Multiple Choice Questions (MCQs)

(Based on Practical Skills in Science)

Multiple choice questions based on the experiment :

To study the dependence of current (I) on the potential difference (V) across a resistor and determine its resistance. Also plot a graph between V and I.

1. To study the dependence of current (I) on the potential difference (V) across a resistor, the correct way of connecting the ammeter and voltmeter in the circuit is :
   (1) ammeter and voltmeter both are connected in series
   (2) ammeter is connected in parallel and voltmeter in series
   (3) ammeter is connected in series and voltmeter in parallel
   (4) ammeter and voltmeter both are connected in parallel

2. The following four circuits have been made for studying the dependence of current on the potential difference across a resistor.

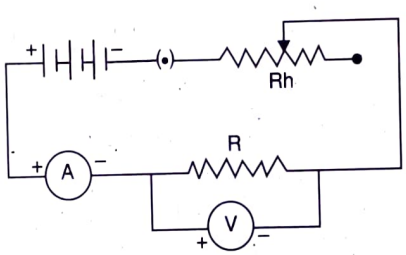
   The correct circuit is :

   (1) A

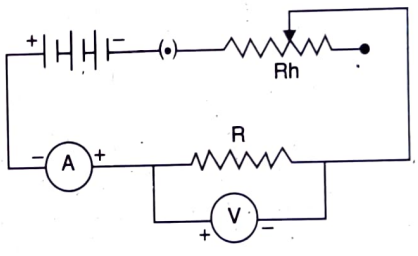
   (2) B

   (3) C

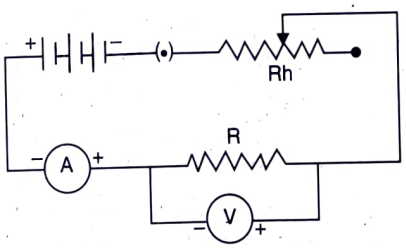
   (4) D



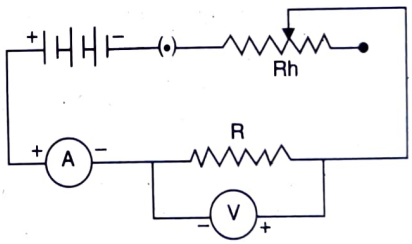
(A)



(B)



(C)



(D)

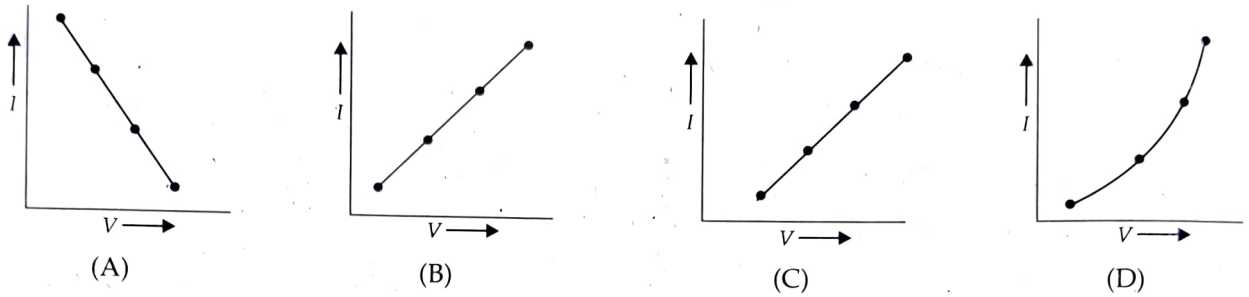
3. To study the dependence of current (I) on the potential difference (V) across a resistor, the following observations were made by four students A, B, C and D.

Student	Reading No. 1	Reading No. 2	Reading No. 3
A	V = 0.5 V I = 0.1 A	V = 1.0 V I = 0.2 A	V = 1.5 V I = 0.3 A
B	V = 0.8 V I = 0.4 A	V = 1.6 V I = 0.8 A	V = 2.4 V I = 1.2 A
C	V = 1.0 V I = 0.5 A	V = 1.2 V I = 1.4 A	V = 1.4 V I = 1.0 A
D	V = 2.4 V I = 0.8 A	V = 2.7 V I = 0.9 A	V = 3.0 V I = 1.0 A

The teacher found that one of the students has made wrong observations. The student who made the mistake is :

(1) A (2) B (3) C (4) D

4. Graphs plotted by four students A, B, C and D for the experiment "To study the dependence of current (I) on the potential difference (V) across a resistor" are shown below :



(A) (B) (C) (D)

The correct V–I graph is :

(1) A (2) B (3) C (4) D

5. The following 'precautions' were listed by a student in the experiment on study of 'Dependence of current on potential difference'.

(A) Use copper wires as thin as possible for making connections.

(B) All the connections should be kept tight.

(C) The positive and negative terminals of the voltmeter and the ammeter should be correctly connected.

(D) The 'zero error' in the ammeter and the voltmeter should be noted and taken into consideration while recording the measurements.

(E) The 'key' in the circuit, once plugged in, should not be taken out till all the observations have been completed.

The 'precautions' that need to be corrected and revised are :

(1) (A), (C) and (E) (2) (C) and (E) (3) (B) and (E) (4) (A) and (E)

6. An ammeter has 20 divisions between 0 mark and 2 A mark on its scale. The least count of this ammeter is :

(1) 0.01 A (2) 0.02 A (3) 0.1 A (4) 0.2 A

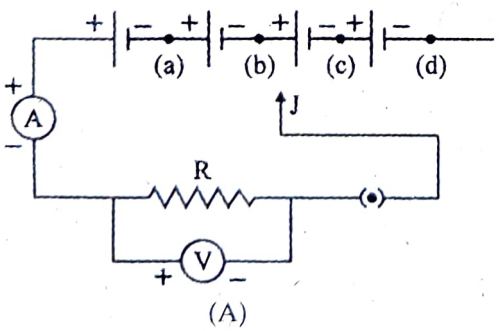
7. A student finds that there are 20 divisions between the 0 mark and 1 V mark of a voltmeter. What is the least count of this voltmeter ?

(1) 0.50 V (2) 0.02 V (3) 0.2 V (4) 0.05 V

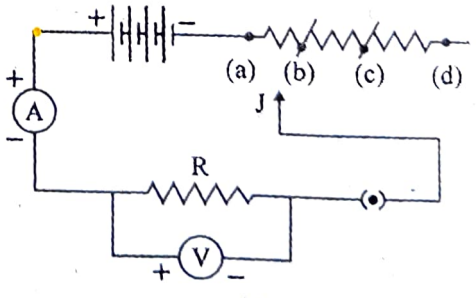
8. Which of the following instruments does not have plus (+) or minus (–) sign marked on it while representing in a circuit diagram ?

(1) Rheostat (2) Voltmeter (3) Ammeter (4) Cell

9. To study the dependence of current (I) on the potential difference (V) across a resistor R, two students used the two set ups shown in Figures A and B respectively. They kept the contact point J in four different positions, marked (a), (b), (c) and (d) in the two figures.



(A)



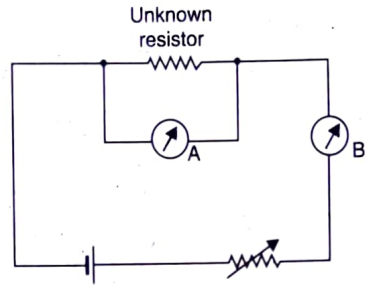
(B)

For the two students, the ammeter and voltmeter readings will be maximum when the contact J is in the position :

(1) (d) in both the set ups (2) (a) in both the set ups

(3) (d) in set up A and (a) in set up B (4) (a) in set up A and (d) in set up B

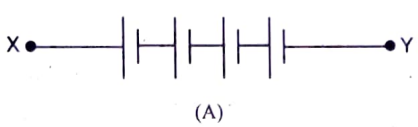
10. In the circuit given below, the instrument B reads 0.93 and the instrument A reads 1.80 in their respective SI units.



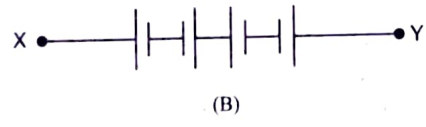
The value of unknown resistor will be :

(1) 0.51 Ω (2) 1.63 Ω (3) 1.93 Ω (4) 19.3 Ω

11. Four identical cells of emf 1.5 V each were connected in four different ways as shown below :



(A)



(B)

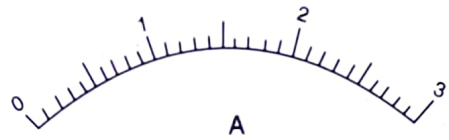
(C)

(D)

The potential difference between the points X and Y would be equal to 6.0 V in case/cases :

(1) A and B (2) A and C (3) A and D (4) A only

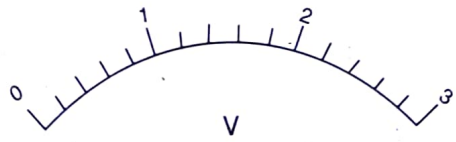
12. The scale of an ammeter is shown below :



The least count of this ammeter is :

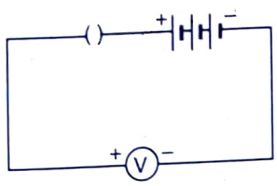
(1) 0.05 A (2) 0.5 A (3) 0.1 A (4) 1 A

13. The least count of the voltmeter shown below is :

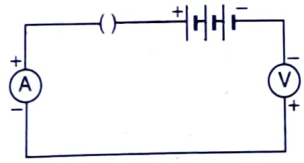


(1) 0.1 V (2) 0.01 V (3) 0.02 V (4) 0.2 V

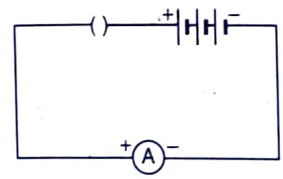
14. Consider the following circuits :



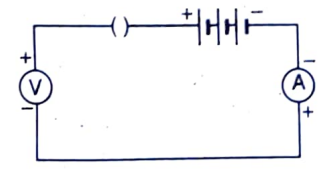
(A)



(B)



(C)

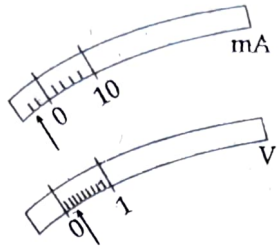


(D)

On plugging the key, the voltmeter/ammeter is likely to be damaged :

(1) in circuit A (2) in circuit B (3) in circuit C (4) in circuit D

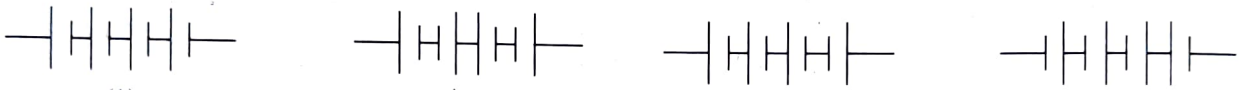
15. The rest positions of the needles in a Milliammeter and Voltmeter when not being used in a circuit are as shown in the figure. The 'zero error' and 'least count' of these two instruments are :



(1) (+4 mA, – 0.2 V) and (1 mA, 0.1 V) respectively
(2) (+4 mA, – 0.2 V) and (2 mA, 0.2 V) respectively
(3) (– 4 mA, + 0.2 V) and (2 mA, 0.2 V) respectively
(4) (– 4 mA, + 0.2 V) and (2 mA, 0.1 V) respectively

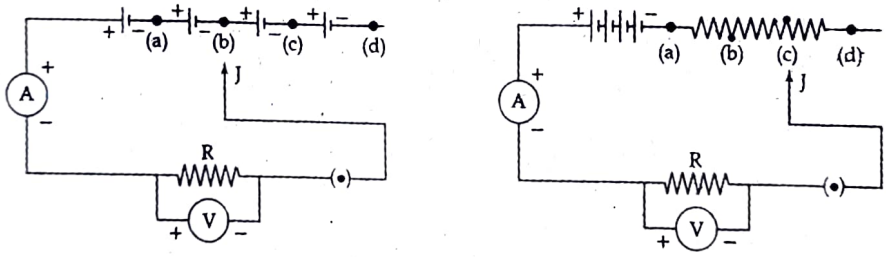
16. A student has to connect 4 cells of 2 V each to form a battery of voltage 8 V. The correct way of connecting these cells is shown in figure :

(1) A (2) B (3) C (4) D



(A) (B) (C) (D)

17. To study the dependence of current (I) on the potential difference (V) across a resistor, two students used the two set ups shown in figs (A) and (B) respectively. They kept the contact J in four different positions, marked (a), (b), (c), (d) in the two figures.

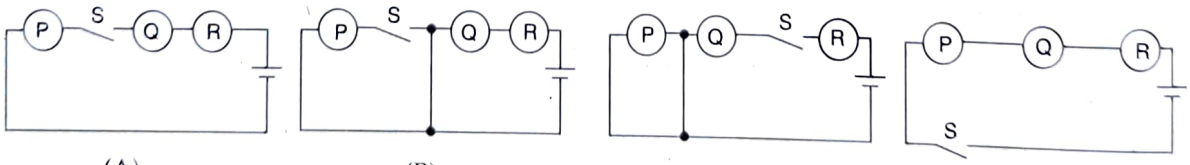


(A) (B)

For the two students, their Ammeter and Voltmeter readings will be minimum when the contact J is in the position :

(1) (a) in both the set ups
(2) (d) in both the set ups
(3) (d) in set up (A) and (a) in set up (B)
(4) (a) in set up (A) and (d) in set up (B)

18. In the circuits A, B, C and D, with switch S open, the lamps Q and R would light up but not lamp P in :

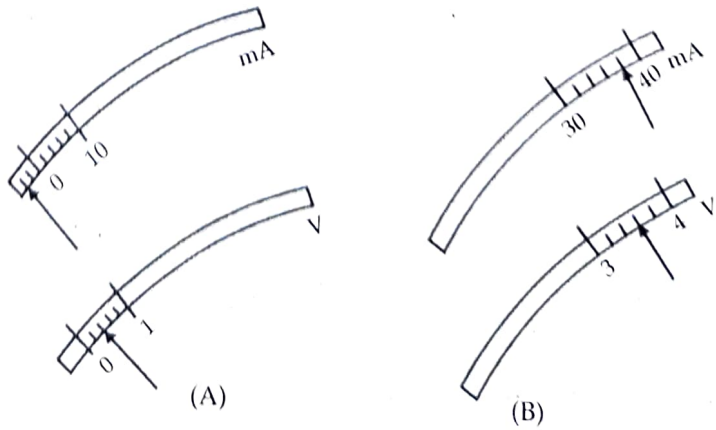


(A) (B) (C) (D)

(1) circuit A
(2) circuit B
(3) circuit C
(4) circuit D

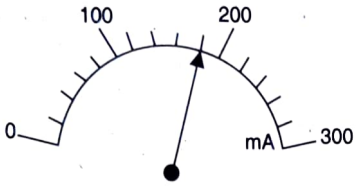
19. The rest positions of the needles in a milliammeter and voltmeter not in use are as shown in Fig. A. When a student uses these in his experiment, the readings of the needles are in the positions shown in Fig. B. The corrected values of current and voltage in the experiment are

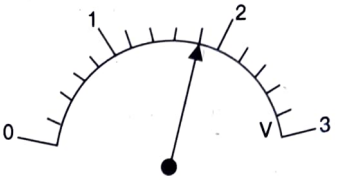
(1) 42 mA and 3.2 V
(2) 42 mA and 4.0 V
(3) 34 mA and 3.2 V
(4) 34 mA and 4.0 V



(A) (B)

20. The current flowing through a resistor connected in an electric circuit and the potential difference applied across its ends are shown in the figures below :

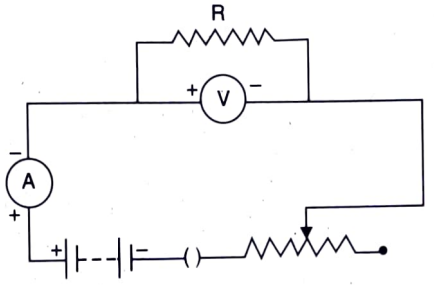




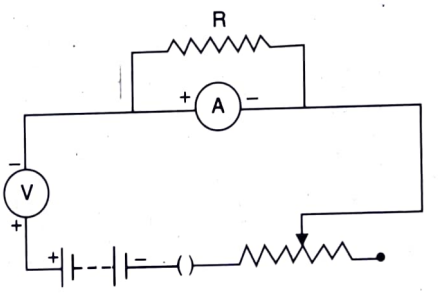
The value of the resistance of the resistor is :

(1) 10 Ω (2) 15 Ω (3) 20 Ω (4) 25 Ω

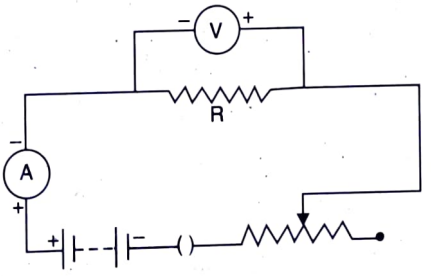
21. Consider the following circuit diagrams drawn by four students :



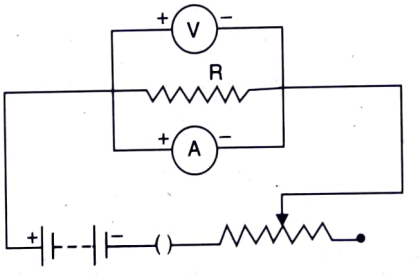
(A)



(B)



(C)

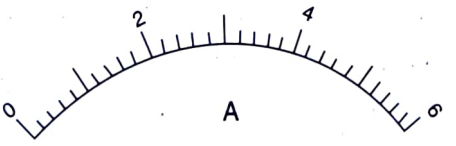


(D)

The correct circuit diagram for studying the dependence of current on the potential difference across a resistor is :

(1) A (2) B (3) C (4) D

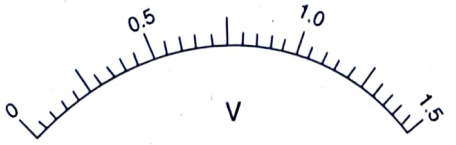
22. The scale of an ammeter is shown below :



The least count of this ammeter is :

(1) 0.1 A (2) 0.01 A (3) 0.02 A (4) 0.2 A

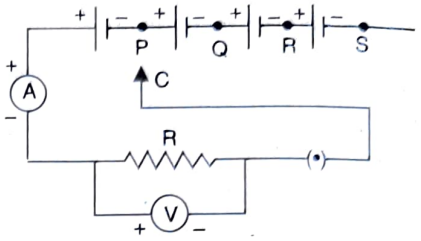
23. The figure below shows the scale of a voltmeter.



The least count of this voltmeter is :

(1) 1 V (2) 0.5 V (3) 5 V (4) 0.05 V

24. A student used the set up given here to study the dependence of current (I) on the potential difference (V) across a resistor.
He kept the contact C in four different positions marked as P,Q, R and S in the figure. On calculating the values of the ratio $\frac{V}{I}$ for his four readings, he would find that the value of this ratio :



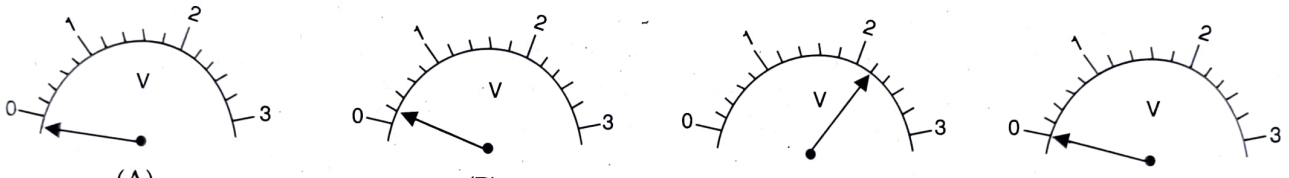
(1) for contact at point P is $\frac{1}{4}$th of that for contact at point S.

(2) for contact at point Q is $\frac{2}{4}$th of that for contact at point S.

(3) for contact at point R is $\frac{3}{4}$th of that for contact at point S.

(4) is the same for all the four readings

25. You are given the following four voltmeters to study the dependence of current (I) on the potential difference (V) across a resistor.

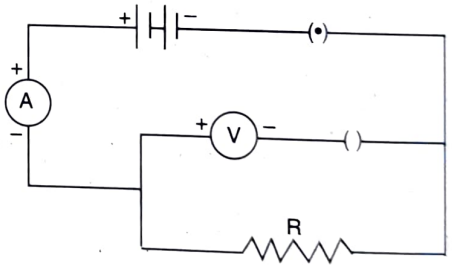


(A) (B) (C) (D)

Which one of the above voltmeters would you prefer to use in the circuit to begin your experiment ?

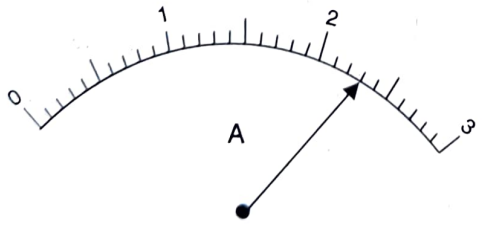
(1) A (2) B (3) C (4) D

26. A student arranged an electric circuit as shown alongside :
He would observe :



(1) no reading in either the ammeter or the voltmeter
(2) no reading in the voltmeter but a reading in the ammeter
(3) no reading in the ammeter but a reading in the voltmeter
(4) readings in both the ammeter and the voltmeter

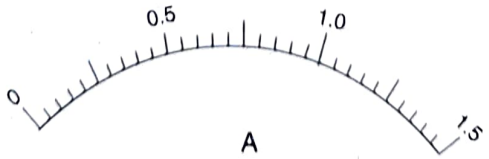
27. Four students recorded the readings of the current by observing the position of pointer on the ammeter scale given below :



If there is no zero error, the correct reading of current is :

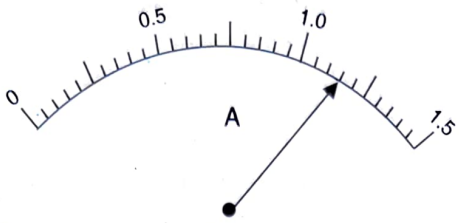
(1) 2.3 A (2) 5 A (3) 2.0 A (4) 2.05 A

28. The least count of the ammeter shown below is :



(1) 0.05 A (2) 0.5 A (3) 0.1 A (4) 1 A

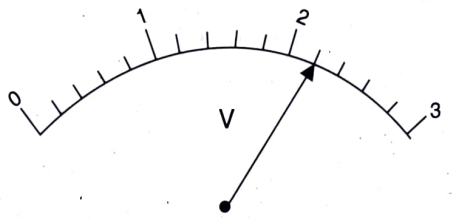
29. Four students measured the reading by observing the position of pointer on the ammeter scale as shown below :



Assuming that the ammeter has no zero error, the correct reading is :

(1) 1.25 A (2) 1.30 A (3) 1.15 A (4) 1.1 A

30. Four students recorded the readings of the potential differece by observing the position of the pointer of an ideal voltmeter as shown below :



The correct reading is :

(1) 2.5 V (2) 2.0 V (3) 2.2 V (4) 2.4 V

Multiple Choice questions based on the experiments :

To determine the equivalent resistance of two resistors (i) when connected in series (ii) when connected in parallel.

31. In an experiment to find the equivalent resistance of two resistors connected in series, a student uses the circuit shown :

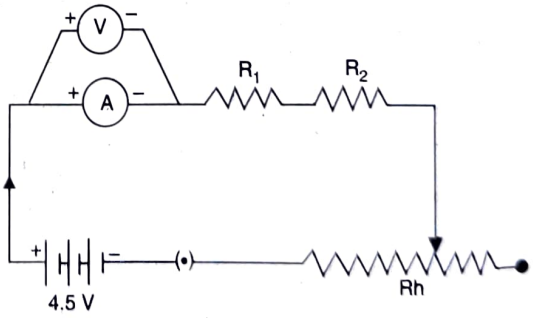
This circuit will give :

(1) correct reading for voltage V but incorrect reading for current I

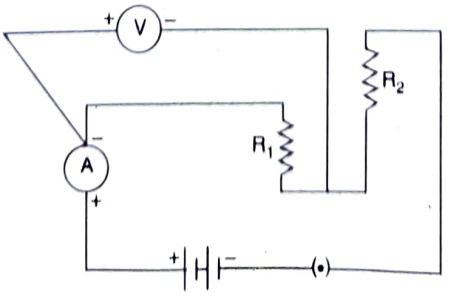
(2) correct reading for current I but incorrect reading for voltage V

(3) correct readings for both voltage V and current I

(4) Incorrect readings for both current I and voltage V



32. A student sets up an electric circuit shown here for finding the equivalent resistance of two resistors in series :



In this circuit, the :

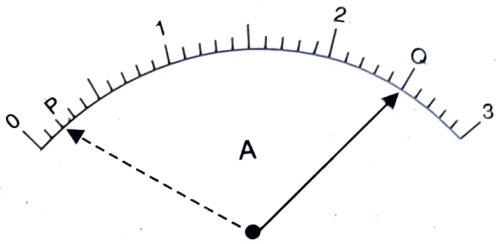
(1) resistors have been connected correctly but the voltmeter has been wrongly connected

(2) resistors have been connected correctly but the ammeter has been wrongly connected

(3) resistors as well as the voltmeter have been wrongly connected

(4) resistors as well as the ammeter have been wrongly connected

33. A student while performing the experiment to find the resultant resistance of two resistors connected in series observes the ammeter pointer at position P when the key is 'off' and the same pointer at position Q when the key is 'on'.

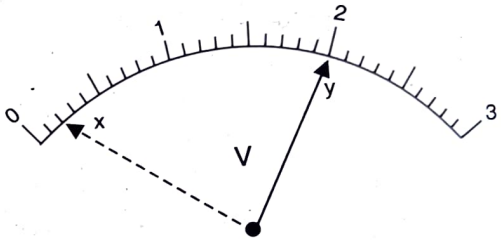


The correct reading of ammeter is :

(1) 0.2 A (2) 2.5 A

(3) 2.3 A (4) 2.7 A

34. While performing an experiment to determine the equivalent resistance of two resistors connected in parallel, a student observes the pointer of voltmeter at position X when the key is 'off' and the same pointer at position Y when the key is 'on'.



The correct voltmeter reading is :

(1) 0.2 V (2) 2 V

(3) 2.2 V (4) 1.8 V

35. Choose the appropriate set of apparatus for performing the experiment to determine the equivalent resistance of two resistors when connected in series :

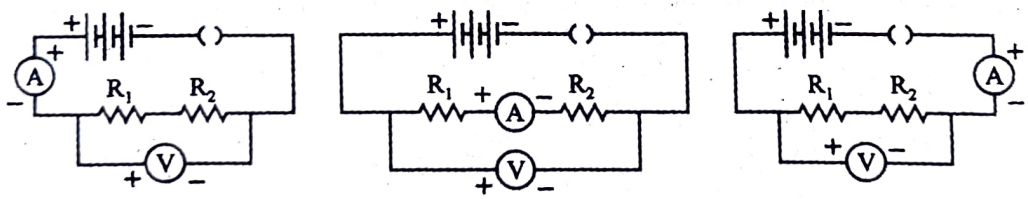
(1) Voltmeter, Ammeter, Two resistors, Key, Battery

(2) Ammeter, Two resistors, Key, Connecting wires, Rheostat, Battery

(3) Key, Rheostat, Voltmeter, Two resistors, Battery, Connecting wires

(4) Battery, Ammeter, Connecting wires, Rheostat, Voltmeter, Two resistors, Key

36. In the experiment on finding the equivalent resistance of two resistors connected in series, three students connected the ammeter in their circuits in the three ways X, Y and Z shown here.

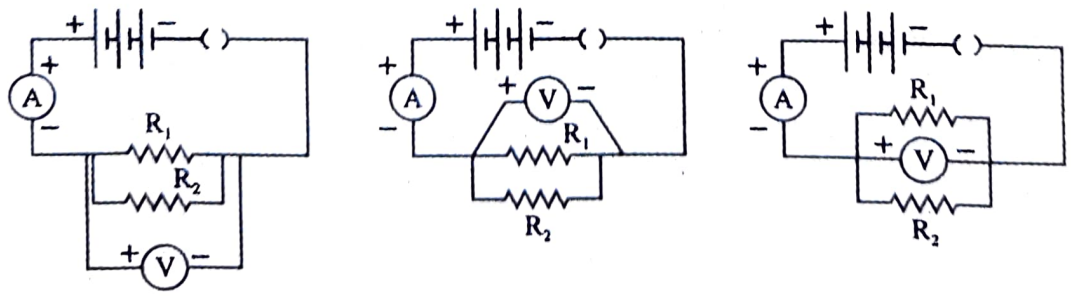


(X) (Y) (Z)

Assuming their ammeters to be ideal, the ammeters have been correctly connected in

(1) cases X and Y only (2) cases Y and Z only (3) cases Z and X only (4) all the three cases

37. In the experiment on finding the equivalent resistance of two resistors, connected in parallel, three students connected the voltmeter in their circuits, in the three ways X, Y and Z shown here.

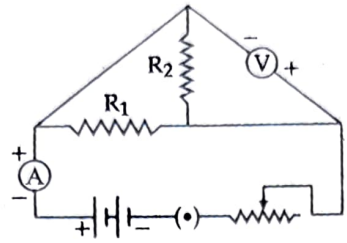


(X) (Y) (Z)

The voltmeter has been correctly connected in

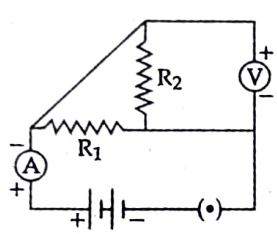
(1) cases X and Y only (2) cases Y and Z only (3) cases Z and X only (4) all the three cases

38. The only *correct* statement for the following electric circuit is :

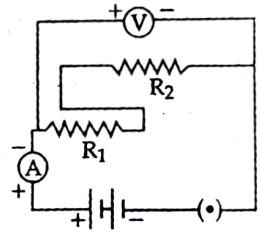


(1) The Voltmeter has been correctly connected in the circuit
(2) The Ammeter has been correctly connected in the circuit
(3) The Resistors R_1 and R_2 have been correctly connected in series
(4) The Resistors R_1 and R_2 have been correctly connected in parallel

39. The only *correct* statement for the two circuits (X) and (Y) shown below is :



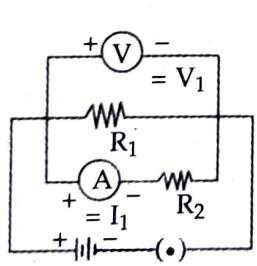
(X)

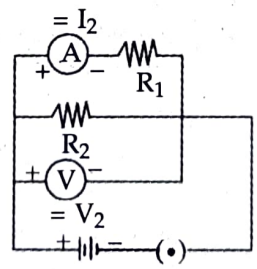


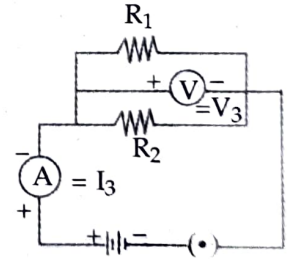
(Y)

(1) The resistors R_1 and R_2 have been connected in series in both the circuits
(2) The resistors R_1 and R_2 have been connected in parallel in both the circuits
(3) In the circuit (X) the resistors have been connected in parallel whereas these are connected in series in circuit (Y).
(4) In the circuit (X) the resistors R_1 and R_2 are connected in series while these are connected in parallel in circuit (Y)

40. For three circuits, shown here



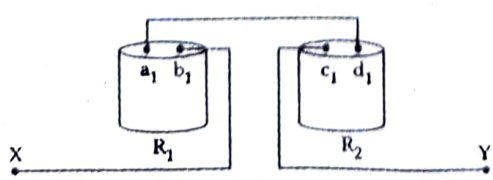




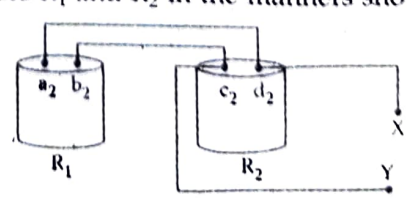
the same two resistors R_1 and R_2 have been connected in parallel in all the circuits but the voltmeter and the ammeter have been connected in three different positions. The relation between the three voltmeter and ammeter readings would be :

(1) $V_1 = V_2 = V_3$ and $I_1 = I_2 = I_3$
(2) $V_1 \neq V_2 \neq V_3$ and $I_1 = I_2 = I_3$
(3) $V_1 = V_2 = V_3$ and $I_1 \neq I_2 \neq I_3$
(4) $V_1 \neq V_2 \neq V_3$ and $I_1 \neq I_2 \neq I_3$

41. Two students (A) and (B) connect their two given resistors R_1 and R_2 in the manners shown below :

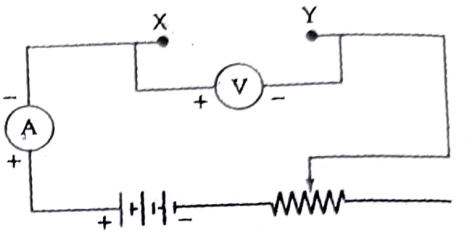


(A)



(B)

Student (A) connects the terminals marked (b_1) and (c_1) while student (B) connects the terminals marked (d_2) and (c_2) in their respective circuits at the points marked X and Y.



Which one of the following is correct in relation to above arrangements ?

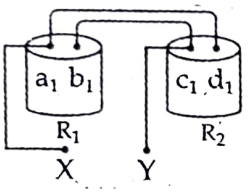
(1) both the students will determine the equivalent resistance of the series combination of the two resistors.

(2) both the students will determine the equivalent resistance of the parallel combination of the two resistors.

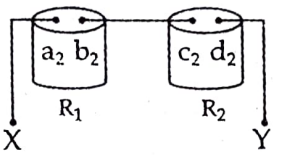
(3) student (A) will determine the equivalent resistance of the series combination while student (B) will determine the equivalent resistance of the parallel combination of the two resistors.

(4) student (A) will determine the equivalent resistance of the parallel combination while student (B) will determine the equivalent resistance of the series combination of the two resistors.

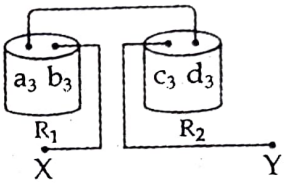
42. Three students (A), (B) and (C) connect their two given resistors R_1 and R_2 in the manners shown below :



(A)

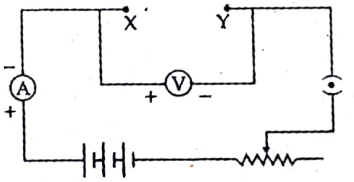


(B)



(C)

They connect the terminals marked X and Y above to the terminals marked X and Y in the circuit given below :

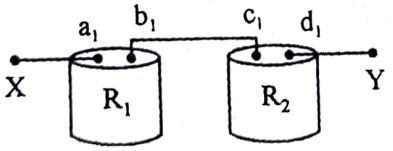


They record the Ammeter readings (I) for different positions of the rheostat and the corresponding Voltmeter readings (V).

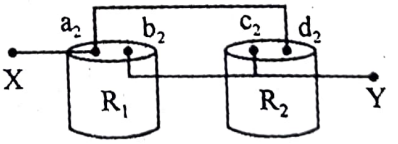
The average value of the ratio V/I in their observations would be minimum for :

(1) students (A) and (B) only
(2) students (B) and (C) only
(3) students (C) and (A) only
(4) student (A) only

43. Students A and B connect the two resistors R_1 and R_2 given to them in the manners shown below :

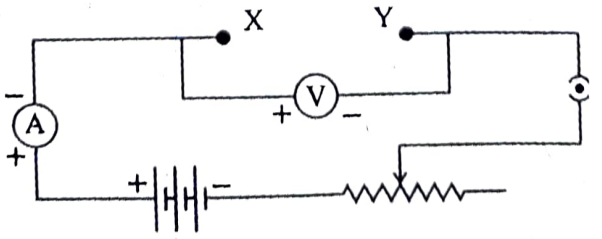


(A)



(B)

and then insert them at X and Y into the measuring circuit shown below :



We can then say that

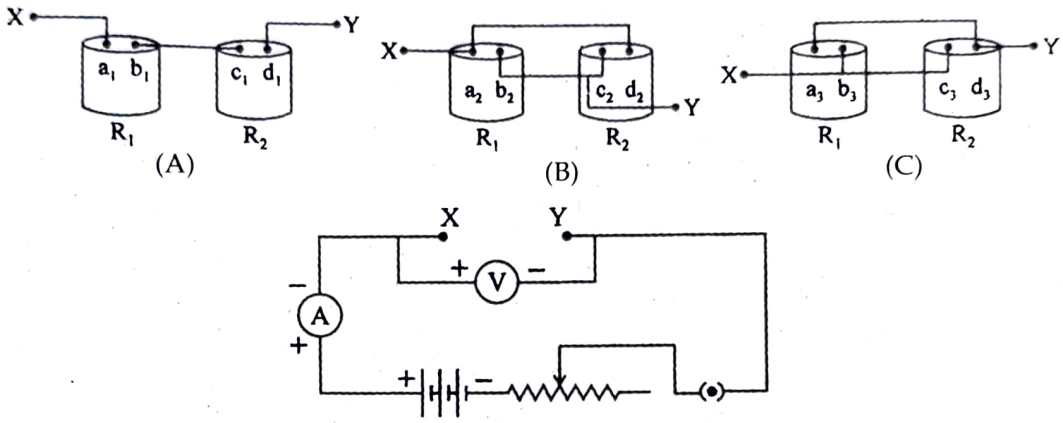
(1) both the students will determine the equivalent resistance of the series combination of R_1 and R_2

(2) both the students will determine the equivalent resistance of the parallel combination of R_1 and R_2

(3) student A will determine the equivalent resistance of the series combination while student B will determine the equivalent resistance of the parallel combination of R_1 and R_2

(4) student A will determine the equivalent resistance of the parallel combination while student B will determine the equivalent resistance of the series combination of R_1 and R_2

44. A student carries out the experiment for studying the dependence of current (I) flowing through a resistor system of R_1 and R_2 on the potential difference (V) applied to it by connecting the resistor system to points X and Y of the measuring circuit as shown :

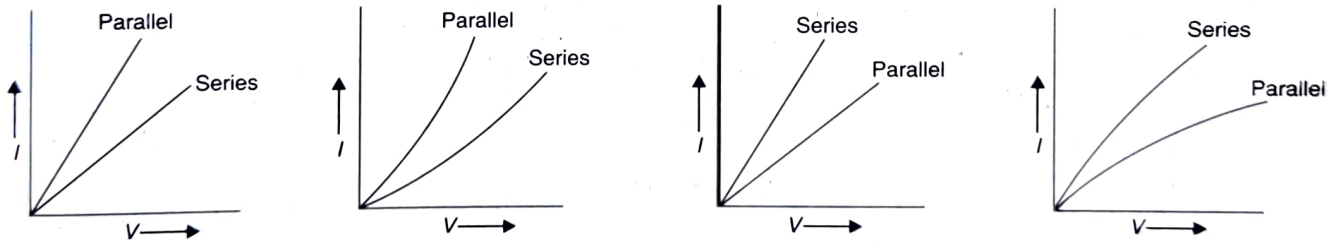


The average value of the ratio V/I, of his observations, would then be equal

(1) only in cases A and B (2) only in cases B and C

(3) only in cases C and A (4) all the three cases

45. Four students performed experiments on series and parallel combination of two given resistors R_1 and R_2 which obey Ohm's law and plotted the following V–I graphs :



Which of the graphs is correctly labelled in terms of 'series' and 'parallel' ?

(1) graph A (2) graph B (3) graph C (4) graph D

46. You are given four ammeters A, B, C and D having the least counts mentioned below :

(a) Ammeter A with least count 0.25 A (b) Ammeter B with least count 0.5 A

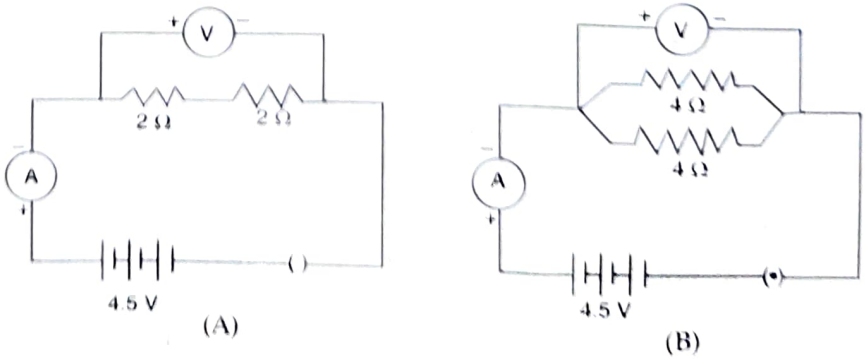
(c) Ammeter C with least count 0.05 A (d) Ammeter D with least count 0.1 A

Which of the ammeters would you prefer for doing an experiment to determine the equivalent resistance of two resistances most accurately, when connected in parallel ?

(1) A (2) B (3) C (4) D

47. Consider the two circuits A and B given alongside :

In the circuits A and B shown here, the voltmeter reading would be :



(1) nearly 4.5 V in both the circuits

(2) 0 V in both the circuits

(3) nearly 1 V for circuit A and nearly 4.5 V for circuit B.

(4) 0 V for circuit A and nearly 4.5 V for circuit B.

48. The values of resistances marked on the coils R_1 and R_2 are found to be correct. A student connects the given resistors in the following manner (as shown in Figure 1).

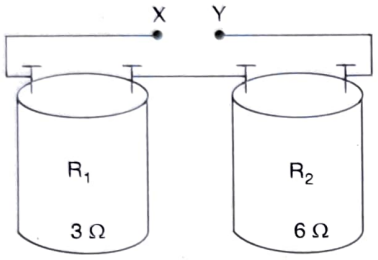


Figure 1.

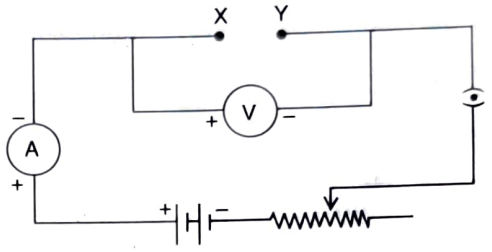


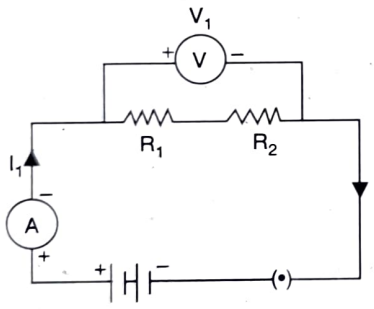
Figure 2.

He then connects the terminals marked X and Y of the above combination of resistors R_1 and R_2 to the terminals marked X and Y in the circuit (shown in Figure 2).

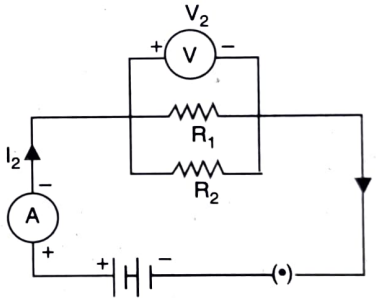
The average value of the ratio V/I in the observations recorded in the circuit would be :

(1) 9 Ω (2) 6 Ω (3) 3 Ω (4) 2 Ω

49. A student using the same two resistors, ammeter, voltmeter and battery, sets up two circuits A and B connecting the two resistors first in series and then in parallel.



(A)



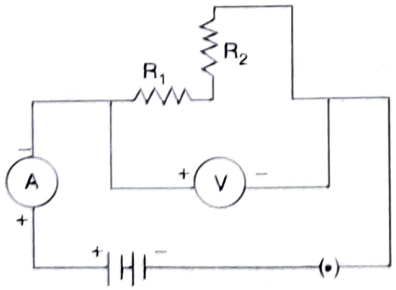
(B)

If the ammeter and voltmeter readings in the two cases be I_1, I_2 and V_1, V_2 respectively, he is likely to observe that :

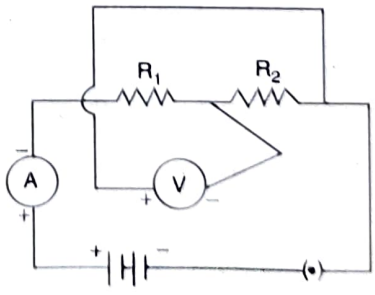
(1) $I_1 = I_2$ but $V_1 \neq V_2$ (2) $I_1 < I_2$ but $V_1 = V_2$

(3) $I_1 > I_2$ but $V_1 = V_2$ (4) $I_1 = I_2$ and $V_1 = V_2$

50. Two students made two circuits A and B to determine the resultant resistance of two resistors R_1 and R_2 connected in series :



(A)



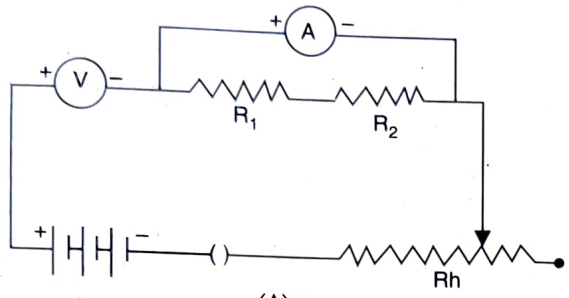
(B)

All the components have been connected correctly in :

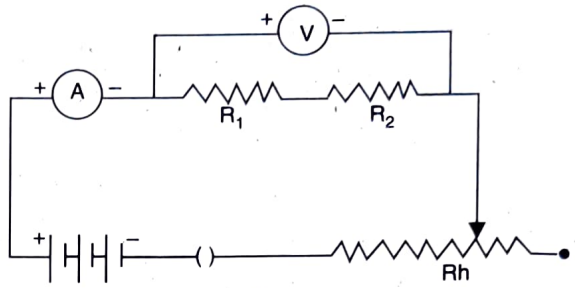
(1) circuit A only (2) circuit B only

(3) both circuits A and B (4) neither of the two circuits

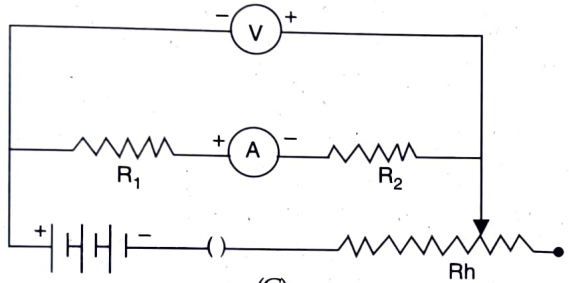
51. Four students have made the following circuit diagrams for determining the equivalent resistance of two resistors connected in series :



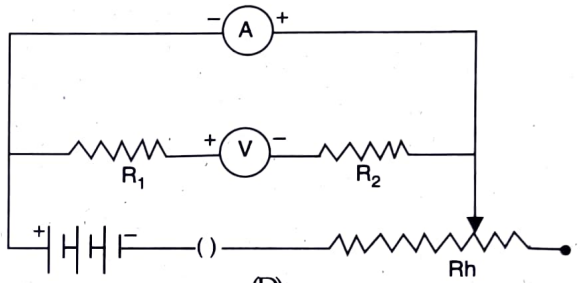
(A)



(B)



(C)

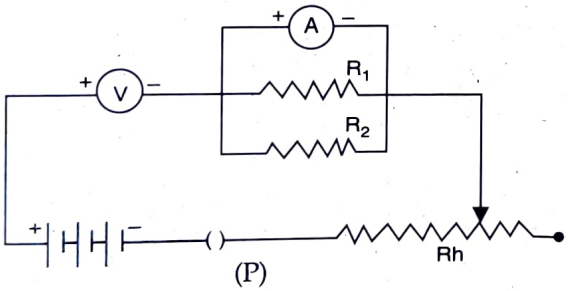


(D)

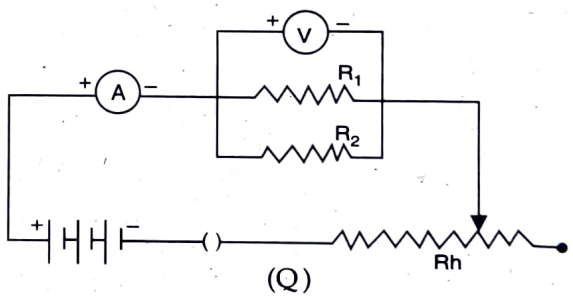
The correct circuit diagram is :

(1) A (2) B (3) C (4) D

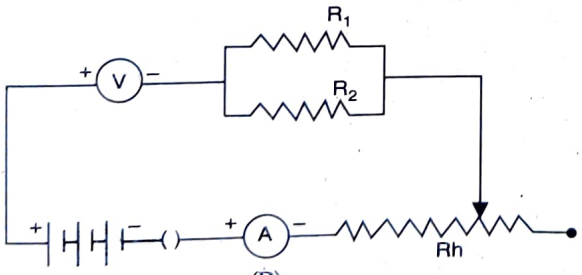
52. Consider the following four circuits P, Q, R and S which have been set up to find the resultant resistance of two resistors combined in parallel :



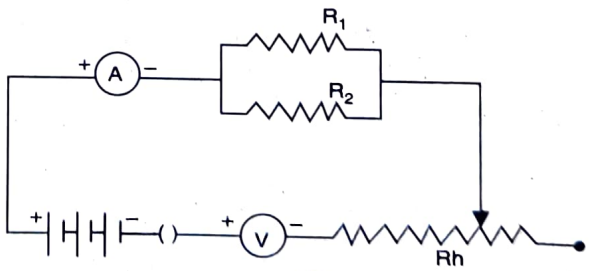
(P)



(Q)



(R)

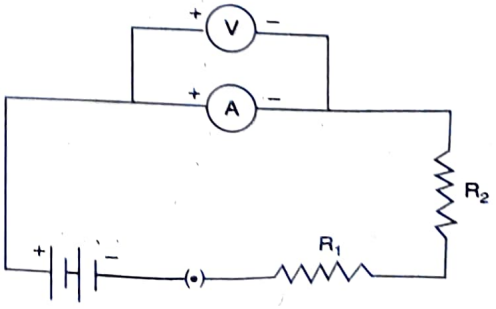


(S)

The correct way of connecting the ammeter and voltmeter in the circuit is :

(1) P (2) Q (3) R (4) S

53. In order to determine the equivalent resistance of two resistors R_1 and R_2 connected in series, a student made this circuit for his experiment.



The only statement which is true for this circuit is that it gives :

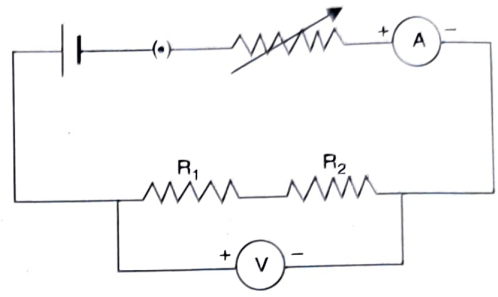
(1) incorrect readings for current I as well as for potential difference V

(2) correct reading for current I but incorrect reading for potential difference V

(3) incorrect reading for current I but correct reading for potential difference V

(4) correct readings for both current I and potential difference V.

54. To find the resultant resistance of two resistors when connected in series, a student arranged the various components according to the circuit shown alongside :



The student, however, did not succeed in his objective. Which of the following mistake has been made by the student in setting up the circuit ?

(1) position of voltmeter is wrong

(2) position of ammeter is wrong

(3) terminals of voltmeter are wrongly connected

(4) terminals of ammeter are wrongly connected

55. The following apparatus is available in the school laboratory :

Battery	:	4.5 V
Rheostat	:	Varies battery voltage from 0 to 4.5 V
Resistors	:	1 Ω and 2 Ω
Ammeters	:	A_1 of range 0 to 1 A ; Least count 0.05 A
	:	A_2 of range 0 to 3 A ; Least count 0.1 A
Voltmeters	:	V_1 of range 0 to 5 V ; Least count 0.1 V
		V_2 of range 0 to 10 V ; Least count 0.5 V

The best combination of ammeter and voltmeter for finding the resultant resistance of the two given resistors connected in series would be :

(1) ammeter A_1 and voltmeter V_1 (2) ammeter A_1 and voltmeter V_2

(3) ammeter A_2 and voltmeter V_1 (4) ammeter A_2 and voltmeter V_2

56. The science laboratory in a school has the following apparatus available in it :

Battery	:	6 V
Rheostat	:	Varies battery voltage from 0 to 6 V
Resistors	:	3 Ω and 6 Ω
Ammeters	:	A_1 of range 0 to 5 A ; Least count 0.25 A
	:	A_2 of range 0 to 3 A ; Least count 0.1 A
Voltmeters	:	V_1 of range 0 to 10 V ; Least count 0.5 V
	:	V_2 of range 0 to 5 V ; Least count 0.1 V

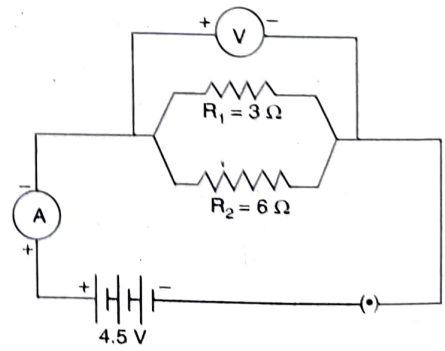
For the experiment to determine the equivalent resistance of the two given resistors connected in parallel, the best combination would be :

(1) ammeter A_1 and voltmeter V_2 (2) ammeter A_2 and voltmeter V_1

(3) ammeter A_1 and voltmeter V_1 (4) ammeter A_2 and voltmeter V_2

57. The ammeter, voltmeter and, resistors R_1 and R_2 connected in the circuit as shown below have been checked and found to be correct.

On plugging the key, the voltmeter reads 4.5 V but the ammeter reads 1.5 A. This is most likely because the wires joined to :



(1) resistor R_1 are loose

(2) resistor R_2 are loose

(3) both the resistors R_1 and R_2 are loose

(4) ammeter terminals are loose

Answers

Question No.	Answer	Question No.	Answer	Question No.	Answer
1	3	21	1	41	3
2	1	22	4	42	2
3	3	23	4	43	1
4	2	24	4	44	2
5	4	25	4	45	1
6	3	26	2	46	3
7	4	27	1	47	4
8	1	28	1	48	1
9	3	29	3	49	2
10	3	30	3	50	1
11	2	31	2	51	2
12	3	32	1	52	2
13	4	33	3	53	2
14	3	34	4	54	4
15	4	35	4	55	3
16	1	36	1	56	2
17	4	37	4	57	2
18	2	38	4		
19	1	39	3		
20	1	40	3		