**Q1.** Suppose you have three concave mirrors A, B and C of focal lengths 10cm, 15cm and 20cm. For each concave mirror, you perform the experiment of image formation for three values of object distance of 10cm, 20cm and 30cm.    **5 Marks**
Giving reason answer the following:
1. For the three object distances, identify the mirror/mirrors which will form an image of magnification - 1.
2. Out of the three mirrors identify the mirror which would be preferred to be used for shaving purposes/ makeup.
3. For the mirror B draw, ray diagram for image formation for object distances 10cm and 20cm.

**Q2.**
1. A $6\Omega$ resistance wire is doubled on itself. Calculate the new resistance of the wire.    **5 Marks**
2. Three $2\Omega$ resistors A, B and C are connected in such a way that the total resistance of the combination is $3\Omega$. Show the arrangement of the three resistors and justify your answer.
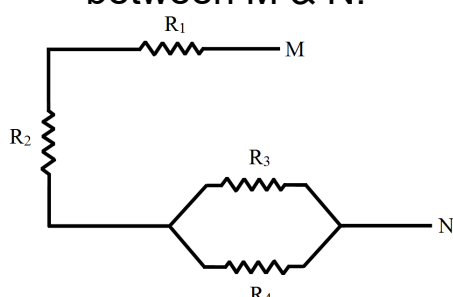
**Q3.**
1. State Ohm's Law.    **5 Marks**
2. How is an ammeter connected in an electric circuit ?
3. The power of a lamp is 100W. Find the energy consumed by it in 1 minute.
4. A wire of resistance $5\Omega$ is bent in the form of a closed circle. Find the resistance between two points at the ends of any diameter of the circle.

**Q4.**
1. Two lamps rated 100W, 220V and 10W, 220V are connected in parallel to 220V supply. Calculate    **5 Marks**
the total current through the circuit.
2. Two resistors X and Y of resistances $2\Omega$ and $3\Omega$ respectively are first joined in parallel and then in series. In each case the voltage supplied is 5V.
   1. Draw circuit diagrams to show the combination of resistors in each case.
   2. Calculate the voltage across the $3\Omega$ resistor in the series combination of resistors.

**Q5.**
1. Find the ratio of resistances of two copper rods X and Y of lengths 30cm and 10cm respectively    **5 Marks**
and having radii 2cm and 1cm respectively.
2. A current of 500mA flows in a series circuit containing an electric lamp and a conductor of $10\Omega$
   when connected to 6 V battery. Find the resistance of the electric lamp.

**Q6.**
1. An electric iron consumes energy at a rate of 880W when heating is at the maximum rate and    **5 Marks**
330W when the heating is at the minimum. If the source voltage is 220V, calculate the current and resistance in each case.
2. What is heating effect of electric current?
3. Find an expression for the amount of heat produced when a current passes through a resistor for some time.

**Q7.**
1. For the combination of resistors shown in the following figure, find the equivalent resistance    **5 Marks**
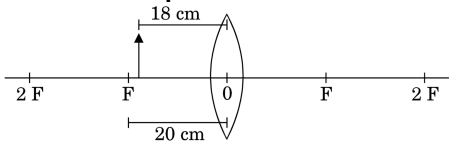between M & N.



2. State Joule's law of heating.
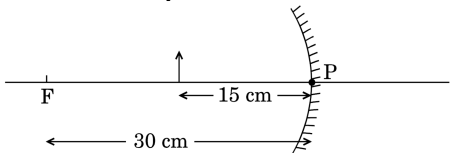3. Why we need a 5A fuse for an electric iron which consumes 1kW power at 220V?

4. Why is it impracticable to connect an electric bulb and an electric heater in series?
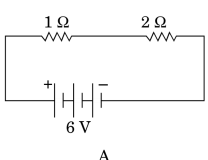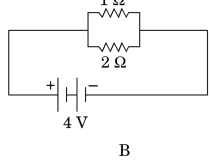
**Q8.**  1. A 5cm tall object is placed perpendicular to the principal axis of a convex lens of focal length **5 Marks**
20cm. The distance of the object from the lens is 30cm. Find the position, nature and size of the image formed.
2. Draw a labelled ray diagram showing object distance, image distance and focal length in the above case.

**Q9.**  At what distance from a concave lens of focal length 25 cm a 10 cm tall object be placed so as to **5 Marks**
obtain its image at 20 cm from the lens. Also calculate the size of the image formed.
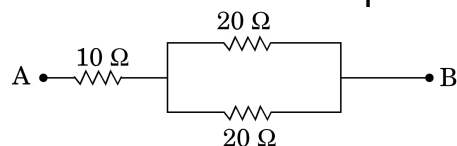Draw a ray diagram to justify your answer for the above situation and label it.

**Q10.**  An object 4.0cm in size, is placed 25.0cm in front of a concave mirror of focal length 15.0cm. **5 Marks**
1. At what distance from the mirror should a screen be placed in order to obtain a sharp image?
2. Find the size of the image.
3. Draw a ray diagram to show the formation of image in this case.

**Q11.**  1. Complete the following ray diagram: **5 Marks**



2. Find the nature, position and size of the image formed.
3. Use lens formula to determine the magnification in this case.

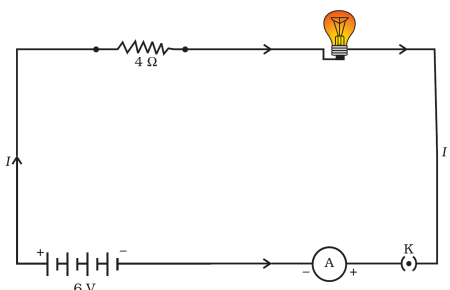**Q12.**  1. Complete the following ray diagram: **5 Marks**



2. Find the nature, position and size of the image formed.
3. Use mirror formula to determine the magnification in this case.

**Q13.**  Compare the power used in $2\Omega$ resistor in each of the following circuits: **5 Marks**



**Q14.**  1. Three resistors $R_1$, $R_2$ and $R_3$ are connected in parallel and the combination is connected to a **5 Marks**
battery, ammeter, voltmeter and key. Draw suitable circuit diagram and obtain an expression for the equivalent resistance of the combination of the resistors.
2. Calculate the equivalent resistance of the following network.



**Q15.**  An electric lamp of resistance $20\Omega$ and a conductor of resistance $4\Omega$ are connected to a 6V battery as **5 Marks**
shown in the circuit. Calculate:



1. The total resistance of the circuit,
2. The current through the circuit,
3. The potential difference across the (i) electric lamp and (ii) conductor, and
4. Power of the lamp.