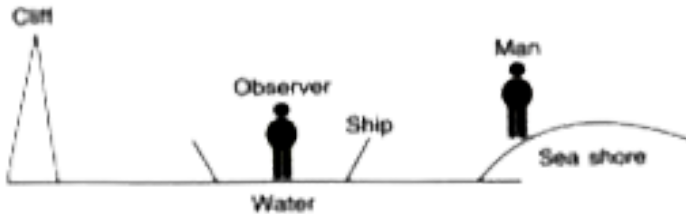


the distance between the observer on the ship and the person on the shore.

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**252.** A person is standing at the sea shore. An observer on the ship which is anchored in between a vertical cliff and the person on the shore fires a gun. the person on the shore hears two sounds, 2 seconds and 3 seconds after seeing the smoke of the fired gun. If the speed of sound in the air is  $320 \text{ m s}^{-1}$ , then calculate :



the distance between the cliff and the observer on the ship.



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**253.** A fuse is rated 8 A. Can it be used with an electrical appliance rated 5 kW, 200 V ? Give a reason.



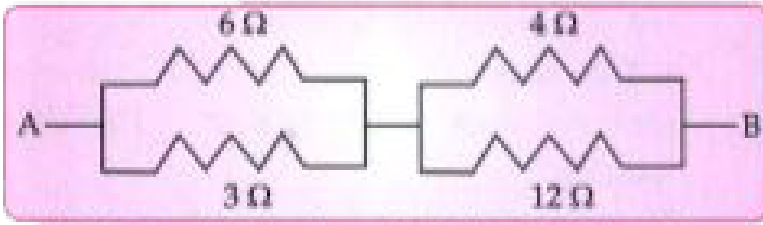
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**254.** Name two safety devices which are connected to the live wire of a household electric circuit.



**Watch Video Solution**

255. Find the equivalent resistance between A and B.



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256. State whether the resistivity of a wire changes with the change in the thickness of the wire.

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**257.** An electric iron is rated 220 V, 2 kW.

If the iron is used for 2 h daily find the cost of running it for one week if it costs Rs. 4.25 per kWh.



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**258.** An electric iron is rated at 220 V, 2 kW.

Why is the fuse absolutely necessary in a power circuit?



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**259.** Heat supplied to a solid changes it into liquid.

What is this change in phase called ?



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**260.** During the phase change does the average kinetic energy of the molecules of the substance increase ?



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**261.** What is the energy absorbed during the phase change called ?



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**262.** State two differences between "Heat Capacity" and "Specific Heat Capacity"



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**263.** What is the relationship between heat capacity and specific heat capacity of a substance ?



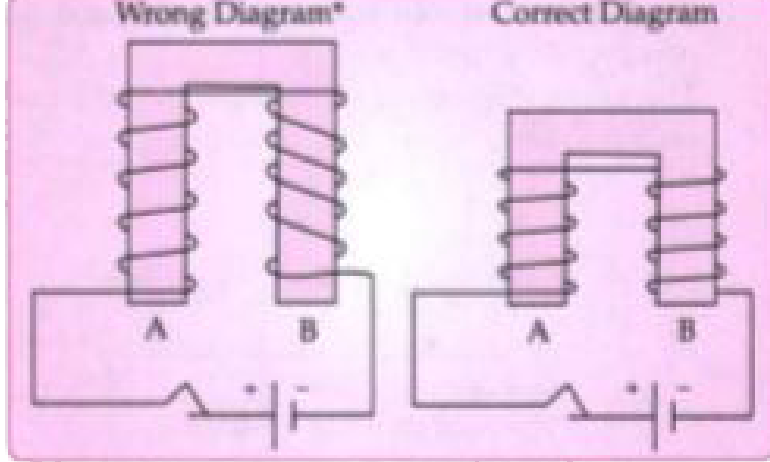
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**264.** The temperature of 170 g of water at  $50^{\circ}\text{C}$  is lowered to  $5^{\circ}\text{C}$  by adding certain amount of ice to it. Find the mass of ice added. Given : Specific heat capacity of water =  $4200\text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$  and specific latent heat of ice =  $336000\text{ J kg}^{-1}$ .



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**265.** The diagram shows a coil wound around a U shape soft iron bar AB.



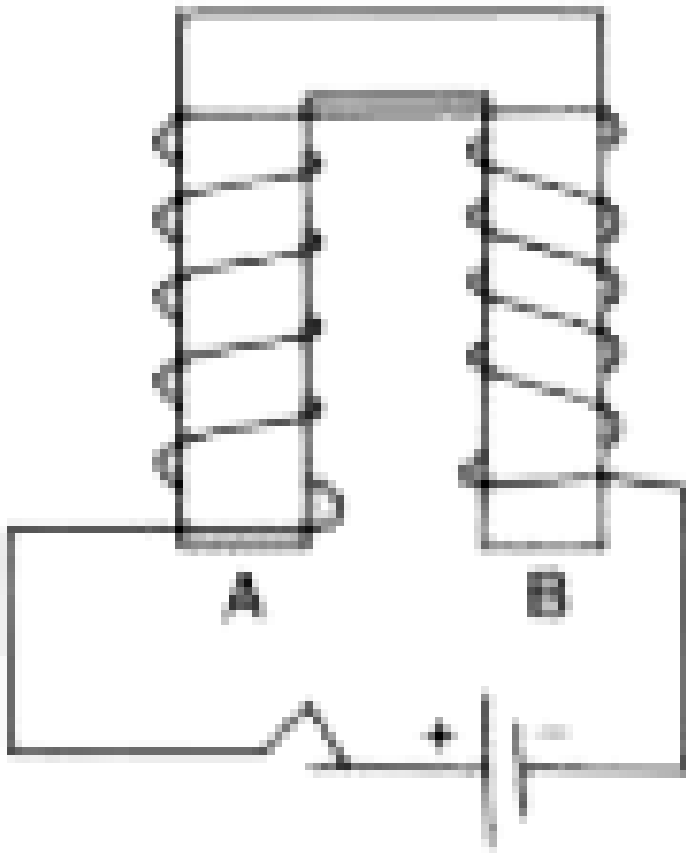
What is the polarity induced at the ends A and B when the switch is pressed ?



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**266.** The diagram shows a coil wound around a U shape soft iron bar AB.

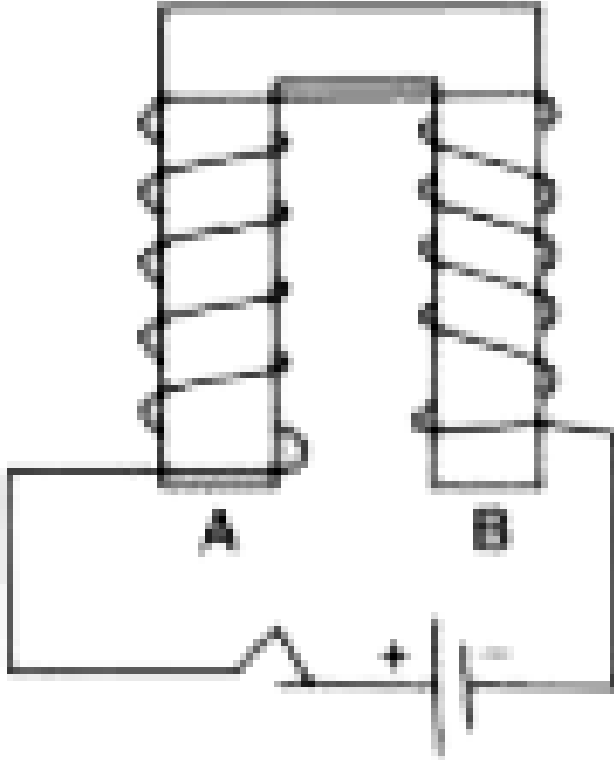




Suggest one way to strengthen the magnetic field in the electromagnet.

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267. The diagram shows a coil wound around a U shape soft iron bar AB.



What will be the polarities at A and B if the direction of current is reversed in the circuit ?

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**268.** The ore of Uranium found in nature contains

${}_{92}^{238}\text{U}$  and  ${}_{92}^{235}\text{U}$  . Although both the isotopes are

fissionable, it is found out experimentally that one of the two isotopes is more easily fissionable.

Name the isotope of Uranium which is easily fissionable



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**269.** The ore of uranium found in nature contains

${}_{92}\text{U}^{238}$  and  ${}_{92}\text{U}^{235}$  . Although both the isotopes are

fissionable, it is found out experimentally that one of

the two isotopes is more easily fissionable.

Give a reason for your answer.



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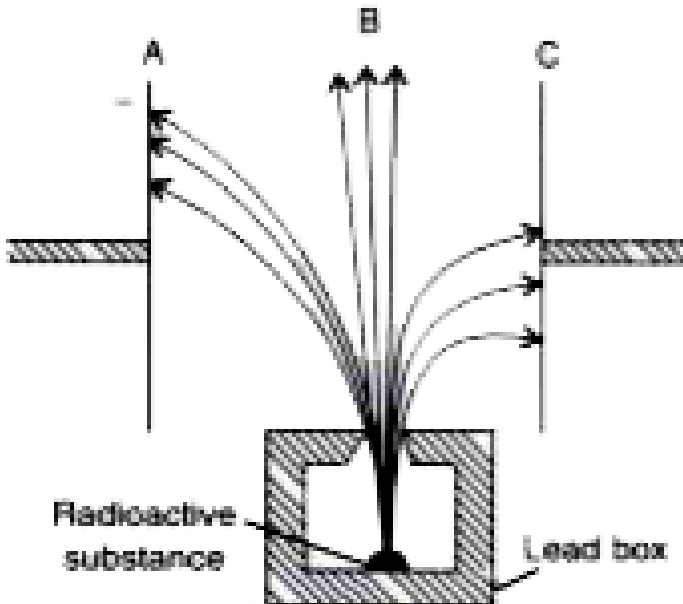
**270.** The ore of uranium found in nature contains  ${}_{92}\text{U}^{238}$  and  ${}_{92}\text{U}^{235}$ . Although both the isotopes are fissionable, it is found out experimentally that one of the two isotopes is more easily fissionable.

Write a nuclear reaction when Uranium 238 emits an alpha particle to form a Thorium (Th) nucleus.



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**271.** Radiations given out from a source when subjected to an electric field in a direction perpendicular to their path are shown below in the diagram. The arrows show the path of the radiation A, B and C. Answer the following question in terms of A, B and C.

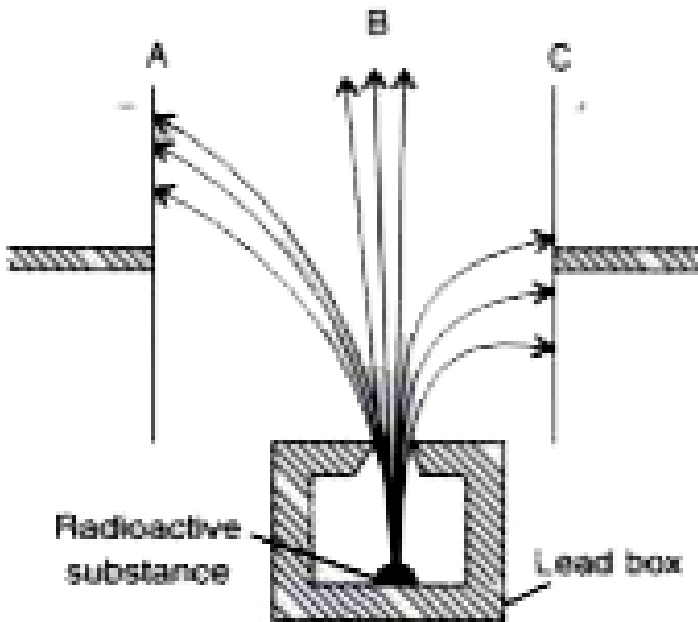


Name the radiation B which is unaffected by the electrostatic field.



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**272.** Radiations given out from a source when subjected to an electric field in a direction perpendicular to their path are shown below in the diagram. The arrows show the path of the radiation A, B and C. Answer the following question in terms of A, B and C.

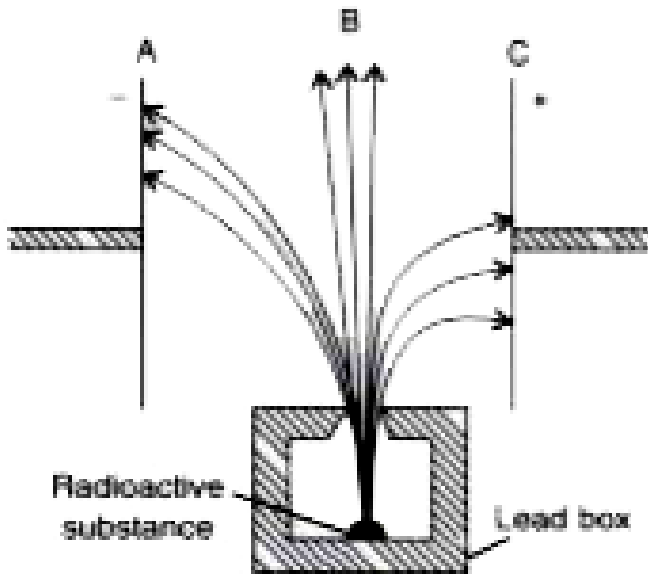


Why does the radiation C deflect more than A?

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**273.** Radiations given out from a source when subjected to an electric field in a direction perpendicular to their path are shown below in the

diagram. The arrows show the path of the radiation A, B and C. Answer the following question in terms of A, B and C.

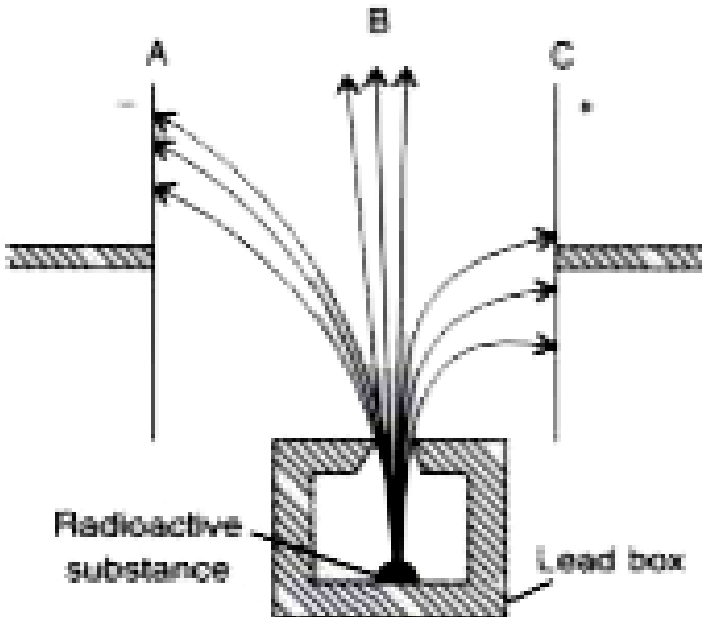


Which among the three causes the least biological damage extremely?

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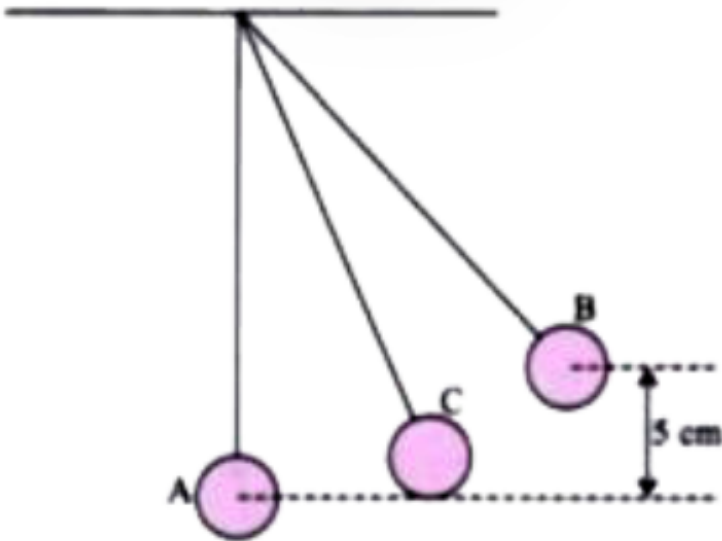


274. Radiations given out from a source when subjected to an electric field in a direction perpendicular to their path are shown below in the diagram. The arrows show the path of the radiation A, B and C. Answer the following question in terms of A, B and C.



Name the radiation which is used in carbon dating.

275. The figure below shows a simple pendulum of mass 200 g. It is displaced from the mean position A to the extreme position B. The potential energy at the position A is zero. At the position B the pendulum bob is raised by 5 m.



(i) What is the potential energy of the pendulum at

the position B?

(ii) What is the total mechanical energy at point C?

(iii) What is the speed of the bob at the position A when released from B ?

(Take  $g = 10\text{ms}^{-2}$  and there is no loss of energy.)



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**276.** With reference to the direction of action, how does a centripetal force differ from a centrifugal during uniform circular motion ?



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**277.** Is centrifugal force the force of reaction of centripetal force ?

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**278.** Compare the magnitudes of centripetal and centrifugal force.

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**279.** A block and tackle system of pulleys has velocity ratio 4.

Draw a neat labelled diagram of the system

indicating clearly the points of application and direction of load and effort.



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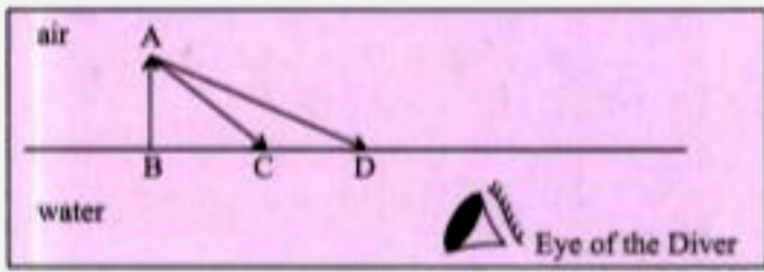
**280.** A block and tackle system of pulleys has velocity ratio 4.

What will be its V. R. if the weight of the movable block is doubled ?



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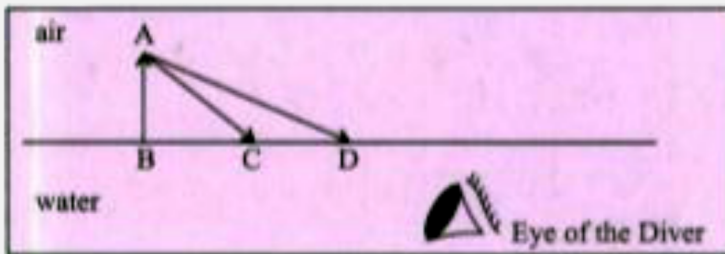
**281.** A diver in water looks obliquely at an object AB in air.



Does the object appear taller, shorter or of the same size to the diver?

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**282.** A diver in water looks obliquely at an object AB in air.



Show the path of two rays AC and AD starting from

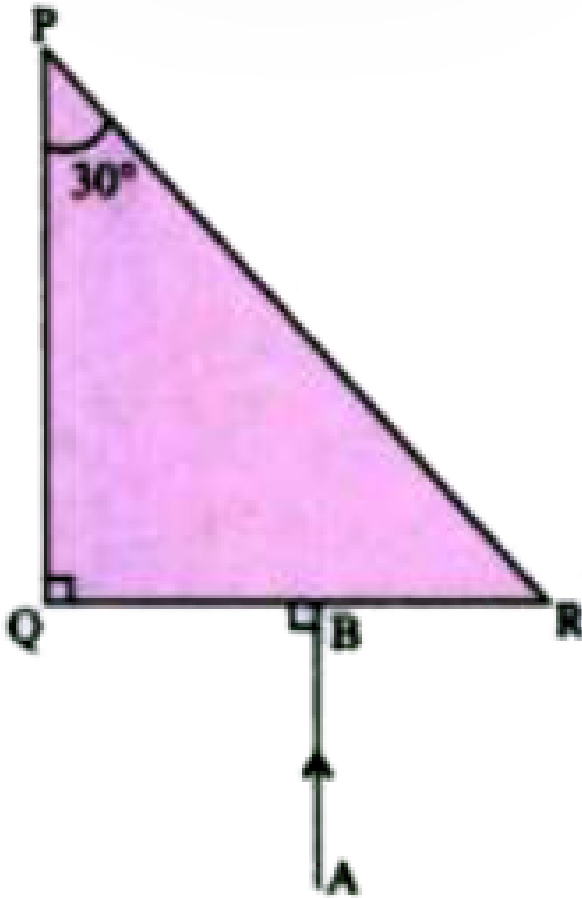
the tip of the object as it travels towards the diver in water and hence obtain the image of the object.



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**283.** Complete the path of the ray AB through the glass prism in PQR till it emerges out of the prism.

Given the critical angle of the glass as  $42^\circ$ .



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**284.** A lens of focal length 20 cm forms an inverted image at a distance 60 cm from the lens.

(i) Identify the lens.

(ii) How far is the lens present in front of the object ?

(iii) Calculate the magnification of the image.



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**285.** Give reasons for the following:

During the day :

Clouds appear white.



**Watch Video Solution**

**286.** Give reasons for the following:

During the day :

Sky appears blue.



**Watch Video Solution**

**287.** Name the system which enables us to locate underwater objects by transmitting ultrasonic waves and detecting the reflecting impulse.



**Watch Video Solution**

**288.** What are acoustically measurable quantities related to pitch and loudness ?



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**289.** When a tuning fork (vibrating) is held close to ear, one hears a faint hum. The same (vibrating tuning fork) is held such that its stem is in contact with the table surface, then one hears a loud sound. Explain.

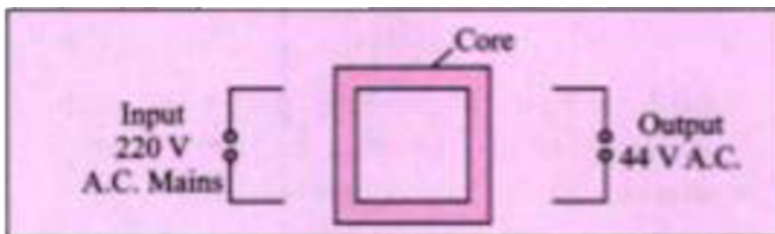


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**290.** A man standing in front of a vertical cliff fires a gun. He hears the echo after 3.5 seconds. On moving closer to the cliff by 84 m, he hears the echo after 3 seconds. Calculate the distance of the cliff from the initial position of the man.

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**291.** The diagram below shows the core of a transformer and its input and output connections.

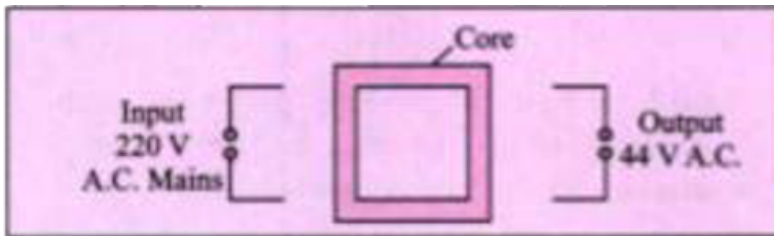


State the material used for the core.



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292. The diagram below shows the core of a transformer and its input and output connections.



Copy and complete the diagram of the transformer by drawing input and output coils.



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293. Superconductors are:



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**294.** Calculate the current drawn by an appliance rated 110 W, 220 V when connected across 220 V supply.

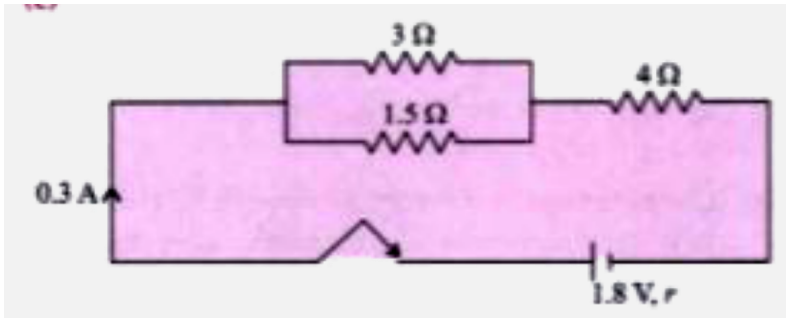


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**295.** Name a substance whose resistance decreases with the increase in temperature.



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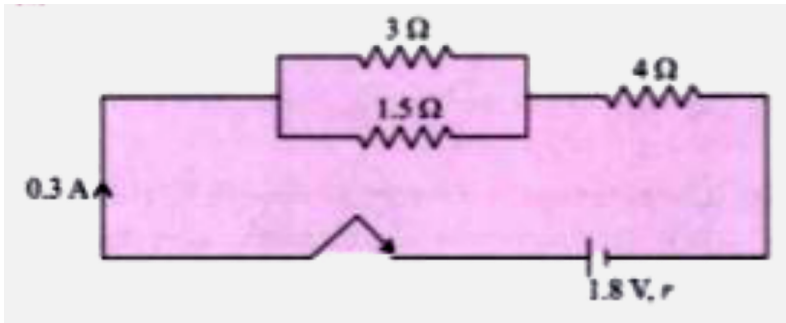
296.

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

Calculate :

Current through  $3\ \Omega$  resistor.

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297.

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

Calculate :

The internal resistance  $r$ .

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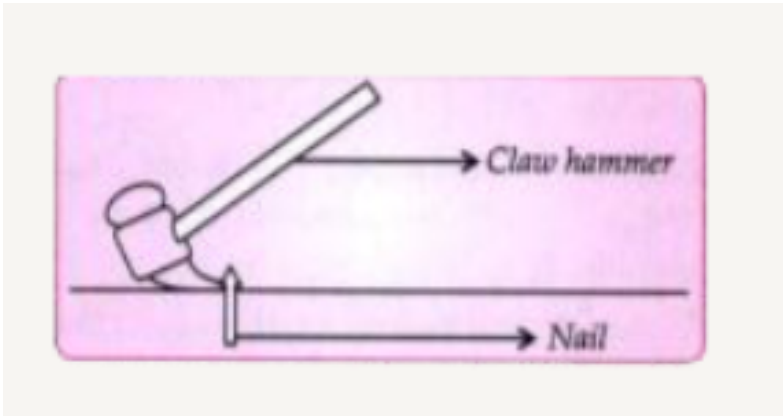
298. Define heat capacity of a substance.

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## Section I

1. The diagram below shows a claw hammer used to remove a nail :



(i) To which class of lever does it belong?

(ii) Give one more example of the same class of lever mentioned by you in (i) for which the mechanical advantage is greater than one.



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2. Two bodies A and B have masses in the ratio 5 : 1 and their kinetic energies are in the ratio 125 : 9. Find the ratio of their velocities.



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3. Name the physical quantity which is measured in calorie. How is it related to the S.I. unit of that quantity?



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4. Name the physical quantity which is measured in calorie. How is it related to the S.I. unit of that quantity?



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5. Define couple.



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6. State the S.I. unit of moment of couple.



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7. Define critical angle. How does it depend on the wavelength of incident light?

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8. State one important factor which affects the critical angle of a given medium.

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9. An electromagnetic radiation is used for photography in fog.

Identify the radiation.



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10. An electromagnetic radiation is used for photography in fog.

Why is this radiation mentioned by you, ideal for this purpose ?



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11. What is the relation between the refractive index of water with respect to air ( ${}_a\mu_w$ ) and the refractive index of air with respect to water ( ${}_w\mu_a$ ).



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**12.** If the refractive index of water with respect to air ( ${}_a\mu_w$ ) is  $\frac{5}{3}$ . Calculate the refractive index of air with respect to water ( ${}_w\mu_a$ ).

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**13.** The specific heat capacity of a substance A is  $3,800 Jkg^{-1}K^{-1}$  and that of a substance B is  $400 Jkg^{-1}K^{-1}$ . Which of the two substances is a good conductor of heat ? Give a reason for your answer.

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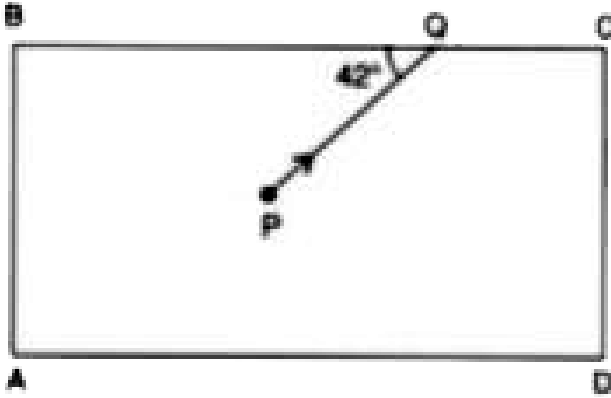
**14.** A man playing a flute is able to produce notes of different frequencies. If he closes the holes near his mouth, will the pitch of the note produced, increase or decrease ? Give a reason.



**Watch Video Solution**

**15.** The diagram alongside shows a light source P embedded in a rectangular glass block ABCD of critical angle  $42^\circ$ . Complete the path of the ray PQ till

it emerges out of the block. [Write necessary angles.]



[Watch Video Solution](#)

**16.** If the lens is placed in water instead of air, how does its focal length change?

[Watch Video Solution](#)



**17.** Which lens, thick or thin has greater focal length?



**Watch Video Solution**

**18.** Two waves of the same pitch have amplitudes in the ratio 1 : 3. What will be the ratio of their intensities and



**Watch Video Solution**

**19.** Two waves of the same pitch have amplitudes in the ratio 1 : 3. What will be the ratio of their frequencies?

A. 1:9

B. 9:1

C. 1:1

D. no change

**Answer: no change**



**Watch Video Solution**

**20.** How does an increase in the temperature affect the specific resistance of a :

Metal and



**Watch Video Solution**

**21.** How does an increase in the temperature affect the specific resistance of a :

Semiconductor ?



**Watch Video Solution**

**22.** State two differences between the forced and resonant vibrations.



**Watch Video Solution**

**23.** Which characteristic of sound, makes it possible to recognize a person by his voice without seeing him ?



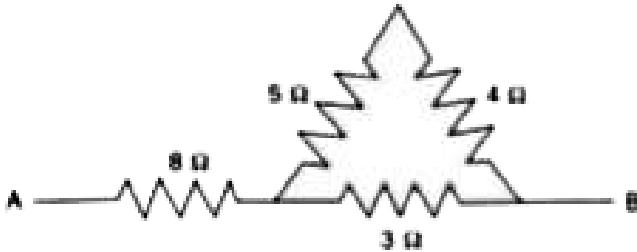
**Watch Video Solution**

**24.** Is it possible for a hydrogen ( ${}^1_1H$ ) nucleus to emit an alpha particle ? Give a reason for your answer.



**Watch Video Solution**

25. Calculate the effective resistance across AB :



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26. State whether the specific heat capacity of a substance remains the same when its state changes from solid to liquid.

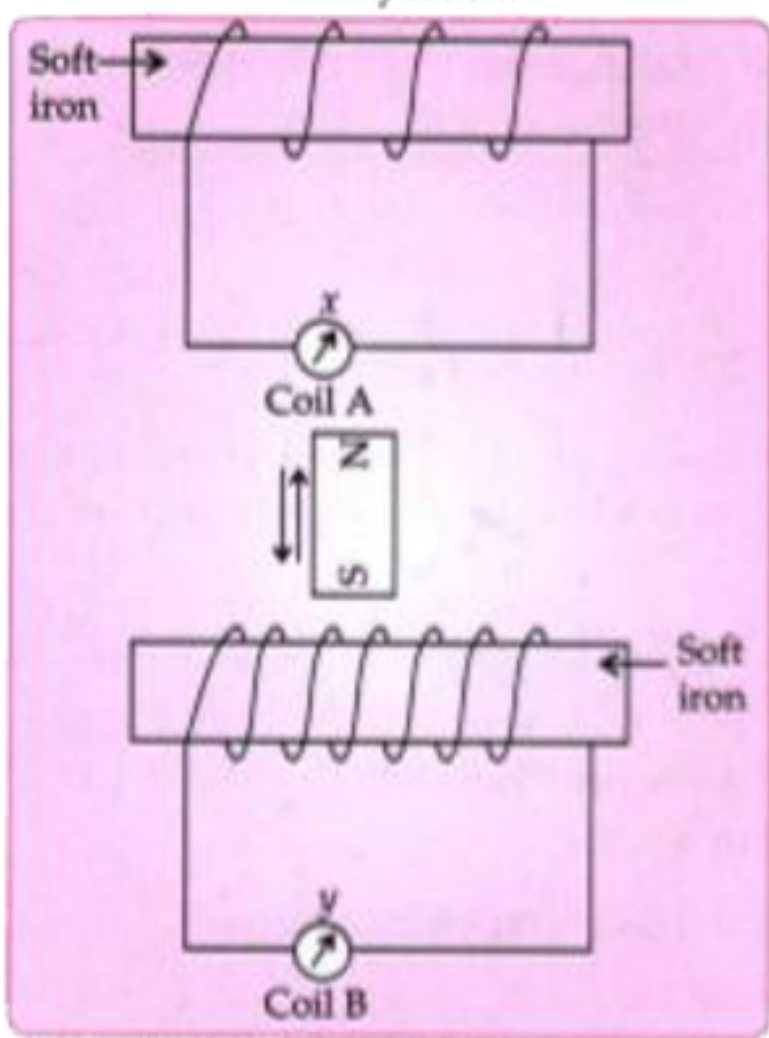
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27. Give one example to support your answer.



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28. A magnet kept at the centre of two coils A and B is moved to and fro as shown in the diagram. The two galvanometers show deflection.



State with a reason whether :

$$x > y$$

or  $x < y$ . [x and y are magnitudes of deflection]

[Watch Video Solution](#)

**29.** Why is a nuclear fusion reaction called a thermo nuclear reaction ?



**Watch Video Solution**

**30.** State two ways to increase the speed of rotation of a D.C. motor.



**Watch Video Solution**



1. A body of mass 10 kg is kept at a height of 5 m. It is allowed to fall and reach the ground.

What is the total mechanical energy possessed by the body at the height of 2 m assuming it is a frictionless medium ?



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2. A body of mass 10 kg is kept at a height of 5 m. It is allowed to fall and reach the ground.

What is the kinetic energy possessed by the body just before hitting the ground? (Take  $g = 10m / s^2$ ).



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3. A uniform meter scale is in equilibrium as shown in the diagram : Calculate the weight of the meter scale.

(ii) Which of the following options is correct to keep the ruler in equilibrium when 40 gf wt is shifted to 0 cm mark?

F is shifted towards 0 cm.

Or

F is shifted towards 100 cm.



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4. The diagram below shows a pulley arrangement :

(i) Copy the diagram and mark the direction of tension on each strand of the string.

(ii) What is the velocity ratio of the arrangement ?

(iii) If the tension acting on the string is  $T$ , then what is the relationship between  $T$  and effort  $E$  ?

(iv) If the free end of the string moves through a distance  $x$ , find the distance by which the load is raised.



**Watch Video Solution**

5. How does the angle of deviation formed by a prism change with the increase in the angle of incidence ?

Draw a graph showing the variation in the angle of deviation with the angle of incidence at a prism surface.



[Watch Video Solution](#)

6. A virtual, diminished image is formed when an object is placed between the optical centre and the principal focus of a lens.

Name the type of lens which forms the above image.

A. convex

B. concave

C. both

D. none

**Answer: concave**



**Watch Video Solution**

7. A virtual, diminished image is formed when an object is placed between the optical centre and the principal focus of a lens.

Draw a ray diagram to show the formation of the image with the above stated characteristics.



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8. An object is placed at a distance 24 cm in front of a convex lens of focal length 8 cm.

(i) What is the nature of the image so formed ?

(ii) Calculate the distance of the image from the lens.

(iii) Calculate the magnification of the image.



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9. It is observed that during march-past we hear a base drum distinctly from a distance compared to the side drums.

Name the characteristics of sound associated with the above observation.



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**10.** It is observed that the temperature of the surroundings starts falling when the ice in a frozen lake starts melting. Give a reason for the observation.



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**11.** A pendulum has a frequency of 4 vibrations per second. An observer starts the pendulum and fires a gun simultaneously. He hears the echo from the cliff

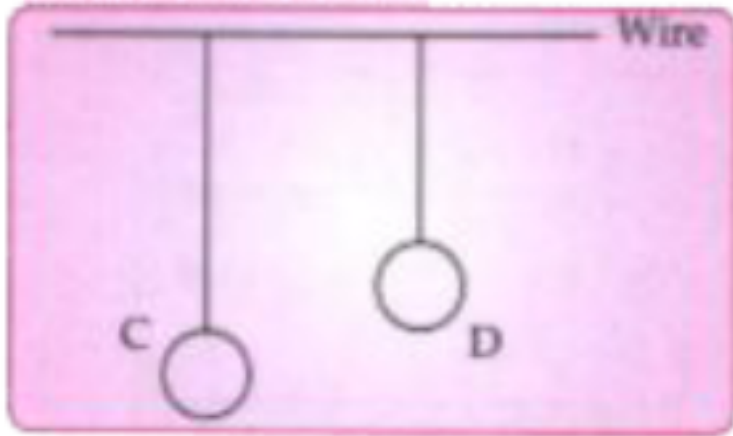
after 6 vibrations of the pendulum. If the velocity of sound in air is 340 m/s, find the distance between the cliff and the observer.



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**12.** Two pendulums C and D suspended from a wire as shown in the figure given below. Pendulum C is made to oscillate by displacing it from its mean position. It is seen that D also starts oscillating.





- (i) Name the type of oscillation, C will execute.
- (ii) Name the type of oscillation, D will execute.
- (iii) If the length of D is made equal to C then what difference will you notice in the oscillations of D?
- (iv) What is the name of the phenomenon when the length of D is made equal to C?

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13. Write one advantage of connecting electrical appliances in parallel combination.



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14. What characteristics should a fuse wire have?

- A. high melting point, high specific resistance
- B. low melting point, low specific resistance
- C. high melting point, low specific resistance
- D. low melting point, high specific resistance

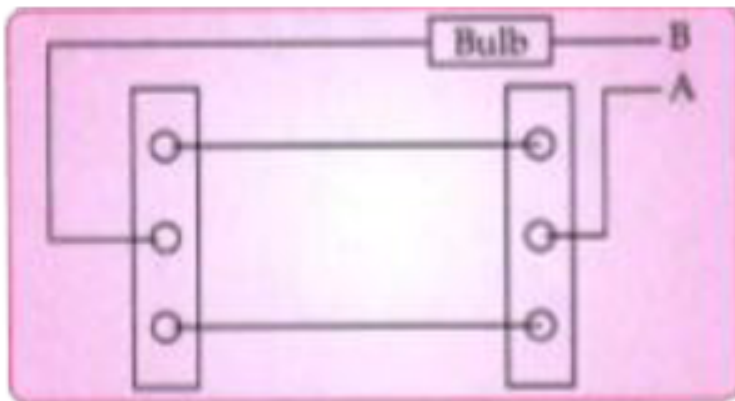
**Answer: low melting point, high specific resistance**

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15. Which wire in a power circuit is connected to the metallic body of the appliance ?

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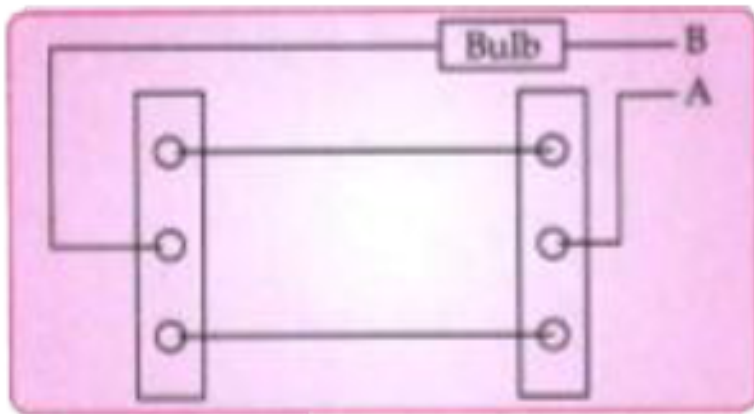
16. The diagram below shows a dual control switch circuit connected to a bulb.



Copy the diagram and complete it so that the bulb is switched ON.

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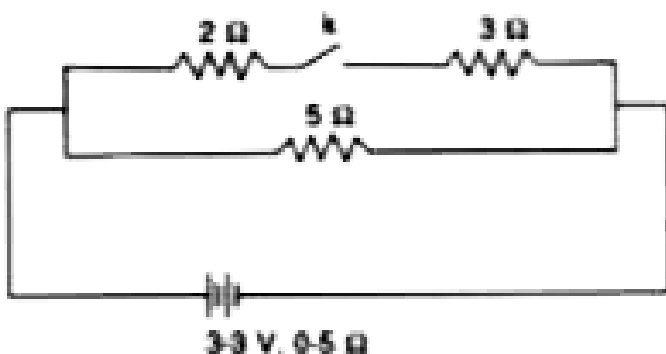
17. The diagram below shows a dual control switch circuit connected to a bulb.



Out of A and B which one is the live wire and which one is the neutral wire ?

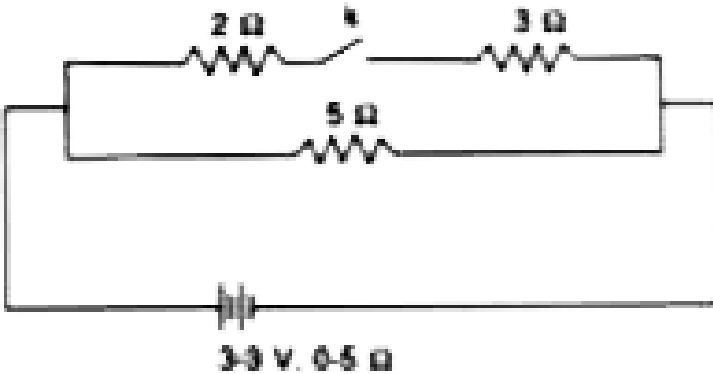
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18. The diagram alongside shows a circuit with the key  $k$  open. Calculate :



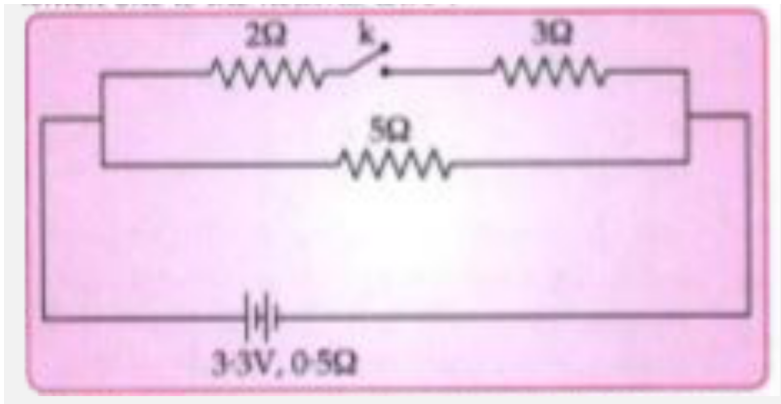
the resistance of the circuit when the key  $k$  is open.

19. The diagram alongside shows a circuit with the key k open. Calculate :



the current drawn from the cell when the key k is open.

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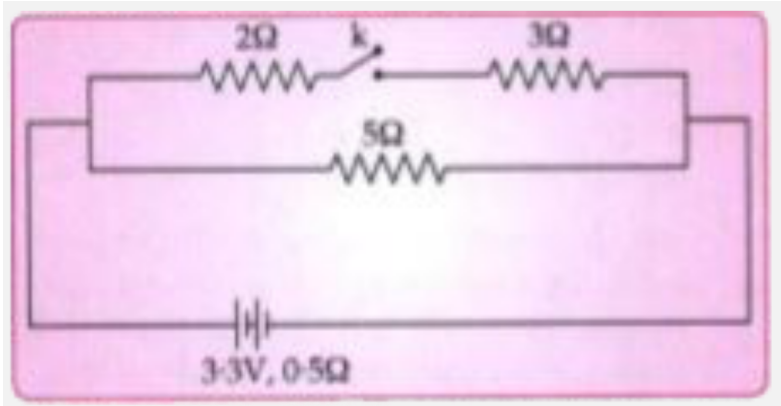
20.

The diagram above shows a circuit with the key  $k$  open. Calculate :

the resistance of the circuit when the key  $k$  is closed.



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21.

The diagram above shows a circuit with the key  $k$  open. Calculate :

the current drawn from the cell when the key  $k$  is closed.

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22. Define Calorimetry.

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23. Name the material used for making a Calorimeter.



[Watch Video Solution](#)

24. Why is a Calorimeter made up of thin sheets of the above material.



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25. The melting point of naphthalene is  $80^{\circ}C$  and the room temperature is  $30^{\circ}C$ . A sample of liquid naphthalene at  $100^{\circ}C$  is cooled down to the room

temperature. Draw a temperature time graph to represent this cooling. In the graph, mark the region which corresponds to the freezing process.



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**26.** 104 g of water at  $30^{\circ}\text{C}$  is taken in a calorimeter made of copper of mass 42 g. When a certain mass of ice at  $0^{\circ}\text{C}$  is added to it, the final steady temperature of the mixture after the ice has melted, was found to be  $10^{\circ}\text{C}$ . Find the mass of ice added. [Specific heat capacity of water =  $4.2 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$ , Specific latent heat of fusion of ice =  $336 \text{ J g}^{-1}$ , Specific heat capacity of copper =  $0.4 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$ ].



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27. Draw a neat labelled diagram of an A.C. generator.



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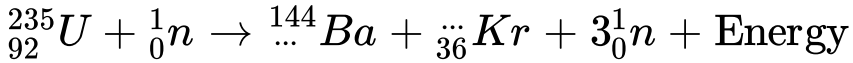
28. Define nuclear fission.



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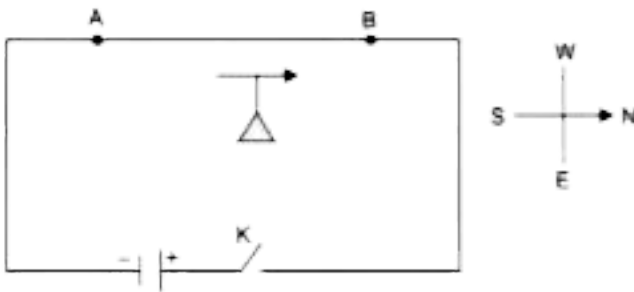
29. Rewrite and complete the following nuclear reaction by filling in the atomic number of Ba and

mass number of Kr :



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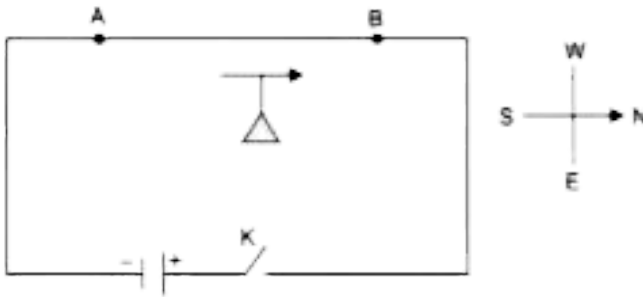
30. The diagram below shows a magnetic needle kept just below the conductor AB which is kept in North South direction.



In which direction will the needle deflect when the key is closed ?

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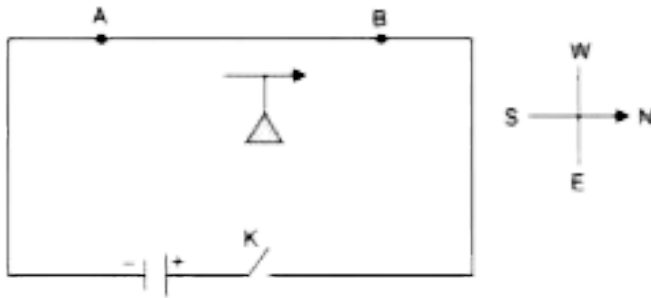
31. The diagram below shows a magnetic needle kept just below the conductor AB which is kept in North South direction.



Why is the deflection produced ?

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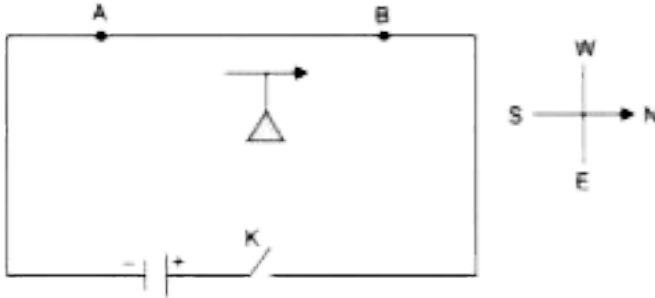
32. The diagram below shows a magnetic needle kept just below the conductor AB which is kept in North South direction.



What will be the change in the deflection of the magnetic needle if it is taken just above the conductor AB ?

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33. The diagram below shows a magnetic needle kept just below the conductor AB which is kept in North South direction.



Name one device which works on this principle.

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**Multiple Choice Questions**

1. A physical change that a particular individual undergoes may be termed as:

A. Growth

B. Development

C. Progress

D. Improvement

**Answer: A**



**View Text Solution**



2. Which of the below stages is called as a "Period of storm & stress"?

A. Childhood

B. Adulthood

C. Adolescence

D. Infancy

**Answer: C**



**View Text Solution**

3. Physical development involves :

A. The growth of a child's ability to think and reason

B. Being able to speak in full sentences and have quite a good vocabulary.

C. Eating ice cream with chop sticks.

D. Physical development involves developing control over the body, particularly muscles and physical

**Answer: D**



**View Text Solution**

4. Choose the best definition of gross motor skills.

A. Gross motor skills involve developing the ability to be able to think about things that happen to you.

B. Gross motor skills are those which require whole body movement, and which involve the large muscles of the body to perform everyday functions, such as standing walking, running

C. Gross motor skills involve the ability to understand your emotions and feelings.

D. Gross motor skills involve the development of the ability to use scissors accurately.

**Answer: B**



**View Text Solution**

**5. Locomotor skills include:**

A. The ability to sleep for 8 hours

B. Walking, running and hopping

C. Sharing and tum taking

D. Eating and pencil control

**Answer: B**



**View Text Solution**

6. Which among these is a not a factor that influences growth and development?

- A. Hereditary
- B. Nutrition
- C. Lifestyle
- D. Environmental

**Answer: C**



**View Text Solution**

7. The ability to use SMALL muscle groups is known as \_\_\_ motor skills.

A. Gross

B. Moral

C. Fine

D. Social

**Answer: C**



**View Text Solution**

8. The number of times you exercise each week:

A. Frequency

B. Frequent

C. Training Schedule

D. Time

**Answer: A**



[View Text Solution](#)

9. How hard the exercise is?

A. Intensity

B. Overload

C. Difficulty

D. Type

**Answer: A**



**View Text Solution**

**10.** Focusing training on activities and exercises relevant to an individual's sporting goals and needs:

A. Specificity

B. Variation



C. Adaptation

D. Type

**Answer: A**



**View Text Solution**

**11.** Training at an appropriate intensity and gradually increasing the amount of stress placed on the body:

A. Progressive Overload

B. Adaptation

C. Intensity

D. Type

**Answer: A**



[View Text Solution](#)

**12.** By ensuring that you progressively overload your body you encourage it to adapt to new stresses being placed upon it

A. Adaptation

B. Variation

C. Intensity

D. Specificity

**Answer: A**



**View Text Solution**

**13.** Simon is 43 years old. Calculate his max heart rate.

A.  $220 - 43 = 177$

B.  $200 - 43 = 157$

C.  $230 - 43 = 187$

D.  $220 - 53 = 167$

**Answer: A**



**View Text Solution**

**14.** Changes that occur in an individual's personality, emotions, and relationships with others refer to \_\_\_\_\_ development.

- A. Biological
- B. Physical
- C. Cognitive
- D. Socio-emotional

**Answer: D**



**View Text Solution**

15. What component would be the most important to a long-distance runner?

- A. Reaction time
- B. Cardiovascular endurance
- C. Agility
- D. Muscular strength

**Answer: B**



[View Text Solution](#)

16. The push-up test measures \_\_\_\_\_

A. Flexibility

B. Cardiovascular Endurance

C. Body Composition

D. Muscular Endurance and Muscle Strength

**Answer: D**



[View Text Solution](#)

17. Skill component that describes the ability to stabilise or control the body while standing or moving

A. Agility

B. Speed

C. Balance

D. Reaction time

**Answer: C**



**View Text Solution**

**18.** What skill component describes the amount of force you can create when performing a task?

A. Speed

B. Power

C. Balance

D. Coordination

**Answer: B**



**View Text Solution**

**19.** What do we call physical activity done to keep the body fit and healthy?

A. Program

B. Flexibility

C. Endurance



D. Exercise

**Answer: D**



**View Text Solution**

**20.** What is an advantage to exercise?

- A. Improves quality of life
- B. Decreases chronic disease
- C. Stress relief
- D. All of these

**Answer: D**



[View Text Solution](#)

21. What type of exercise is more appropriate in the cool down as they help the muscles to relax?

- A. Static stretching
- B. Strength exercise
- C. Dynamic stretching
- D. Endurance exercise

**Answer: A**



[View Text Solution](#)

22. What is the correct sequence of an exercise program?

- A. Cool down, warm up, work out
- B. Work out, cool down, warm up
- C. Work out, warm up, cool down
- D. Warm up, work out, cool down

**Answer: D**



**View Text Solution**

**23.** What principles of exercise state that we are unique to each other in terms of fitness level, fitness goals, and nutritional preferences?

A. Specificity

B. Adaptation

C. Individuality

D. Progression

**Answer: C**



**View Text Solution**

**24.** This is an instructional program that gives attention to the development and care of the body.

- A. Physical Education
- B. Physical Development
- C. Physical Fitness
- D. Physical Curriculum

**Answer: A**



**View Text Solution**

**25.** This development can be acquired through physical education when someone acquires positive traits such as confidence, discipline, courage and perseverance.

A. Emotional Development

B. Mental Development

C. Physical Development

D. Social Development

**Answer: A**



**View Text Solution**

## 26. What is flexibility?

- A. The ability to maintain centre of mass over a base of support
- B. The ability to move a joint fluidly through its complete range of motion
- C. The maximum amount of force that can be generated by a muscle or muscle group
- D. The ability to quickly and precisely move or change direction without losing balance or time

**Answer: B**



[View Text Solution](#)

27. An immediate and temporary care given to a person who has been injured or suddenly taken ill.

A. Moral Support

B. Therapy

C. First Aid

D. Exercise

**Answer: C**



[View Text Solution](#)



**28.** When the two bones that come together to form a joint become separated, the joint is described as being \_\_\_\_\_

A. Dislocated

B. Fractured

C. Sprained

D. Strained

**Answer: A**



**View Text Solution**

**29.** The "E" in the RICE method is

- A. Enquire
- B. Emergency
- C. Elongate
- D. Elevate

**Answer: D**



**View Text Solution**

**30.** What does aerobic mean?

A. Without oxygen

B. With oxygen

C. Bows and arrows

D. None of these

**Answer: B**



[View Text Solution](#)

**31.** What is reaction time?

A. The time taken to respond to a stimulus.

B. The ability to perform strength performances quickly

C. The ability to put body parts into motion quickly.

D. The ability to use two or more body parts together.

**Answer: A**



**View Text Solution**

**32.** Ideal choice of sport for Endomorphs can be \_\_\_\_\_

A. Weightlifting

B. Marathon running

C. Long Jump

D. High Jump

**Answer: A**



**View Text Solution**

**33.** Which of the following is not a body type?

A. Ectomorph

B. Mesomorph

C. Hectomorph

D. Endomorph

**Answer: C**



**View Text Solution**

**34. What is a somatotype?**

- A. The size of your foot
- B. A bunch of tomatoes
- C. Classifying a body type
- D. How you play sport

**Answer: C**



**View Text Solution**

**35.** This body type typically has narrow shoulders, chest, hips, and abdomen.

A. Ectomorph

B. Mesomorph

C. Hectomorph

D. Endomorph

**Answer: A**



**View Text Solution**

 [View Text Solution](#)

**36.** Mesomorph's are

- A. Hard muscular body
- B. Delicate built
- C. Lightly muscled
- D. Round shape

**Answer: A**



[View Text Solution](#)



**37.** What is the reason for a warm up?

A. To increase likelihood of injuries

B. To decrease muscle temperature

C. To burn more calories

D. To increase heart rate and blood flow to  
muscles

**Answer: D**



**View Text Solution**

**38.** Which of the following is not a soft tissues?

A. Ligaments

B. Skin

C. Bone

D. Muscle

**Answer: C**



[View Text Solution](#)

**39.** Overload in sports training relates to when:

A. the oxygen is adequate to supply the need of the body.

B. the oxygen supplying mechanisms are not able to increase.

C. the intake of oxygen is insufficient to meet the demand.

D. the supply of oxygen is more than required.

**Answer: C**



**View Text Solution**

**40.** The definite general purpose of leading towards the aim are generally known as:

A. Target

B. Goals

C. Objectives

D. Motives

**Answer: C**



**View Text Solution**

**41.** Major Aim of Physical Education is to ensure a/an:

A. child's optimum physical development.

B. programme of activity and sports for all.

C. all-round development of the individual.

D. complete removal of boredom of the classroom activity.

**Answer: C**



**View Text Solution**

**42.** A good muscle tone is highly related to:

A. reflex time

B. movement time

C. transmission time

D. reaction time

**Answer: D**



**View Text Solution**

**43.** Which of the following is not an objective of sports training?

A. To accelerate athlete's growth and development

B. To make athlete dream about winning only

C. To bring about change in athlete's attitude, habits and behaviour

D. To make the athlete highly skillful technically and tactically

**Answer: B**



[View Text Solution](#)

**44.** What does cruciate mean?

A. To cross

B. To separate

C. To join at an intersection

D. To collide

**Answer: A**



**View Text Solution**

**45.** An important piece of equipment to help prevent concussion and damage to the mouth.

A. Helmet with no face shield

B. Face shield

C. Gumshield



D. Shin pads

**Answer: C**



**View Text Solution**

**46.** The ligament that is most commonly injured when your foot is planted and your body is rotating around your leg—a rotation injury is \_\_\_\_

A. ACL

B. PCL

C. MCL

D. LCL

**Answer: A**



**View Text Solution**

**47.** What treatment should you not use immediately after an injury, such as an ankle sprain?

- A. Rest
- B. Ice
- C. Compression
- D. Heat

**Answer: D**



**View Text Solution**

48. Which of the following is not a common knee injury?

- A. Runners Knee
- B. Cruciate Ligament Injury
- C. Hernia
- D. Tom Cartilage

**Answer: C**

49. Which of these is a common running injury?

A. Runners Knee

B. Shin Splint

C. Blister

D. All of these

**Answer: D**



**View Text Solution**

50. Injuries to muscles are known as tears or \_\_\_\_\_

A. Sprain

B. Strain

C. Breaks

D. Cracks

**Answer: B**



**View Text Solution**

## Questions

1. Choose the correct statement with respect to Refraction of light

- A. The ray of light does not necessarily deviate from its original path
- B. The light ray bends away from the normal when density of second medium is less than the first medium
- C. Speed of light decreases when it enters from one optical rarer medium to another denser medium due to decrease in wavelength of light wave
- D. All of the above

**Answer: D**



2. When a light ray enters from one optical medium to another and bends towards the normal then,

A. Angle of incidence is less than angle of refraction

B. it is travelling from optically denser medium to optically rarer medium

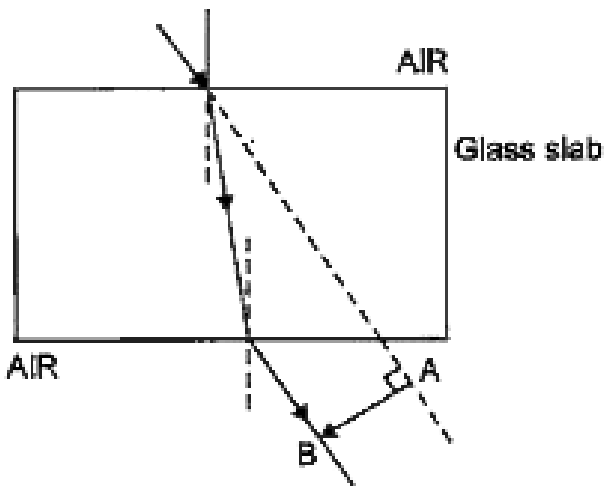
C. it is travelling from optically rarer medium to a optically denser medium

D. Speed of light remains unchanged

Answer: C

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3. In the diagram below the lateral displacement is given as:



A. ray AB

B. ray BA



C. segment AB

D. segment BA

**Answer: D**



**Watch Video Solution**

4. Identify the lens which exhibits the following characteristics of image virtual, erect and diminished

A. Convex lens

B. Concave lens

C. Plano convex lens

D. Concavo convex lens

**Answer: B**

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5. A coin is dropped in a glass through containing benzene filled to a depth of 4cm. When viewed from the outside it appears to be raised by 2cm. The refractive index of benzene with respect to air is calculated as:

A. dividing real depth by shift that is  $[4/2] = 2$

B. First finding the apparent depth as real depth-shift and then using the relation refractive index is real depth upon apparent depth =

$$[4 / (4 - 2)] = 2$$

C. Finding the real depth and then using the relation refractive index is real depth/apparent depth

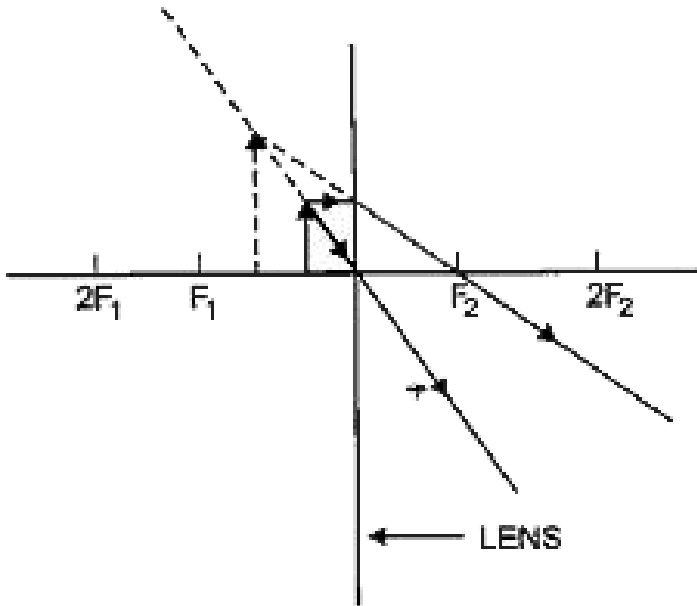
D. None of the above

**Answer: B**



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6. The diagram below shows a spherical lens in which the image obtained is highly magnified and has a power of 4.0 D. With reference to this answer the following questions:



The spherical lens used is :

A. convex

B. convexo concave

C. concave

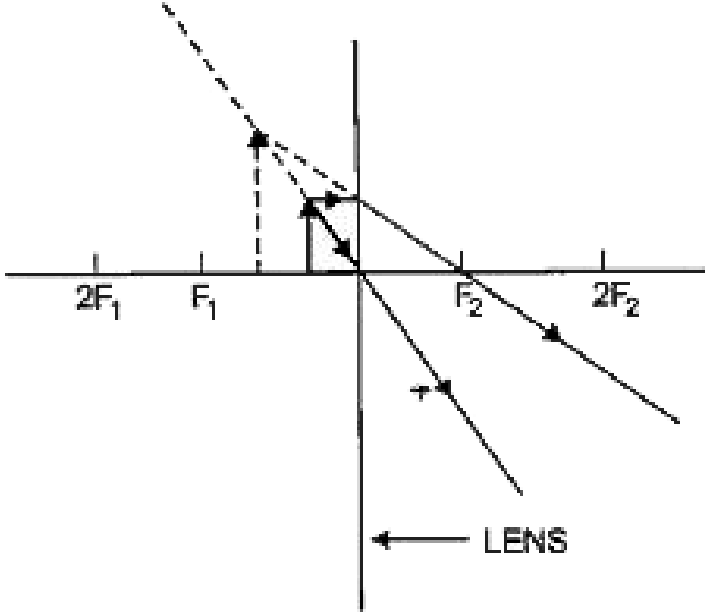
D. plano convex

**Answer: A**



**View Text Solution**

7. The diagram below shows a spherical lens in which the image obtained is highly magnified and has a power of  $4.0\text{ D}$ . With reference to this answer the following questions:



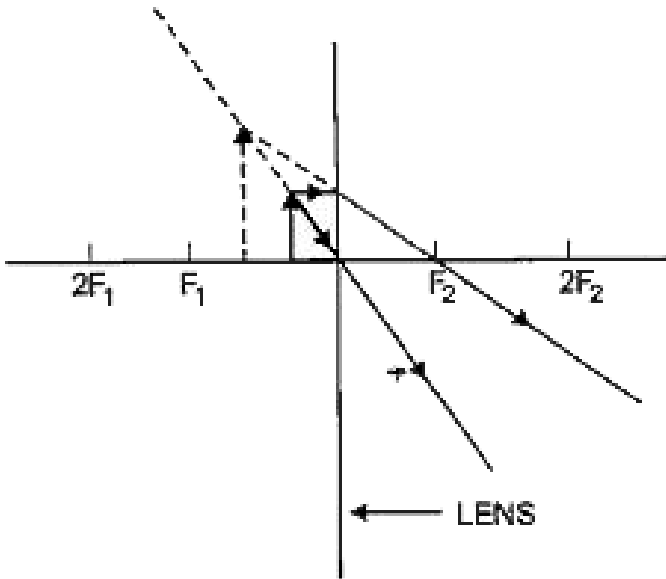
The focal length of lens is :

- A. 100cm
- B. 25cm
- C. 0.25m
- D. both 2 and 3

**Answer: D**



8. The diagram below shows a spherical lens in which the image obtained is highly magnified and has a power of 4.0 D. With reference to this answer the following questions:



The screen is placed at a distance of :

A. 15cm

B. 20cm

C. 12.5cm

D. data insufficient

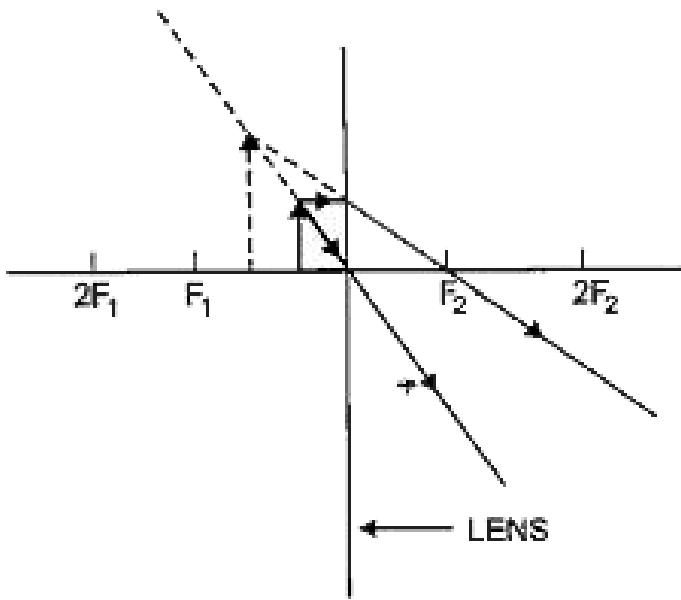
**Answer: D**



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9. The diagram below shows a spherical lens in which the image obtained is highly magnified and has a power of 4.0 D. With reference to this answer the following questions:





If this lens is blackened at the lower half

- A. The focal length would be halved
- B. The focal length is doubled
- C. The focal length remains unaffected
- D. The focal length is  $1/4th$

**Answer: C**



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10. What are the two forms of mechanical energy?

- A. Elastic potential and vibrational kinetic
- B. Gravitational potential and rotational kinetic
- C. kinetic energy and potential energy
- D. None of the above

**Answer: C**



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**11.** One kilowatt hour is equal to

A. 36 kJ

B. 0.36 MJ

C. 3.6 MJ

D. 0.36 KJ

**Answer: C**



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**12.** Ram and Shyam each of mass 45kg reach the fourth floor of a building in time 4 sec and 5 sec

respectively. The ratio of their inertia is :

A. 4:5

B. 5:4

C. 1:1

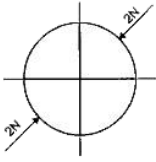
D. Information is incomplete

**Answer: C**

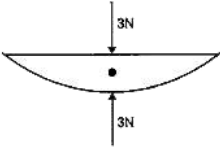


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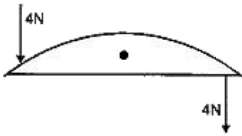
**13.** Identify in which of the case it constitutes a couple



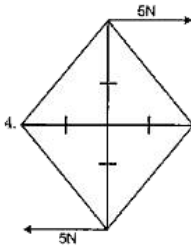
A.



B.



C.



D.

**Answer: D**



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14. The kinetic energy of body becomes one third when

A. mass is same velocity is tripled

B. mass is doubled and velocity tripled

C. mass is  $1/3^{rd}$  while velocity is also  $1/3^{rd}$

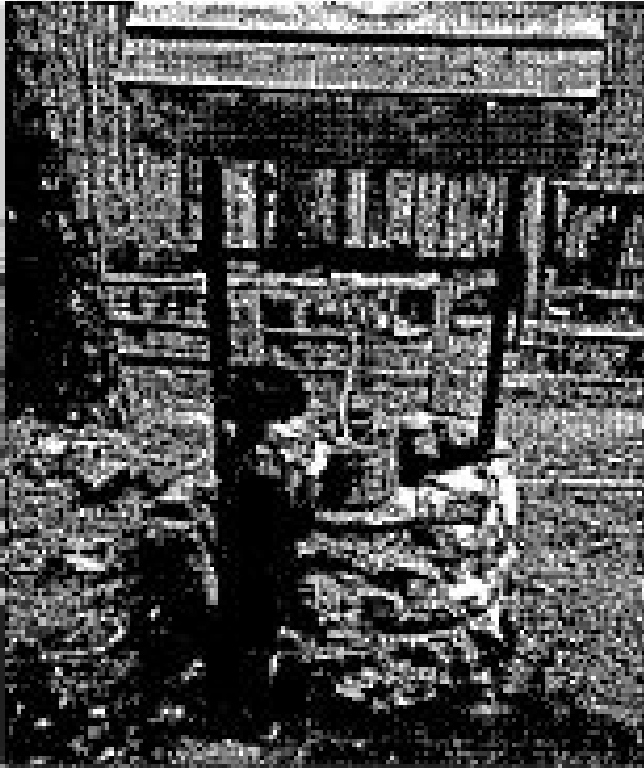
D. mass is tripled and velocity is  $1/3^{rd}$

**Answer: D**



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15. The diagram shows a boy drawing water from a well by means of bucket through a height of 15 m. If the volume of bucket is 2 litre. [ $g = 10Nkg^{-1}$ ]



The mass of water lifted is

A. 20kg

B. 2kg

C. 200g

D. 20g

**Answer: B**



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**16.** The diagram shows a boy drawing water from a well by means of bucket through a height of 15 m. If the volume of bucket is 2 litre.  $[g = 10Nkg^{-1}]$





The mechanical energy possessed by the bucket at height of 7.5m is

- A. potential energy
- B. kinetic energy
- C. translational kinetic energy

D. gravitational potential energy

**Answer: D**



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**17.** The diagram shows a boy drawing water from a well by means of bucket through a height of 15 m. If the volume of bucket is 2 litre. [ $g = 10Nkg^{-1}$ ]



The total energy when the empty bucket of mass 500g is falling freely under gravity at a height of 5m from the surface of water is

A. 150J

B. 75J

C. 300J

D. 50J

**Answer: B**



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**18.** The diagram shows a boy drawing water from a well by means of bucket through a height of 15 m. If the volume of bucket is 2 litre.  $[g = 10Nkg^{-1}]$



What is the mass of water collected by the boy after 20 rounds of the bucket been dropped inside the well

A. 2kg

B. 22kg

C. 40kg

D. 220kg

**Answer: C**



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**19.** The relationship to evaluate the efficiency is

A. Mechanical advantage/velocity ratio

B.  $\text{load} \times \text{displacement of load} / \text{effort} \times \text{displacement of effort}$

C. work output/work input

D. All of the above

**Answer:**



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**20.** State which of the following statements are true.

A. Mechanical advantage is always a unitless quantity

B. Velocity ratio is also called displacement ratio

C. Efficiency is always less than one

D. both 1 and 2

**Answer: D**

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21. In case of cranes and hoist the velocity ratio is

- A. number of movable pulleys
- B. 2 number of pulleys
- C. Total number of pulleys
- D. displacement of load/displacement of effort

**Answer: C**

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22. A sprinter covers a distance of  $2\pi r$  while running across joggers track of circumference 44 cm. Find the work done by the sprinter if the distance travelled by him is  $1.76 \times 10^3 km$

A. zero J

B. 10J

C. 100J

D. 1000J

**Answer: A**



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23. If the wave velocity of sound in air is  $336\text{m s}^{-1}$  then the minimum distance for echo to occur is

A. 17m

B. 18m

C. 16.6m

D. 17.6m

**Answer: C**



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24. Observe the figure and answer the questions below.



Describe the type of motion possessed by Charlene

- A. Acrobat
- B. Free fall
- C. Fall due to gravitational force
- D. both 2 and 3

**Answer: D**

25. Observe the figure and answer the questions below.



Which form of energy conserved in this case

- A. mechanical energy
- B. kinetic energy
- C. gravitational potential energy
- D. wind energy

**Answer: A**

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**26.** Observe the figure and answer the questions below.



How would you relate energy at the top to energy at bottom

**A.** Potential energy is greater than kinetic energy

B. Potential energy is less than kinetic energy

C. Gravitational potential energy is equal to kinetic energy

D. Wind energy is equal to kinetic energy

**Answer: C**



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**27.** Observe the figure and answer the questions below.



Name the law which governs the above relation

- A. Newton's law of gravitation
- B. Law of conservation of mass
- C. Law of conservation of mass
- D. Law of conservation of mechanical energy

**Answer: D**



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**28.** Select the correct reason why diamond appears to sparkle in the dark

A. It has a low critical angle of  $24^\circ$

B. Due to the light getting entrapped inside the diamond as a result of successive total internal reflection

C. Due to refraction of light

D. both 1 and 2

**Answer: D**



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29. The energy transformation taking place in an electric fan is

A. Mechanical energy to electrical energy

B. electrical energy to mechanical energy

C. Mechanical kinetic rotational energy to electrical energy

D. Electrical energy to Mechanical kinetic rotational energy

**Answer: D**



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30. A girl sitting on a swing and a boy having the same mass as the girl swings to the same height as that of the girl as shown in the figure below. Which of the statements are correct pertaining to the boy and girl



A. The boy and girl possess same gravitational potential energy at extreme

B. The boy and girl possess the same total energy during its oscillation

C. Both 1 and 2

D. None of the above

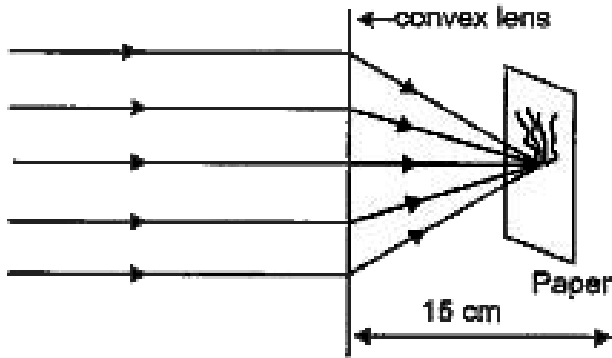
**Answer: C**



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**31.** A convex lens is used to burn a piece of paper as shown in the figure. What is its focal length and

power?



A. Focal length = 15cm and Power =  $+6.67D$

B. Focal length greater than 15cm and Power =  
6.67 D

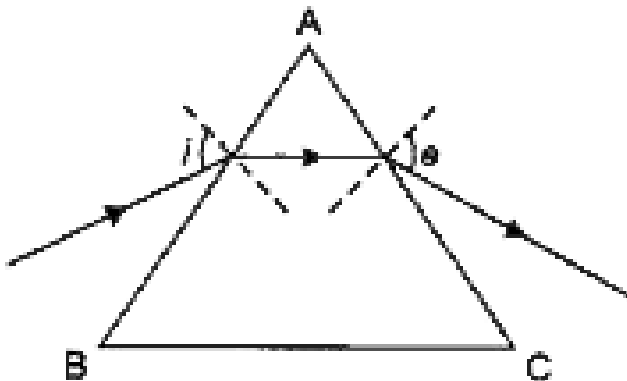
C. Focal length less than 15cm and Power less  
than 6.67 D

D. Focal length equal to 15cm and Power is more  
than 6.67 D

Answer: A

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32. The figure shows the deviation of a ray of light when in minimum deviation position. Answer the following questions:



Is the diagram correct?

A. Yes

B. No

C. Inlet ray angle must be equal to exit ray angle

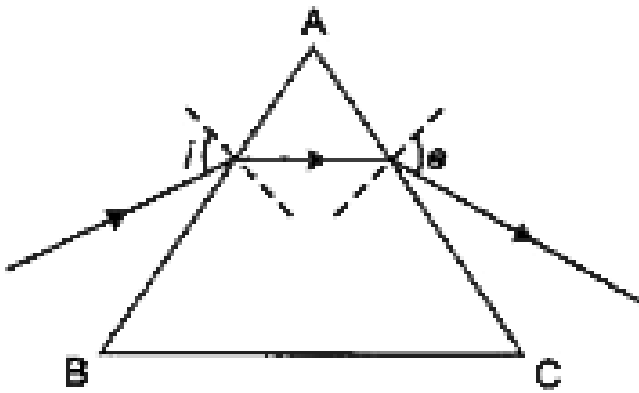
D. none of these

**Answer: A**



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**33.** The figure shows the deviation of a ray of light when in minimum deviation position. Answer the following questions:



The relation between angle of incidence and angle of emergence is:

A. angle of incidence is greater than angle of emergence

B. angle of emergence is greater than angle of incidence

C. angle of incidence is equal to angle of emergence

D. angle of incidence is half the angle of emergence

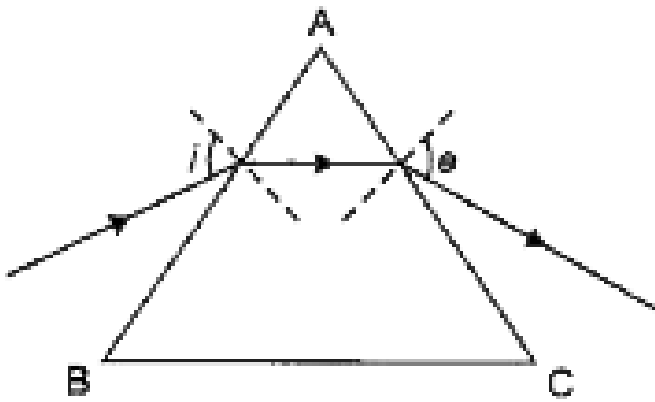
**Answer: C**



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**34.** The figure shows the deviation of a ray of light when in minimum deviation position. Answer the following questions:





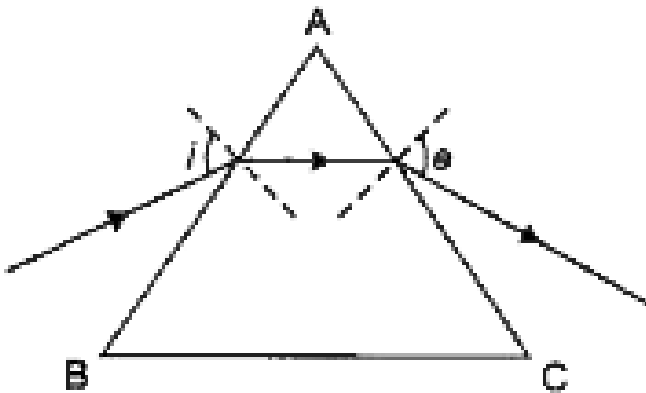
The refracted ray is ..... To the base of the prism

- A. parallel
- B. equidistant
- C. coplanar and non-intersecting
- D. All of the above

**Answer: D**

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35. The figure shows the deviation of a ray of light when in minimum deviation position. Answer the following questions:



The measure of angular deviation for a particular colour of light while passing through a glass prism is called:

A. deviation

B. refractibility

C. Refrangibility

D. Scattering

**Answer: C**



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