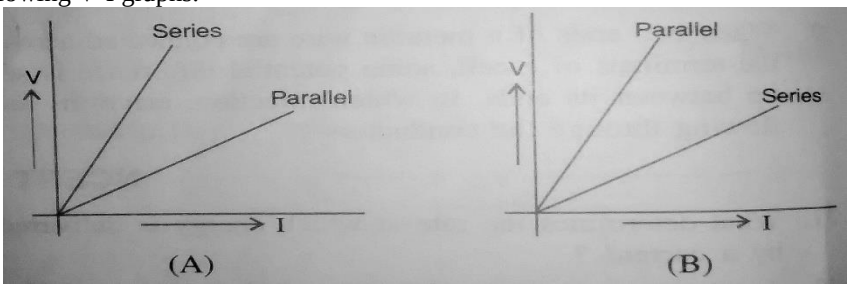
STD: X
Unit : Current Electricity
Level - II

Q.1. Two conducting wires of same material, and of equal lengths and diameters are first connected in series and then in parallel in a given electric circuit. The ratio of heat produced in series and parallel combinations would be –

(a) 1:2 (b) 1:4 (c) 2:1 (d) 4:1

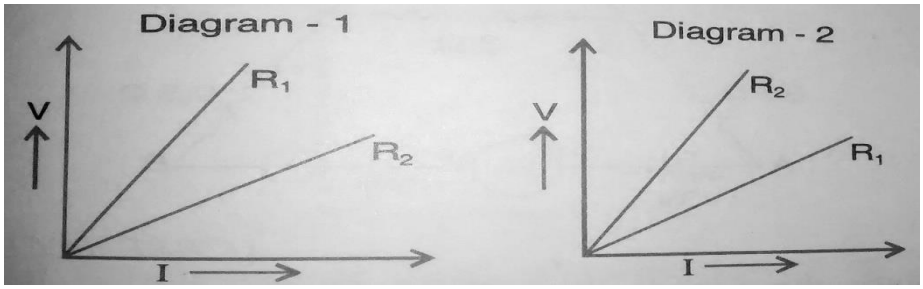
Q.2. Two students perform the experiments on series and parallel combinations of two given resistors R_1 and R_2 and plot the following V-I graphs.



Which of the two diagrams correctly represents the labels 'series and parallel' on the plotted curves? Justify your answer.

Q.3. Two metallic wires A and B of the same material are connected in parallel. Wire A has length *l* and radius r, wire B has a length a length *2l* and radius *2r*. Calculate the ratio of the equivalent resistance in parallel combination and the resistance of wire A

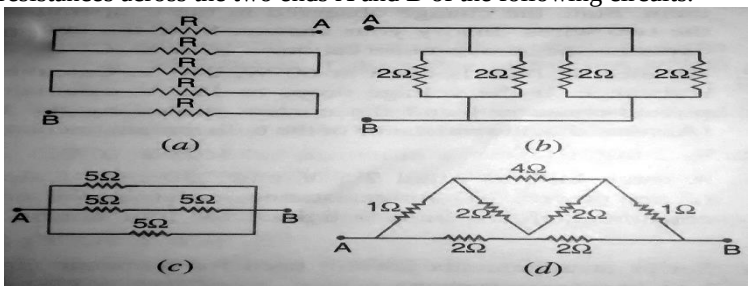
Q.4. Two students perform experiments on two given resistors R_1 and R_2 and plot the *V-I* graph shown by diagram 1 and 2. If $R_1 > R_2$, which of two diagrams correctly represent the situation on the plotted curves ? Justify your answer.



Q.5. A 10 Ω resistor is connected in parallel across the series combination of 4 Ω and 6 Ω resistors. Calculate the amount of heat produced per second, in 4 Ω resistance if 10 J heat is produced per second in 10 Ω resistor.

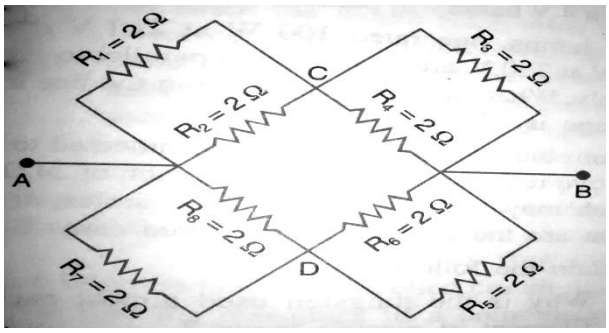
Q.6. You are given several identical resistors each having resistance of 10 Ω and a maximum current of 1 A is allowed to pass through each resistor. It is required to make a suitable combination of these resistances of 5 Ω which can carry a current of 4 A. Find the number of such resistances that will be required.

Q.7. Find the equivalent resistances across the two ends A and B of the following circuits.

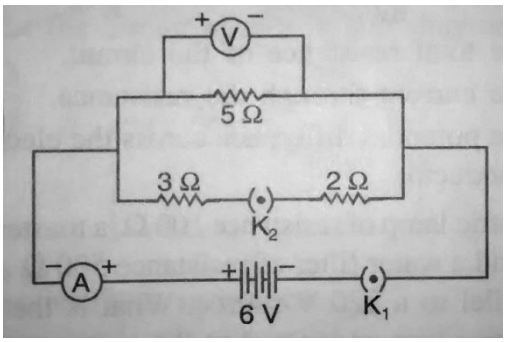


Q.8. The potential difference between the terminals of an electric heater is 110 V when it draws a current of 5 A from the source. How much current will the heater draw and what will be its wattage, if the potential difference is increased to 220 V ? Assume that the resistance of the heater element does not change with temperature.

Q.9. Find the equivalent resistance across the two ends A and B of this circuit.



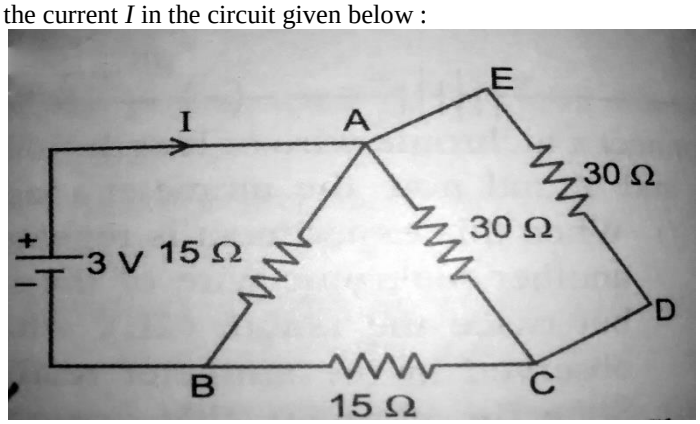
Q.10. In the given circuit, Calculate :-



i. Net resistance of the circuit.
ii. Voltmeter reading when :-
(a) Both the keys are open and
(b) Both the keys are closed.
iii. Current through 3 Ω resistor.

Q.11. A set of 'n' identical resistors each of resistance R are connected in series and the effective resistance is found to be 'X'. When these 'n' resistors are connected in parallel, the effective resistance is found to be 'Y'. Find the ratio of X and Y.

Q.12. Find the value of the current *I* in the circuit given below :



Q.13. An electric bulb is rated 220 V and 100 W. When it is operated on 110 V, the power consumed will be : –
(i) 100 W (ii) 75 W (iii) 50 W (iv) 25 W

Q.14. A copper wire has diameter 0.5 mm and resistivity of 1.6×10^{-8} Ωm. What will be the length of this wire to make its resistance 10 Ω ? How much does the resistance change if the diameter is doubled?

Q.15. How many 176 Ω resistors (in parallel) are required to carry 5 A on a 220 V line?

Q.16. How can three resistors of resistances 2 Ω, 3 Ω and 6 Ω be connected to give a total resistance of :–
(a) 4 Ω (b) 1 Ω ?

Q.17. Compute the heat generated while transferring 96000 C of charge in one hour through a potential difference of 50 V.