

Current Divider Rule MCQs with Answers

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

Quick formulas to remember

$$I_1 = I \times R_2 / (R_1 + R_2) \quad | \quad I_2 = I \times R_1 / (R_1 + R_2) \quad | \quad I_1 : I_2 = R_2 : R_1$$

$$\text{Conductance form: } I_1 = I \times G_1 / (G_1 + G_2) \quad | \quad \text{AC: } I_1 = I \times Z_2 / (Z_1 + Z_2)$$

$$\text{Ammeter shunt: } R_{sh} = I_m \times R_m / (I - I_m) \quad | \quad \text{Total current: } I = I_1 + I_2 \text{ (KCL)}$$

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. The current divider rule is used for resistors connected in:

- (a) series
- (b) star only
- (c) parallel
- (d) delta only

Q2. For two parallel resistors R_1 and R_2 carrying a total current I , the current through R_1 is:

- (a) $I \times R_1 / (R_1 + R_2)$
- (b) $I \times R_2 / (R_1 + R_2)$
- (c) $I \times (R_1 + R_2) / R_2$
- (d) $I \times R_1 \times R_2$

Q3. In a parallel circuit, the larger current flows through:

- (a) the smaller resistance
- (b) the larger resistance
- (c) both equally
- (d) neither

Q4. In a parallel circuit, the current through a branch is:

- (a) directly proportional to its resistance
- (b) proportional to the square of its resistance
- (c) inversely proportional to its resistance
- (d) independent of its resistance

Q5. A current of 10 A divides between $2 \, \Omega$ and $3 \, \Omega$ resistors in parallel. The current through the $3 \, \Omega$ resistor is:

- (a) 6 A
- (b) 5 A
- (c) 2 A
- (d) 4 A

Q6. A current of 12 A divides between 4 Ω and 12 Ω resistors in parallel. The current through the 12 Ω resistor is:

- (a) 9 A
- (b) 3 A
- (c) 4 A
- (d) 6 A

Q7. A current of 20 A divides between 5 Ω and 20 Ω resistors in parallel. The current through the 5 Ω resistor is:

- (a) 16 A
- (b) 4 A
- (c) 10 A
- (d) 20 A

Q8. A current of 8 A divides between two equal resistors in parallel. The current through each is:

- (a) 8 A
- (b) 4 A
- (c) 2 A
- (d) 16 A

Q9. A current of 9 A divides among three equal resistors in parallel. The current through each is:

- (a) 9 A
- (b) 6 A
- (c) 4.5 A
- (d) 3 A

Q10. Two parallel branches have conductances of 2 S and 3 S, and the total current is 10 A. The current in the 2 S branch is:

- (a) 4 A
- (b) 6 A
- (c) 2 A
- (d) 10 A

Q11. A current of 12 A divides among 2 Ω , 3 Ω and 6 Ω resistors in parallel. The current through the 6 Ω resistor is:

- (a) 6 A
- (b) 4 A
- (c) 2 A
- (d) 12 A

Q12. For two resistors in parallel, the ratio of currents $I_1 : I_2$ is equal to:

- (a) $R_2 : R_1$
- (b) $R_1 : R_2$
- (c) 1 : 1
- (d) $R_1 \text{ squared} : R_2 \text{ squared}$

Q13. A total current of 10 A divides between 10 Ω and 40 Ω resistors in parallel. The current through the 40 Ω resistor is:

- (a) 8 A
- (b) 5 A
- (c) 4 A
- (d) 2 A

Q14. An ammeter has an internal resistance of 9 Ω and a full-scale current of 100 mA. To measure up to 1 A, the shunt resistance required is:

- (a) 1 Ω
- (b) 9 Ω
- (c) 0.1 Ω
- (d) 0.9 Ω

Q15. In the same ammeter (full-scale 100 mA, measuring 1 A in total), the current through the shunt is:

- (a) 1 A
- (b) 0.9 A
- (c) 0.1 A
- (d) 9 A

Q16. If one of two parallel branches has zero resistance (a short circuit), the current through the other branch is:

- (a) the total current
- (b) half the total current
- (c) double the total current
- (d) zero

Q17. If one of two parallel branches is open, the current in the other branch equals:

- (a) zero
- (b) half the total current
- (c) the total current
- (d) twice the total current

Q18. A current divider uses resistors in _____, while a voltage divider uses resistors in _____.

- (a) parallel, series
- (b) series, parallel
- (c) series, series
- (d) parallel, parallel

Q19. A total current of 6 A divides between 4 Ω and 8 Ω resistors in parallel. The current through the 4 Ω resistor is:

- (a) 2 A
- (b) 6 A
- (c) 3 A
- (d) 4 A

- Q20. A current of 8 A divides among 4 Ω , 4 Ω and 2 Ω resistors in parallel. The current through the 2 Ω resistor is:**
- (a) 2 A
 - (b) 4 A
 - (c) 8 A
 - (d) 1 A
- Q21. A 9 A current divides between a branch of 2 Ω in series with 4 Ω , and a parallel branch of 3 Ω . The current through the 3 Ω branch is:**
- (a) 3 A
 - (b) 9 A
 - (c) 6 A
 - (d) 4.5 A
- Q22. A current of 10 A flows into 2 Ω and 3 Ω resistors in parallel. The voltage across the combination is:**
- (a) 10 V
 - (b) 6 V
 - (c) 24 V
 - (d) 12 V
- Q23. In an AC circuit, the current divider rule for two parallel branches uses:**
- (a) impedances
 - (b) only resistances
 - (c) only capacitances
 - (d) only frequencies
- Q24. If two parallel branches carry equal currents, then their resistances are:**
- (a) different
 - (b) equal
 - (c) zero
 - (d) double each other
- Q25. Two resistors in parallel are 6 Ω and 3 Ω . If the 6 Ω branch carries 2 A, the total current is:**
- (a) 4 A
 - (b) 2 A
 - (c) 12 A
 - (d) 6 A
- Q26. A total current of 9 A divides between 6 Ω and 12 Ω resistors in parallel. The current through the 12 Ω resistor is:**
- (a) 6 A
 - (b) 3 A
 - (c) 4.5 A
 - (d) 9 A
- Q27. With a fixed total current and a fixed R1, if R2 in a two-branch parallel circuit is increased, the current through R1:**
- (a) decreases
 - (b) remains unchanged
 - (c) increases
 - (d) becomes zero

Q28. The current divider rule is derived from:

- (a) KCL together with Ohm's law (the same voltage across all branches)
- (b) Faraday's law
- (c) Lenz's law
- (d) Coulomb's law

Q29. A total current of 20 A divides between two parallel branches. One branch carries 12 A. The other carries:

- (a) 32 A
- (b) 12 A
- (c) 8 A
- (d) 4 A

Q30. A total current of 5 A divides between 10 Ω and 15 Ω resistors in parallel. The current through the 15 Ω resistor is:

- (a) 3 A
- (b) 2 A
- (c) 5 A
- (d) 2.5 A

Section B: Answer Key

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

Section C: Answers with Explanations

Q1. Answer: (c) parallel

A current divider shares a total current among resistors connected in parallel.

Q2. Answer: (b) $I \times R_2 / (R_1 + R_2)$

$I_1 = I \times R_2 / (R_1 + R_2)$. Note that the other resistor appears in the numerator.

Q3. Answer: (a) the smaller resistance

The voltage is the same across each branch, so $I = V / R$ is larger for the smaller resistance.

Q4. Answer: (c) inversely proportional to its resistance

$I = V / R$ with the same V .

Q5. Answer: (d) 4 A

$I = 10 \times 2 / (2 + 3) = 4$ A (and the 2 Ω resistor carries 6 A).

Q6. Answer: (b) 3 A

$I = 12 \times 4 / (4 + 12) = 3$ A (and the 4 Ω resistor carries 9 A).

Q7. Answer: (a) 16 A

$I = 20 \times 20 / (5 + 20) = 16 \text{ A}$ (and the 20Ω resistor carries 4 A).

Q8. Answer: (b) 4 A

Equal resistors share the current equally: $8 / 2 = 4 \text{ A}$.

Q9. Answer: (d) 3 A

$9 / 3 = 3 \text{ A}$.

Q10. Answer: (a) 4 A

In conductance form, $I_1 = I \times G_1 / (G_1 + G_2) = 10 \times 2 / 5 = 4 \text{ A}$.

Q11. Answer: (c) 2 A

Total conductance = $1/2 + 1/3 + 1/6 = 1 \text{ S}$. $I = 12 \times (1/6) / 1 = 2 \text{ A}$. (The 2Ω and 3Ω resistors carry 6 A and 4 A.)

Q12. Answer: (a) $R_2 : R_1$

Currents are inversely proportional to resistance, so $I_1 / I_2 = R_2 / R_1$.

Q13. Answer: (d) 2 A

$I = 10 \times 10 / (10 + 40) = 2 \text{ A}$ (and the 10Ω resistor carries 8 A).

Q14. Answer: (a) 1Ω

$R_{sh} = I_m \times R_m / (I - I_m) = 0.1 \times 9 / 0.9 = 1 \Omega$.

Q15. Answer: (b) 0.9 A

Total 1 A minus meter current 0.1 A = 0.9 A.

Q16. Answer: (d) zero

All the current takes the zero-resistance path, so the other branch carries no current.

Q17. Answer: (c) the total current

The entire current must flow through the remaining branch.

Q18. Answer: (a) parallel, series

A current divider splits current among parallel branches. A voltage divider splits voltage across series resistors.

Q19. Answer: (d) 4 A

$I = 6 \times 8 / (4 + 8) = 4 \text{ A}$.

Q20. Answer: (b) 4 A

Total conductance = $0.25 + 0.25 + 0.5 = 1 \text{ S}$. $I = 8 \times 0.5 / 1 = 4 \text{ A}$.

Q21. Answer: (c) 6 A

The first branch is 6Ω . $I = 9 \times 6 / (6 + 3) = 6 \text{ A}$ through the 3Ω branch.

Q22. Answer: (d) 12 V

$R_{equivalent} = 6 / 5 = 1.2 \Omega$, so $V = 10 \times 1.2 = 12 \text{ V}$. (Check: the 2Ω branch carries 6 A, and $6 \times 2 = 12 \text{ V}$.)

Q23. Answer: (a) impedances

$I_1 = I \times Z_2 / (Z_1 + Z_2)$, with complex impedances and phasor currents.

Q24. Answer: (b) equal

With the same voltage and the same current, the resistances must be equal.

Q25. Answer: (d) 6 A

$V = 2 \times 6 = 12 \text{ V}$. The 3Ω branch carries 4 A. Total = $2 + 4 = 6 \text{ A}$.

Q26. Answer: (b) 3 A

$I = 9 \times 6 / (6 + 12) = 3 \text{ A}$ (and the 6Ω resistor carries 6 A).

Q27. Answer: (c) increases

$I_1 = I \times R_2 / (R_1 + R_2)$ increases as R_2 increases, because more current is pushed into the lower-resistance branch.

Q28. Answer: (a) KCL together with Ohm's law (the same voltage across all branches)

The branch currents sum to the total (KCL), and each equals the common voltage divided by its resistance (Ohm's law).

Q29. Answer: (c) 8 A

By KCL, $20 - 12 = 8$ A.

Q30. Answer: (b) 2 A

$I = 5 \times 10 / (10 + 15) = 2$ A (and the $10\ \Omega$ resistor carries 3 A).

Score check: 26 to 30 - Excellent | 20 to 25 - Good, revise weak topics | Below 20 - Revise the current divider formula, parallel circuits and the ammeter shunt, then retry.

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