

PRACTICE PAPER 01 (2026-27)

CHAPTER 11: ELECTRICITY

SUBJECT: SCIENCE

MAX. MARKS : 40

CLASS : X

DURATION : 1½ hrs

General Instructions:

- (i) All questions are compulsory.
 - (ii) This question paper contains **20** questions divided into five Sections A, B, C, D and E.
 - (iii) **Section A** comprises 10 MCQs and Assertion-Reason questions of **1 mark** each. **Section B** comprises 4 Very Short Answer questions of **2 marks** each. **Section C** comprises 3 Short Answer questions of **3 marks** each. **Section D** comprises 1 Long Answer question of **5 marks**. **Section E** comprises 2 Case Study Based questions of **4 marks** each.
 - (iv) There is no overall choice. Internal choice is provided in Section E.
 - (v) Use of calculators is not permitted.
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SECTION - A

Questions 1 to 10 carry 1 mark each.

1. One coulomb of charge is equivalent to the charge contained in nearly
 - (a) 1.6×10^{-19} electrons
 - (b) 6×10^{18} electrons
 - (c) 6×10^{23} electrons
 - (d) 1.6×10^{19} electrons
2. To measure the current through a resistor and the potential difference across it, the ammeter and voltmeter are connected respectively
 - (a) both in series
 - (b) both in parallel
 - (c) in series and in parallel
 - (d) in parallel and in series
3. A wire has resistance R. If its length is doubled and its area of cross-section is halved (same material), its new resistance is
 - (a) R/4
 - (b) R
 - (c) 2R
 - (d) 4R
4. The commercial unit of electrical energy, 1 kilowatt hour, is equal to
 - (a) 3.6×10^3 J
 - (b) 3.6×10^6 J
 - (c) 1000 J
 - (d) 3600 J
5. The resistance of the filament of a bulb rated 100 W, 220 V is
 - (a) 2.2 Ω
 - (b) 48.4 Ω
 - (c) 484 Ω
 - (d) 22 000 Ω
6. Three resistors of 6 Ω each are connected in parallel. Their equivalent resistance is
 - (a) 18 Ω
 - (b) 9 Ω
 - (c) 2 Ω
 - (d) 3 Ω
7. The heating element of an electric iron is usually made of
 - (a) copper
 - (b) tungsten
 - (c) nichrome
 - (d) silver

8. The resistivity of a conductor depends on
- (a) its length
 - (b) its area of cross-section
 - (c) the nature of its material (and temperature)
 - (d) the current through it

In the following questions 9 and 10, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:

- (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
- (b) Both (A) and (R) are true but (R) is not the correct explanation of (A).
- (c) (A) is true but (R) is false.
- (d) (A) is false but (R) is true.

9. **Assertion (A):** A fuse wire is connected in series with the appliance it protects.

Reason (R): When an unduly high current flows, the fuse wire heats up, melts and breaks the circuit.

10. **Assertion (A):** Electrical appliances in a house are connected in series.

Reason (R): In a series circuit, if one component fails, the circuit is broken and none of the components works.

SECTION - B

Questions 11 to 14 carry 2 marks each.

11. A current of 0.4 A flows through a bulb for 5 minutes. Find the charge that flows through it and the number of electrons that pass. (Charge on an electron = 1.6×10^{-19} C)
12. (a) Define 1 volt.
(b) How much work is done in moving a charge of 2 C across two points having a potential difference of 12 V?
13. State Ohm's law. What is the shape of the V-I graph for a conductor obeying this law, and what does it indicate?
14. (a) Why is tungsten used almost exclusively for the filaments of electric bulbs?
(b) Why are bulbs usually filled with nitrogen and argon?

SECTION - C

Questions 15 to 17 carry 3 marks each.

15. A manganin wire is 1 m long and has an area of cross-section of 0.2 mm^2 . The resistivity of manganin is $44 \times 10^{-6} \Omega \text{ m}$.
(a) Find its resistance.
(b) Find the resistance of another manganin wire that is 2 m long and has double the diameter of the first wire.
16. You are given three resistors of 4Ω each. Show, with reasons, how you would connect them to get an equivalent resistance of (a) 6Ω and (b) $8/3 \Omega$. (c) What are the maximum and minimum resistances you can get using all three?
17. An electric oven rated 880 W and a mixer rated 440 W are both connected in parallel to a 220 V supply.
(a) Find the current drawn by each appliance.
(b) Find the total current drawn from the supply.
(c) Find the resistance of each. Which has the higher resistance?

SECTION - D

Question 18 carries 5 marks.

18. In the circuit shown, a 12 V battery is connected to a resistor $R_1 = 2\ \Omega$ in series with a parallel combination of $R_2 = 6\ \Omega$ and $R_3 = 3\ \Omega$.

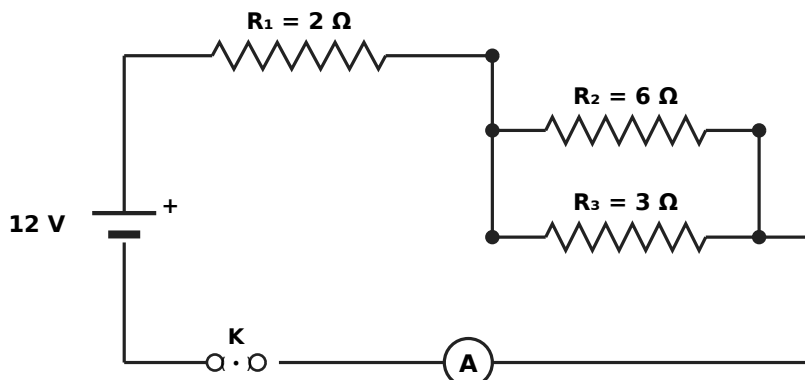


Figure: Circuit for Question 18

Calculate: (a) the equivalent resistance of the circuit; (b) the current shown by the ammeter; (c) the potential difference across R_1 and across the parallel combination; (d) the current through R_2 and through R_3 ; (e) the heat produced in R_1 in 1 minute.

SECTION - E (Case Study Based Questions)

Questions 19 and 20 carry 4 marks each.

19. A student connected a nichrome wire in a circuit with a battery, an ammeter, a voltmeter, a rheostat and a key. She recorded the following readings, keeping the temperature of the wire constant:

Potential difference V (volt)	1.5	3.0	4.5	6.0	7.5
Current I (ampere)	0.3	0.6	0.9	1.2	1.5

- (a) Which law is verified by these observations? State it. **(1)**
(b) Find the resistance of the wire. **(1)**
(c) Describe the shape of the V-I graph. If a nichrome wire of the same thickness but double the length is used, what current will flow when $V = 6.0\text{ V}$? **(2)**

OR

- (c) How should the ammeter and the voltmeter be connected in this circuit? What is the role of the rheostat? **(2)**

20. Read the passage and answer the questions that follow.

A family uses an electric iron rated 1000 W and a geyser rated 2000 W, both working on the 220 V household supply. The iron is used for 1 hour a day and the geyser for 1.5 hours a day. Each appliance is protected by a fuse, and the appliances in the house are connected in parallel. Electricity costs ₹7 per unit.

- (a) Find the current drawn by the iron. Which fuse - 3 A, 5 A or 10 A - should be used for it? **(1)**
(b) Find the resistance of the heating element of the iron. **(1)**
(c) Calculate the electrical energy consumed by the two appliances in 30 days and its cost. **(2)**

OR

- (c) Give two reasons why household appliances are connected in parallel and not in series. **(2)**