

Conductance MCQs with Answers

KSEB Sub Engineer Exam | 30 Questions | Electrical Engineering | Prepared by Entri

Quick formulas to remember

$$G = 1 / R \quad | \quad I = G \times V \quad | \quad \sigma = 1 / \rho \quad | \quad G = \sigma \times A / l \quad | \quad P = V^2 G$$

$$\text{Parallel: } G = G_1 + G_2 \quad | \quad \text{Series: } 1/G = 1/G_1 + 1/G_2 \quad | \quad \text{AC: } Y = 1 / Z, G = R / (R^2 + X^2)$$

Instructions: Choose the correct option for each question. Attempt all 30 questions first, then check the answer key and explanations at the end. Try to finish within 20 minutes.

Section A: Questions

Q1. Conductance is the reciprocal of:

- (a) Resistance
- (b) Inductance
- (c) Capacitance
- (d) Reactance

Q2. The SI unit of conductance is:

- (a) ohm
- (b) siemens
- (c) henry
- (d) tesla

Q3. The older name for the unit of conductance is:

- (a) farad
- (b) henry
- (c) mho
- (d) weber

Q4. Ohm's law in terms of conductance G is:

- (a) $I = G \times V$
- (b) $I = V / G$
- (c) $I = G / V$
- (d) $I = G + V$

Q5. The conductance of a 5 Ω resistor is:

- (a) 5 S
- (b) 0.2 S
- (c) 0.5 S
- (d) 25 S

Q6. A conductor has a conductance of 0.25 S. Its resistance is:

- (a) 0.25 Ω
- (b) 2.5 Ω
- (c) 0.4 Ω
- (d) 4 Ω

Q7. The conductance of a $20\ \Omega$ resistor is:

- (a) $20\ \text{S}$
- (b) $0.5\ \text{S}$
- (c) $0.05\ \text{S}$
- (d) $0.2\ \text{S}$

Q8. A conductance of $2\ \text{S}$ has $6\ \text{V}$ across it. The current is:

- (a) $3\ \text{A}$
- (b) $12\ \text{A}$
- (c) $0.33\ \text{A}$
- (d) $8\ \text{A}$

Q9. A current of $3\ \text{A}$ flows through a conductance of $0.5\ \text{S}$. The voltage across it is:

- (a) $6\ \text{V}$
- (b) $1.5\ \text{V}$
- (c) $3.5\ \text{V}$
- (d) $0.17\ \text{V}$

Q10. Two conductances of $4\ \text{S}$ each are connected in series. The effective conductance is:

- (a) $8\ \text{S}$
- (b) $4\ \text{S}$
- (c) $16\ \text{S}$
- (d) $2\ \text{S}$

Q11. Conductances of $2\ \text{S}$ and $3\ \text{S}$ are connected in parallel. The effective conductance is:

- (a) $1.2\ \text{S}$
- (b) $6\ \text{S}$
- (c) $5\ \text{S}$
- (d) $1\ \text{S}$

Q12. Three $2\ \Omega$ resistors are connected in parallel. The total conductance is:

- (a) $6\ \text{S}$
- (b) $0.67\ \text{S}$
- (c) $0.5\ \text{S}$
- (d) $1.5\ \text{S}$

Q13. Two $2\ \Omega$ resistors are connected in series. The total conductance is:

- (a) $0.25\ \text{S}$
- (b) $4\ \text{S}$
- (c) $1\ \text{S}$
- (d) $0.5\ \text{S}$

Q14. For conductances connected in series, the effective conductance G is given by:

- (a) $G = G_1 + G_2$
- (b) $G = G_1 \times G_2$
- (c) $1/G = 1/G_1 + 1/G_2$
- (d) $G = G_1 - G_2$

Q15. Conductivity is the reciprocal of:

- (a) resistivity
- (b) resistance
- (c) permittivity
- (d) reluctance

Q16. The SI unit of conductivity is:

- (a) ohm-metre
- (b) siemens per metre
- (c) siemens
- (d) ohm per metre

Q17. If the length of a conductor is doubled (same area and material), its conductance becomes:

- (a) double
- (b) half
- (c) unchanged
- (d) four times

Q18. If the cross-sectional area of a conductor is doubled (same length and material), its conductance:

- (a) halves
- (b) remains unchanged
- (c) doubles
- (d) becomes one-fourth

Q19. A wire is stretched to double its length (volume remains constant). Its conductance becomes:

- (a) half
- (b) double
- (c) four times
- (d) one-fourth

Q20. When the temperature of a metal rises, its conductance generally:

- (a) increases
- (b) decreases
- (c) remains constant
- (d) becomes infinite

Q21. When the temperature of a semiconductor rises, its conductance generally:

- (a) decreases
- (b) remains constant
- (c) becomes zero
- (d) increases

Q22. Among the following, which has the highest conductivity?

- (a) Silver
- (b) Copper
- (c) Aluminium
- (d) Iron

Q23. The conductance of a good insulator is:

- (a) very low
- (b) very high
- (c) infinite
- (d) the same as copper

Q24. A wire has a resistance of $8\ \Omega$. If its length is doubled (same area and material), its conductance becomes:

- (a) $0.125\ \text{S}$
- (b) $0.25\ \text{S}$
- (c) $16\ \text{S}$
- (d) $0.0625\ \text{S}$

Q25. A voltage of $10\ \text{V}$ is applied across a conductance of $0.2\ \text{S}$. The power dissipated is:

- (a) $2\ \text{W}$
- (b) $50\ \text{W}$
- (c) $100\ \text{W}$
- (d) $20\ \text{W}$

Q26. A lamp rated $100\ \text{W}$, $200\ \text{V}$ has a conductance (at rated values) of:

- (a) $400\ \text{S}$
- (b) $0.0025\ \text{S}$
- (c) $0.005\ \text{S}$
- (d) $0.5\ \text{S}$

Q27. A $12\ \text{V}$ source is connected across conductances of $0.5\ \text{S}$ and $0.25\ \text{S}$ in parallel. The total current is:

- (a) $6\ \text{A}$
- (b) $9\ \text{A}$
- (c) $4.5\ \text{A}$
- (d) $12\ \text{A}$

Q28. Conductances of $1\ \text{S}$ and $3\ \text{S}$ are connected in parallel and carry a total current of $8\ \text{A}$. The current through the $3\ \text{S}$ branch is:

- (a) $2\ \text{A}$
- (b) $4\ \text{A}$
- (c) $6\ \text{A}$
- (d) $8\ \text{A}$

Q29. In an AC circuit, admittance (Y) is the reciprocal of:

- (a) impedance
- (b) reactance
- (c) resistance
- (d) susceptance

Q30. A series AC circuit has $R = 3\ \Omega$ and $X = 4\ \Omega$. Its conductance G is:

- (a) $0.33\ \text{S}$
- (b) $0.2\ \text{S}$
- (c) $0.12\ \text{S}$
- (d) $0.14\ \text{S}$

Section B: Answer Key

1 - (a)	2 - (b)	3 - (c)	4 - (a)	5 - (b)
6 - (d)	7 - (c)	8 - (b)	9 - (a)	10 - (d)
11 - (c)	12 - (d)	13 - (a)	14 - (c)	15 - (a)
16 - (b)	17 - (b)	18 - (c)	19 - (d)	20 - (b)
21 - (d)	22 - (a)	23 - (a)	24 - (d)	25 - (d)
26 - (b)	27 - (b)	28 - (c)	29 - (a)	30 - (c)

Section C: Answers with Explanations

Q1. Answer: (a) Resistance

Conductance $G = 1 / R$.

Q2. Answer: (b) siemens

Conductance is measured in siemens (S).

Q3. Answer: (c) mho

The mho (ohm spelt backwards) is the old name for the siemens.

Q4. Answer: (a) $I = G \times V$

Since $I = V / R$ and $G = 1 / R$, $I = G \times V$.

Q5. Answer: (b) 0.2 S

$G = 1 / R = 1 / 5 = 0.2 \text{ S}$.

Q6. Answer: (d) 4 Ω

$R = 1 / G = 1 / 0.25 = 4 \Omega$.

Q7. Answer: (c) 0.05 S

$G = 1 / 20 = 0.05 \text{ S}$ (50 mS).

Q8. Answer: (b) 12 A

$I = G \times V = 2 \times 6 = 12 \text{ A}$.

Q9. Answer: (a) 6 V

$V = I / G = 3 / 0.5 = 6 \text{ V}$.

Q10. Answer: (d) 2 S

$1 / G = 1/4 + 1/4 = 1/2$, so $G = 2 \text{ S}$.

Q11. Answer: (c) 5 S

In parallel, conductances add: $2 + 3 = 5 \text{ S}$.

Q12. Answer: (d) 1.5 S

Each has $G = 0.5 \text{ S}$. In parallel, $G_{\text{total}} = 3 \times 0.5 = 1.5 \text{ S}$.

Q13. Answer: (a) 0.25 S

$R_{\text{total}} = 4 \Omega$, so $G = 1 / 4 = 0.25 \text{ S}$.

Q14. Answer: (c) $1/G = 1/G_1 + 1/G_2$

Series conductances combine like parallel resistances: reciprocals add.

Q15. Answer: (a) resistivity

$\sigma = 1 / \rho$.

Q16. Answer: (b) siemens per metre

$\sigma = 1 / \rho$, and ρ is in ohm-metre, so σ is in siemens per metre (S/m).

Q17. Answer: (b) half

$G = \sigma \times A / l$, so G is inversely proportional to length.

Q18. Answer: (c) doubles

$G = \sigma \times A / l$, so G is directly proportional to area.

Q19. Answer: (d) one-fourth

Length doubles and area halves, so $G = \sigma A / l$ becomes $(1/2) / 2 = 1/4$ of the original.

Q20. Answer: (b) decreases

Metals have a positive temperature coefficient of resistance, so resistance rises and conductance falls.

Q21. Answer: (d) increases

More charge carriers are generated at higher temperature, so conductance increases.

Q22. Answer: (a) Silver

Silver has the highest electrical conductivity among common metals.

Q23. Answer: (a) very low

Insulators have very high resistance, so their conductance is very low.

Q24. Answer: (d) 0.0625 S

New $R = 16 \Omega$, so $G = 1 / 16 = 0.0625 \text{ S}$.

Q25. Answer: (d) 20 W

$P = V^2 \times G = 100 \times 0.2 = 20 \text{ W}$.

Q26. Answer: (b) 0.0025 S

$R = V^2 / P = 400 \Omega$, so $G = 1 / 400 = 0.0025 \text{ S}$.

Q27. Answer: (b) 9 A

$G_{\text{total}} = 0.75 \text{ S}$, so $I = G \times V = 0.75 \times 12 = 9 \text{ A}$.

Q28. Answer: (c) 6 A

Current divider: $I = 8 \times 3 / (1 + 3) = 6 \text{ A}$.

Q29. Answer: (a) impedance

$Y = 1 / Z$, and its unit is also the siemens.

Q30. Answer: (c) 0.12 S

$Y = 1 / Z = (R - jX) / (R^2 + X^2)$, so $G = R / (R^2 + X^2) = 3 / 25 = 0.12 \text{ S}$.

Note that G is not simply $1 / R$ when reactance is present.

Score check: 26 to 30 - Excellent | 20 to 25 - Good, revise weak topics | Below 20 - Revise conductance, resistivity and series-parallel circuits, then retry.

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