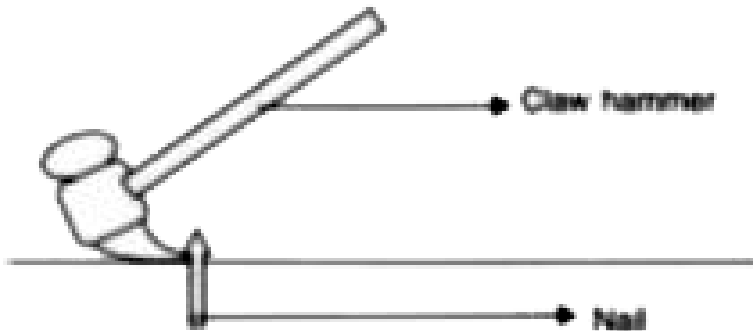# PHYSICS

BOOKS - SELINA PHYSICS (ENGLISH)

QUESTION PAPER-2019

Section I

1. The diagram alongside shows a claw hammer used to remove a nail :
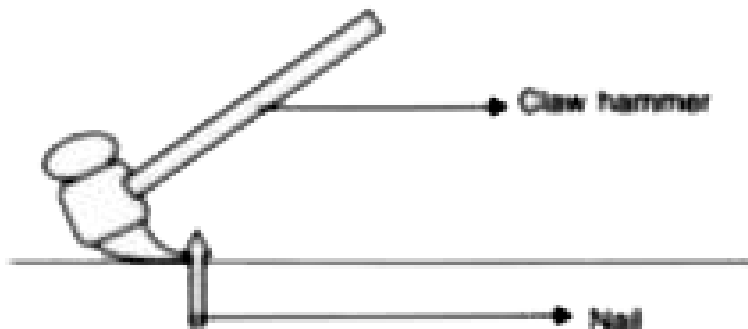
To which class of lever does it belong?

Claw hammer

Nail

2. The diagram alongside shows a claw hammer used to remove a nail :

Give one more example of the same class of lever mentioned by you in (i) for which the

mechanical advantage is greater than one.

Claw hammer
Nail

> ▶ **Watch Video Solution**

3. 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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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. Name the S.I. unit of heat. How is it related to the unit calorie?

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6. Define couple.

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

▶ **Watch Video Solution**

8. Define critical angle for a given medium

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

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

Identify the radiation.

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

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

12. 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 $(_w\mu_a)$.

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

14. 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.

15. 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.

16. The diagram alongside shows a light source P embedded in a rectangular glass block ABCD of critical angle $42°$. Complete the path of the ray PQ till it emerges out of the block. [Write necessary angles.]
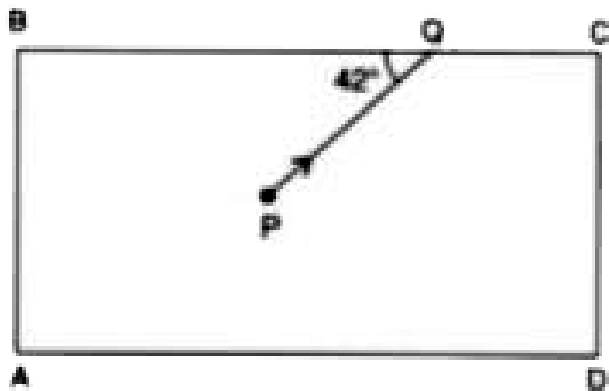
17. If the lens is placed in water instead of air, how does its focal length change?

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

> ▶ **Watch Video Solution**

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

intensities and

20. Two waves of the same pitch have amplitudes in the ratio 1 : 3. What will be the ratio of their :

frequencies?

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

Metal and

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

Semiconductor ?

23. Define resonant vibrations.

> ▶ **Watch Video Solution**

24. Which characteristic of sound, makes it possible to recognize a person by his voice without seeing him ?
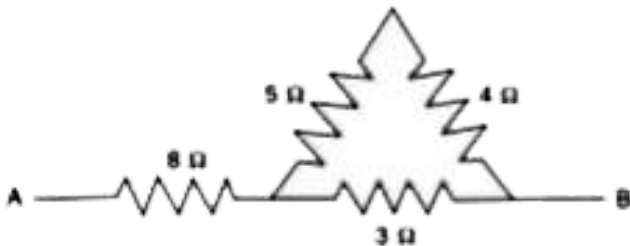
> ▶ **Watch Video Solution**

25. Is it possible for a hydrogen $\left(_1^1H\right)$ nucleus to emit an alpha particle ? Give a reason for your answer.

26. Calculate the effective resistance across AB :

27. State whether the specific heat capacity of a substance remains the same when its state changes from solid to liquid.
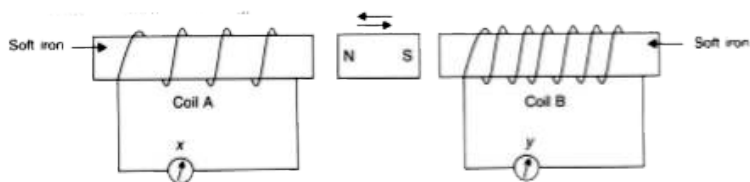
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28. Give one example to support your answer.

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29. 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 :
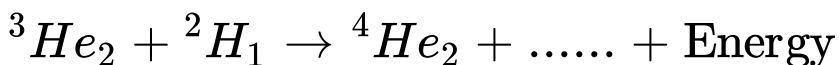
x > y

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

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30. Why is a nuclear fusion reaction called a thermo nuclear reaction ?

31. Complete the reation :

$$^{3}He_{2} + {}^{2}H_{1} \rightarrow {}^{4}He_{2} + \text{......} + \text{Energy}$$

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

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

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Section Ii

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 = $10m/s^2$).

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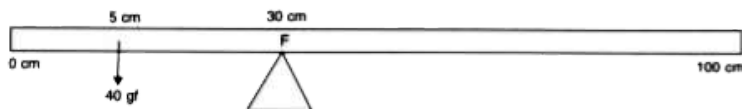
Calculate the weight of the meter scale.

**4.** A uniform meter scale is in equilibrium as shown in the diagram :
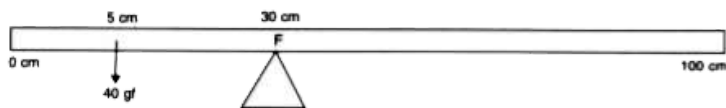
Which of the following options is correct to keep the ruler in equilibrium when 40 gf wt is shifted to 0 cm mark? F is shifted towards 0 cm. Or F is shifted towards 100 cm.

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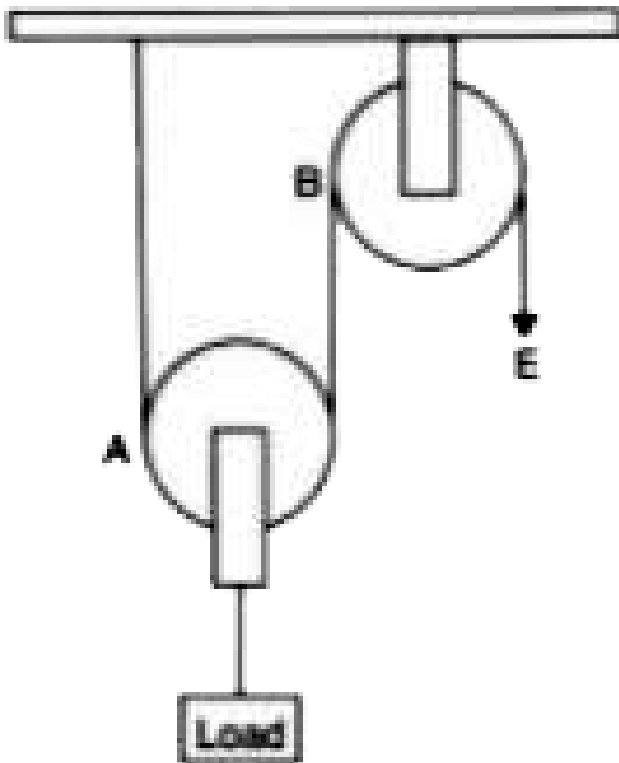**5.** The diagram alongside shows a pulley arrangement :

Copy the diagram and mark the direction of tension on each strand of the string.
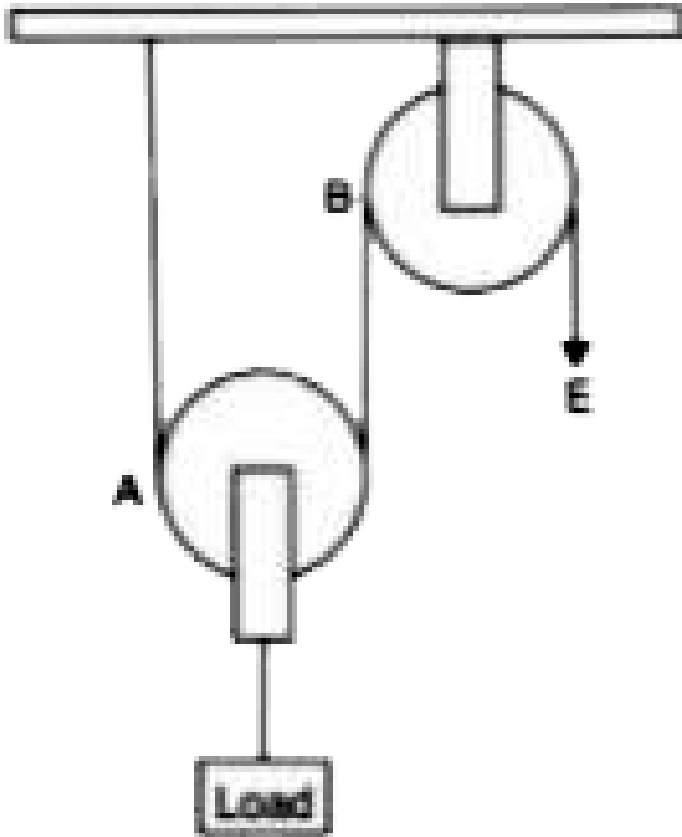
6. The diagram alongside shows a pulley arrangement :

What is the velocity ratio of the arrangement ?

7. The diagram alongside shows a pulley arrangement.

(a) Name the pulleys A and B.

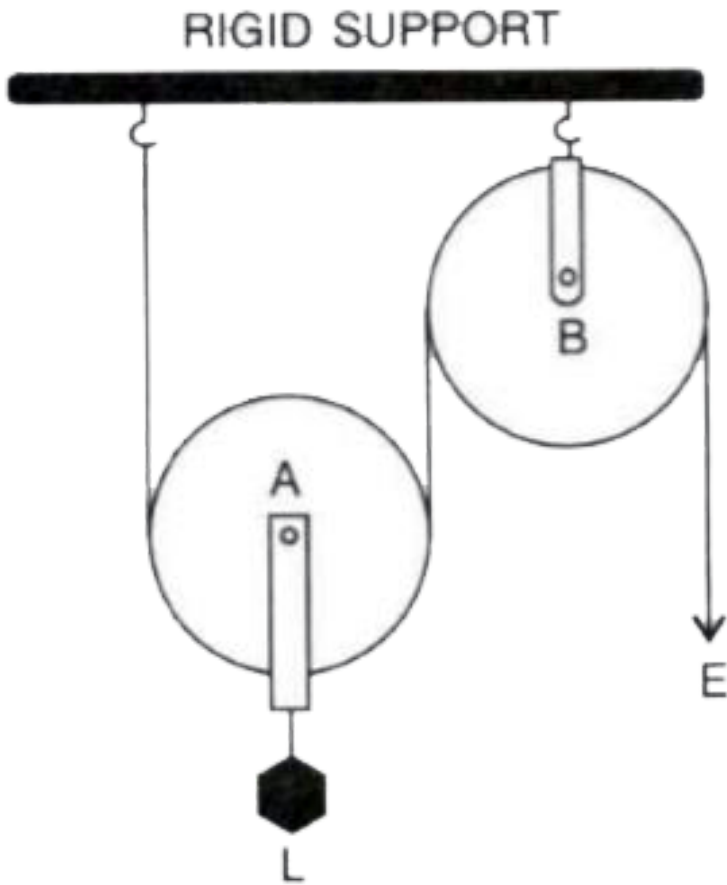(b) In the diagram, mark the direction of tension on each strand of string.

(c) What is the purpose of the pulley B?

(d) If the tension is T, deduce the relation between

T and E

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

(f) Assuming that the efficiency of the system is 100%, what is the mechanical advantage ?
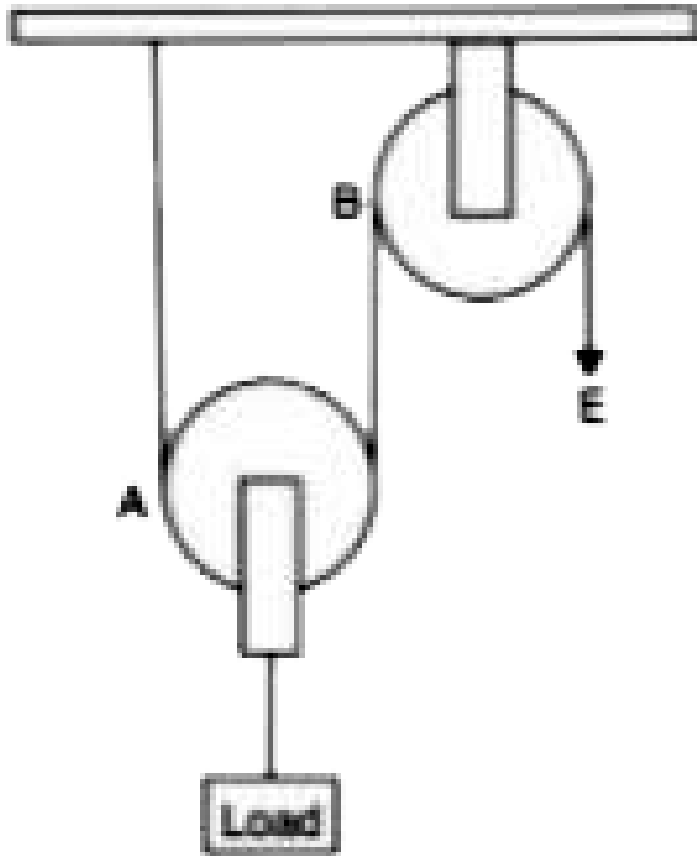
RIGID SUPPORT

8. The diagram alongside shows a pulley arrangement :

If the free end of the string moves through a distance x, find the distance by which the load

is raised.

9. 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.

10. 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.

11. 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.

12. 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.

13. An object is placed at a distance 24 cm in front of a convex lens of focal length 8 cm. Calculate the distance of the image from the lens.

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14. 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.

15. 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.

16. 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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17. 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.

18. Two pendulums C and D are 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.

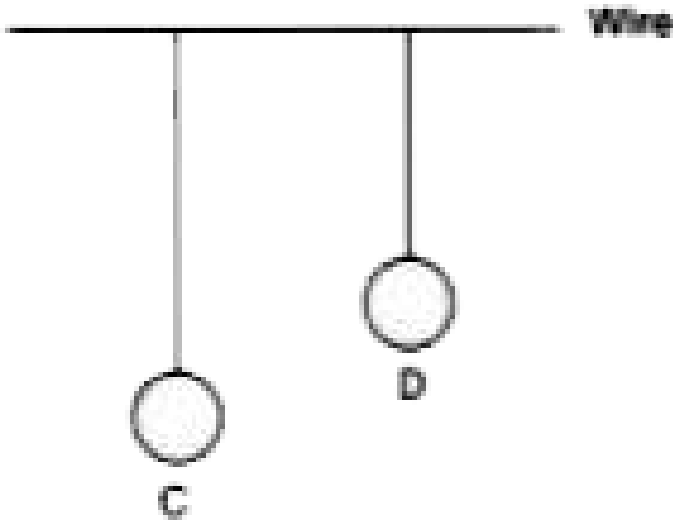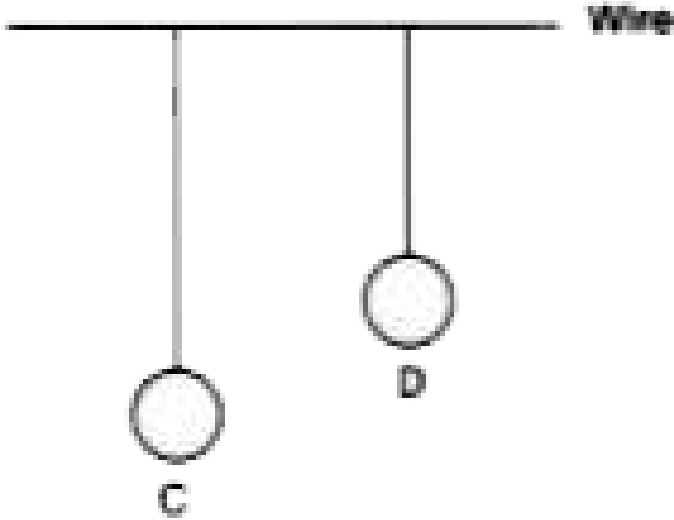Name the type of oscillation, C will execute.
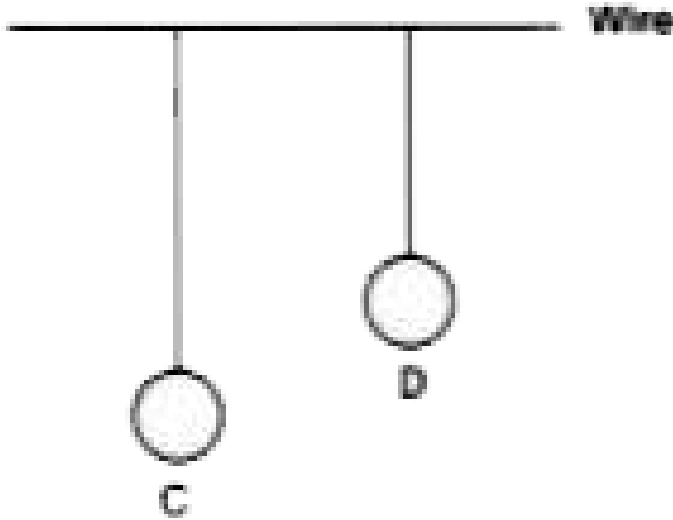
19. Two pendulums C and D are suspended from a wire as shown in the figure given below. Pendulum C is made to oscillate by displacing

it from its mean position. It is seen that D also

starts oscillating.

Name the type of oscillation, D will execute.

20. Two pendulums C and D are 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.

If the length of D is made equal to C then what difference will you notice in the oscillations of

D?

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21. Two pendulums C and D are 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.

What is the name of the phenomenon when the length of D is made equal to C ?
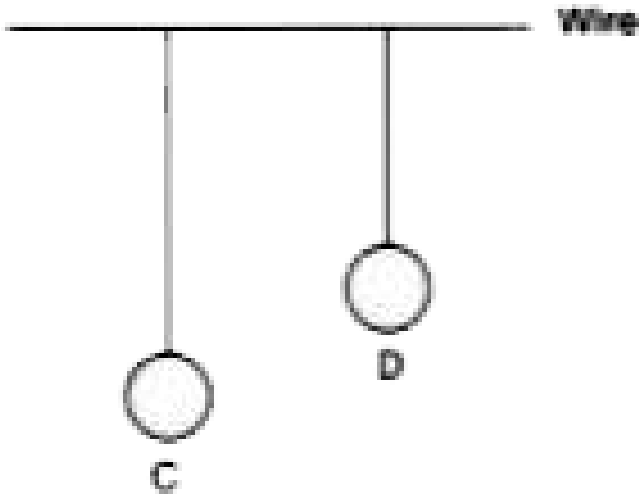
22. Write one advantage of connecting electrical appliances in parallel combination.

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23. What characteristics should a fuse wire have?

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

25. The Fig. below shows a dual control switch circuit use to light a bulb.
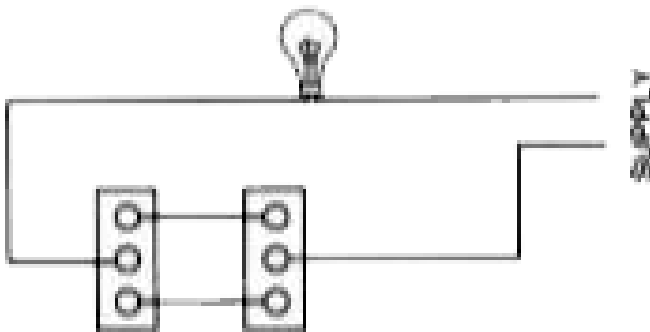
Complete the circuit so that bulb is switched on.

26. The Fig. below shows a dual control switch circuit use to light a bulb.
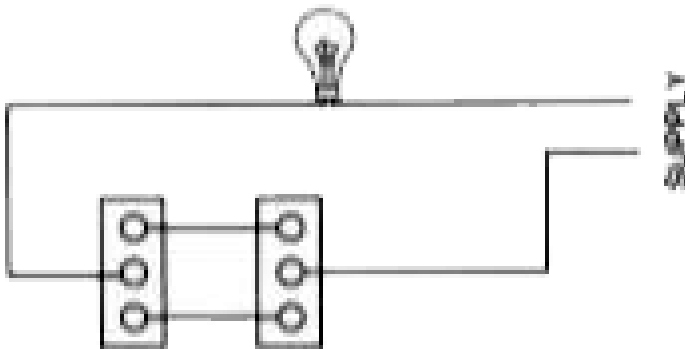
Mark the supply terminals with L and N to indicate live and neutral wires.

27. The diagram alongside shows a circuit with the key k open. Calculate :
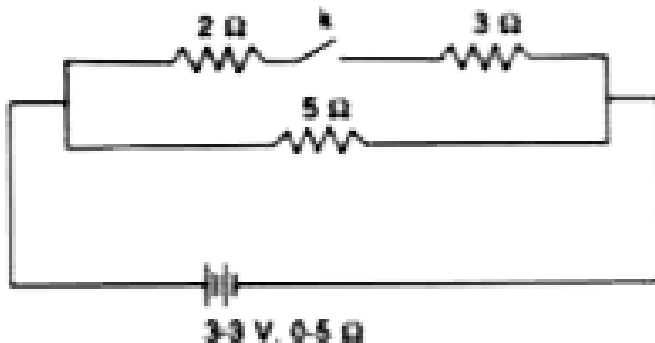
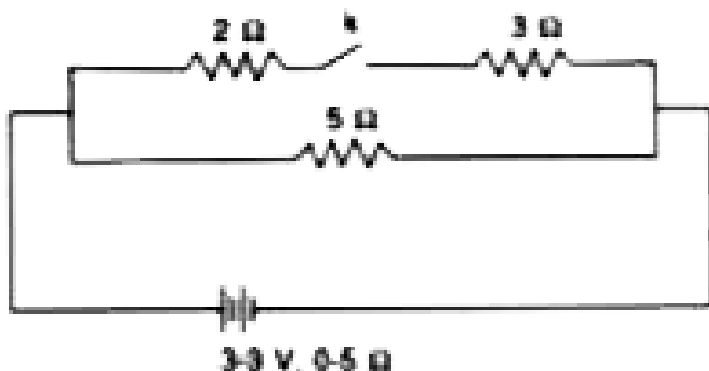the resistance of the circuit when the key k is open.

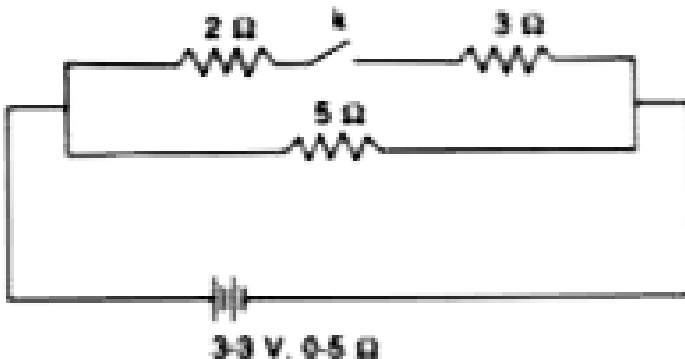**28.** The diagram alongside shows a circuit with the key k open. Calculate :

the current drawn from the cell when the key k

is open.

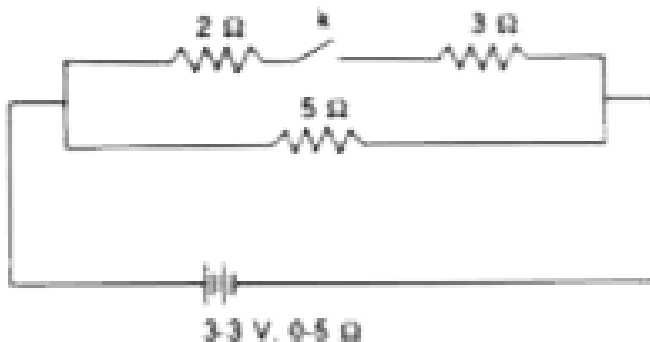**29.** The diagram alongside shows a circuit with

the key k open. Calculate :

the resistance of the circuit when the key k is

closed.

30. The diagram alongside shows a circuit with

the key k open. Calculate :

the current drawn from the cell when the key k

is closed.

31. Define Calorimetry.

32. Name the material used for making a

Calorimeter.

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

34. The melting point of naphthalene is $80°C$ and the room temperature is $30°C$. A sample of liquid naphthalene at $100°C$ 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.

35. 104 g of water at $30°C$ is taken in a calorimeter made of copper of mass 42 g. When a certain mass of ice at 0ºC is added to it, the final steady temperature of the mixture after the ice has melted, was found to be $10°$ C. Find the mass of ice added. [Specific heat capacity of water = 4.2 J $g^{-1°}C^{-1}$, Specific

latent heat of fusion of ice = 336 J g^{-1}, Specific heat capacity of copper $= 0.4Jg^{-1}{}^{\circ}C^{-1}$].

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

37. Define nuclear fission.
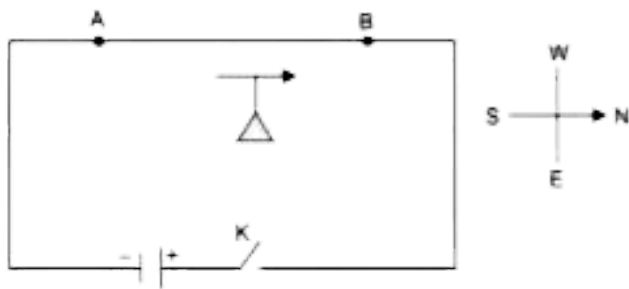
38. Rewrite and complete the following nuclear reaction by filling in the atomic number of Ba and mass number of Kr :

$$^{235}_{92}U + ^{1}_{0}n \rightarrow ^{144}_{...}Ba + ^{...}_{36}Kr + 3^{1}_{0}n + \text{Energy}$$
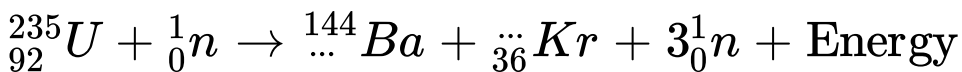
39. The diagram below shows a magnetic needle kept just below the conductor AB which is kept in North South direction.
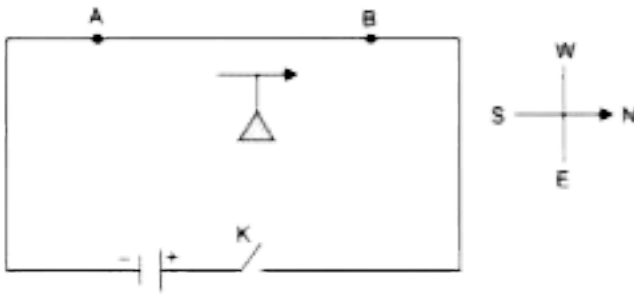
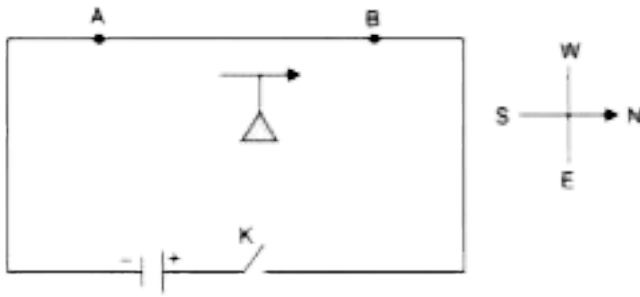In which direction will the needle deflect when the key is closed ?

40. 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 ?

41. 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 is taken just above the conductor AB ?

42. The diagram below shows a magnetic needle kept just below the conductor AB which is kept in North South direction.
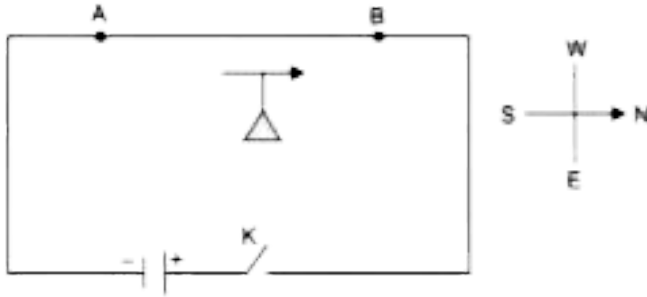
Name one device which works on this principle.

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