Electricity: Circuits and their Components

Standard difficulty · 20 questions · 40 marks · Time: 36 minutes

Name: _____ Date: _____ Score: ____ / 40

Show your working for Sections B and C. Answers are on the last page — try every question first!

Section A — Choose the correct answer — 8 × 1 = 8 marks

1. A cell has a positive terminal which is the:
(a) paper cover **(b)** middle of the cell
(c) flat metal disc **(d)** metal cap

2. Which of these is a CONDUCTOR of electricity?
(a) a copper wire **(b)** a paper strip **(c)** a cork **(d)** a candle

3. Which of these is an INSULATOR?
(a) a safety pin **(b)** a copper wire **(c)** a steel spoon **(d)** a cork

4. In which case will the lamp glow?
(a) when an LED is joined the wrong way round
(b) when the cell is used up
(c) when the switch is OFF
(d) when the switch is ON and all parts are working

5. In a circuit diagram, a circle with a cross or loop inside stands for a:
(a) lamp **(b)** switch ON **(c)** LED **(d)** battery

6. Each torch needs a battery of 3 cells. How many cells are needed for 15 torches?
(a) 15 cells **(b)** 18 cells **(c)** 48 cells **(d)** 45 cells

7. A cell costs ₹12. How much do 10 cells cost?
(a) ₹120 **(b)** ₹108 **(c)** ₹22 **(d)** ₹132

8. 8 lamps were tested in a circuit. 6 did not glow because their filaments were broken. How many lamps were fine?
(a) 14 lamps **(b)** 6 lamps **(c)** 2 lamps **(d)** 8 lamps

Section B — Short answer — 8 × 2 = 16 marks

9. What is an electric circuit?

10. Write "conductor" or "insulator": (a) a coin (b) a plastic ruler

11. Will the lamp glow? Write "yes" or "no": (a) when a wire's plastic covering was not removed at the joint (b) when an incandescent lamp is connected the other way round

12. Name the component: (a) a gap in the line that is open (b) a circle with a cross or loop inside

13. Is each "positive" or "negative"? (a) the flat metal disc of a cell (b) the longer lead of an LED

14. A box has 6 batteries of 5 cells each and 5 loose cells. How many cells are there in all?

15. A circuit needs 5 pieces of copper wire, each 110 cm long. How many centimetres of wire is that? How many metres?

16. Where is each used in electrical things, and why? (a) ceramic (b) tungsten (in the filament)

Section C — Word problems — 4 × 4 = 16 marks

17. Describe how to make a conduction tester and use it to test materials.

18. You test a paper strip, a safety pin, aluminium foil, a rubber band, a steel spoon, a cork with a conduction tester. (a) Which will make the lamp glow? (b) Which will not? (c) Why must wire joints be stripped of their covering?

19. Will the lamp glow in each case? Give a reason for each: (1) an incandescent lamp is connected the other way round; (2) a wire's plastic covering was not removed at the joint; (3) a steel paper clip is used to close the switch gap; (4) the switch is OFF.

20. A class has 7 cells and does not know which work. They test each in a circuit with a lamp and find 2 do not light it. (a) How many cells work? (b) Describe the test. (c) Why must the lamp and wires stay the same for every cell?

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Answer key

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Q	Answer	Working
1	**(d) metal cap**	the flat disc is negative
2	**(a) a copper wire**	—
3	**(d) a cork**	—
4	**(d) when the switch is ON and all parts are working**	—
5	**(a) lamp**	—
6	**(d) 45 cells**	15 × 3 = 45
7	**(a) ₹120**	12 × 10 = 120
8	**(c) 2 lamps**	8 − 6 = 2
9	**A complete, closed path through which electric current flows.**	—
10	**(a) conductor (b) insulator**	—
11	**(a) no (b) yes**	—
12	**(a) switch OFF (b) lamp**	—
13	**(a) negative (b) positive**	—
14	**35 cells**	6 × 5 + 5
15	**550 cm; 5.5 m**	5 × 110
16	**(a) lamp holders: an insulator that does not melt (b) glows when hot without melting**	—
17	**Connect a cell, a lamp (or LED) and wires so two free wire ends are left open. Touch both ends to an object. If the lamp glows, the object is a conductor (key, coin, foil); if not, it is an insulator (wood, plastic, rubber).**	—
18	**(a) a safety pin, aluminium foil, a steel spoon (b) a paper strip, a rubber band, a cork (c) The plastic covering is an insulator; current flows only through bare metal touching bare metal.**	—
19	**(1) yes; (2) no; (3) yes; (4) no. A lamp glows only if the circuit is complete, the cell works and an LED faces the right way.**	—
20	**(a) 5 cells (b) Put each cell in turn in a closed circuit with the same lamp; if**	—

Q	Answer	Working
	the lamp glows, the cell works. (c) So that only the cell changes; otherwise a faulty lamp or wire could give a wrong result.	