PHYSICS

BOOKS - HC VERMA

DISPERSION AND SCATTERING OF LIGHT

Question Bank

1. A 4-V battery is connected to a lamp of resistance 4Ω. Calculate the current through

the lamp.

2. A 3-V battery is connected across a $5 - \Omega$ resistance. Calculate the heat produced in 5 seconds.

3. An electric kettle is rated 500W, 220V. It is used to heat water for 30 seconds. Assuming

the voltage to be 220 V, calculate the heat produced.

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4. Calculate the current in a wire if 900 C of charge passes through it in 10 minutes.

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5. How much current will flow through a resistor of resistor of resistance 12Ω if a

battery of 18 V is connected across it ?

6. Calculate the resistance of a copper wire of length 1 m and area of cross section $2mm^2$. Resistivity of copper is $1.7 \times 10^{-5}\Omega m$.

7. Calculate the wattage of an electric heater which draws 5A current when connected to a

220-V power supply.

8. When a particle of charge $10\mu C$ is brought from infinity to a point P,2.0 Mj of work is done by the external forces. What is the potential at P?

9. Calculate the work done in taking a charge of 0.02 C from A to B if the potential at A is 20 V, and that at B is 30V.

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10. How much charge flows through a wire in 10 minutes if the current through it is 2.5 A?

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11. A 2-V cell is connected to a $1 - \Omega$ resistor . How many electrons come out of the negative terminal of the cell in 2 minutes ?

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12. The amount of charge passing through a cell in 4 seconds is 12 C. What is the current supplied by the cell?

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13. A 6-V battery is connected across a $5 - \Omega$ resistor.Calculate the current passing through the resistor .

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14. When a 24V battery is connected to resistor, the current in it is 0.4 A. What is the resistance of the resistor ? What would be the current through it when it is connected to a battery of 6V?

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15. In an experiment, the current flowing through a resistor and the potential difference across it are measured. The values are given below. Show that these values confirm Ohm's law, and find the resistance of the resistor.

i(ampere)	1.0	1.5	2.0	2.5	3.0
V(volt)	4.0	6.0	8.0	10.0	12

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16. The resistivity of copper is $1.7 \times 10^{-8}\Omega m$. What length of copper wire of diameter 0.1 mm will have a resistance of 34Ω ?

17. The resistivity of copper is $1.7 \times 10^{-8}\Omega m$. Another copper wire of the same length but of half the diameter as the first is taken. What is the ratio of its resistance to that of the first wire ?

18. Three resistors, each of resistance 12Ω, are connected in parallel. What is the equivalent resistance ?

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19. A uniform wire of resistance R is cut into two equal pieces, and these pieces are joined in parallel. What is the resistance of the combination ?

20. How will you join the resistors of resistances $3\Omega, 6\Omega$ and 8Ω to get an equivalent resistance of 10Ω?

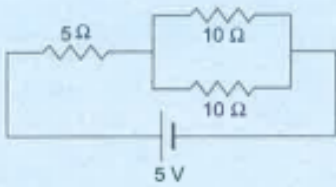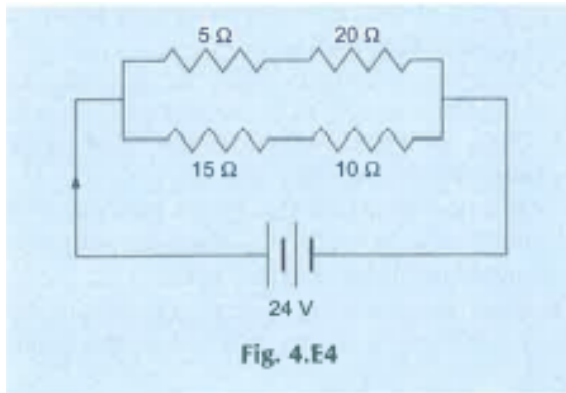**21.** Find the current supplied by the cell in the circuit shown in Figure 4.E3.

Fig. 4.E3

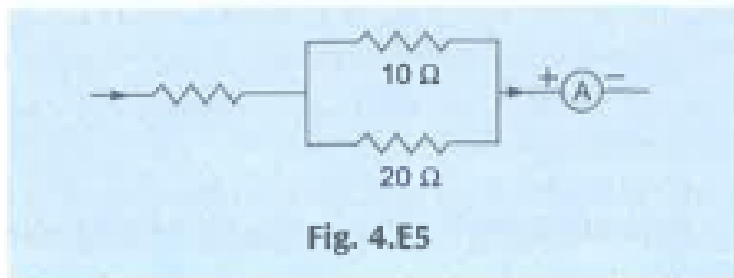**22.** In the circuit shown below, calculate the total resistance of the circuit and the current

flowing through it.

Fig. 4.E4

23. Figure 4.E5 shows a part of an electric circuit. The reading of the ammeter is 3.0 A. Find the currents through the 10Ω and

$20 - \Omega$ resistors.

Fig. 4.E5

24. A 12 -V battery connected to a bulb drives a current of 2.0 A through it. Find the energy supplied by the battery in 10 minutes.

25. A current of 1.5 A flows through a wire of 8Ω Find the amount of heat produced in 10 seconds.

26. A current of 2A produces 200J of heat in a wire in a given period of time. If the current is

increased to 4A, how much heat will be produced in the same time ?

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27. A bulb is rated 5.0 V, 100 mA. Calculate its rated power and resistance.

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28. Calculate the resistance of a bulb rated 40 W ,230 V when in On condition.

29. Calculate the current 10Ω and 20Ω are joined in series. A potential difference of 12 V is applied across the combination. Find the power consumed by each resistor.

30. Two resistors of resistances 10Ω and 20Ω are joined in series. A potential difference of

12V is applied across the combination. Find the power consumed by each resistor.

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31. Two resistors of resistances 10Ω and 20Ω are joined in parallel. A potential difference of 12V is applied across the combination. Find the power consumed by each resistor.

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32. Calculate the energy consumed in kilowatt hours by a 60-W fan in 2 hours.

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33. A heater draws 1100 W at 220 V. Find the resistance of the heater when in On condition

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34. A heater draws 1100 W at 220 V.Calculate the kilowatt hours consumed in a week if the heater is used daily for four hours at the rated voltage .

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35. A bulb used in a car is rated 12 V, 48 W. Find the energy consumed in one minute when the bulb is connected to a 12 -V battery.

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36. A bulb used in a car is rated 12 V, 48 W. Find the energy consumed in one minute when the bulb is connected to a 6 -V battery.

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37. The potential at a point is 20 V. The work done in bringing a charge of 0.5 C. from infinity to this point will be

A. 20 J

B. 10 J

C. 5 J

D. 40 J

Answer: B

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38. A negative charge released from a point A moves along the line AB. The potential at A is 15 V, and it varies uniformly along AB. The potential at B.

A. may be 10 V

B. may be 15 V

C. may be 20 V

D. must be 15 V

Answer: C

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39. A charge is taken a point A to a point B. The work done per unit charge in the process is called

A. the potential at A

B. the potential at B

C. the potential difference between B and A

D. the current from A to B

Answer: C

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40. Joule/coulomb is the same as

A. watt

B. volt

C. ampere

D. ohm

Answer: B

41. A voltmeter is used to measure

A. potential difference

B. electric current

C. electric power

D. resistance

Answer: A

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42. On which of the following no plus' or 'minus' sign is marked ?

A. a cell

B. an ammeter

C. a voltmeter

D. a resistor

Answer: D

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43. An ammeter is always connected in ....

And a voltmeter in .... The suitable words, in

order, for the blanks are

A. series, series

B. parallel , parallel

C. parallel , series

D. series , parallel

Answer: D

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44. In a metal,

A. all the electrons are free to move

B. all the electrons are bound to their

   parent atoms

C. there are no electrons

D. some electrons are free to move

Answer: D

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45. The free electrons of a metal are free to

A. move on the surface only

B. are free to escape through the surface

C. are free to fall into the nuclei

D. are free to move anywhere in the metal

Answer: D

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46. The current in a wire depends

A. only on the potential difference applied

B. only on the resistance of the wire

C. on both of them

D. on none of them

Answer: C

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47. Consider the following incomplete statement "Ohm's law relates potential difference with ... for a given resistance".The suitable choice of the missing word is

A. Power

B. energy

C. current

D. time

Answer: C

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48. Consider the following statements:(A) In series connection, the same current flows through each element.

B. In parallel connection, the same potential difference is applied across each element.

A. both A and B are correct

B. A is correct but B is wrong

C. A is wrong but B is correct

D. both A and B are wrong

Answer: A

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49. It is not possible to have a particel with charge `20xx10^(-19) C.

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50. An electron released from rest at a point A moves towards a nearby point B. The potential at A is higher than the potential at B.

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51. A metal has a large number of electrons, but a nonmetal has only a small number of electrons.

52. The Positive terminal of cell is connected to the end A, and the negative terminal is connected to the end B of a metallic wire AB. Electrons flow in the wire in the direction B to A.

53. If two equal resistances are connected in parallel the equivalent resistance is halved.

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54. A thick wire has a larger resistance than a thin wire.

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