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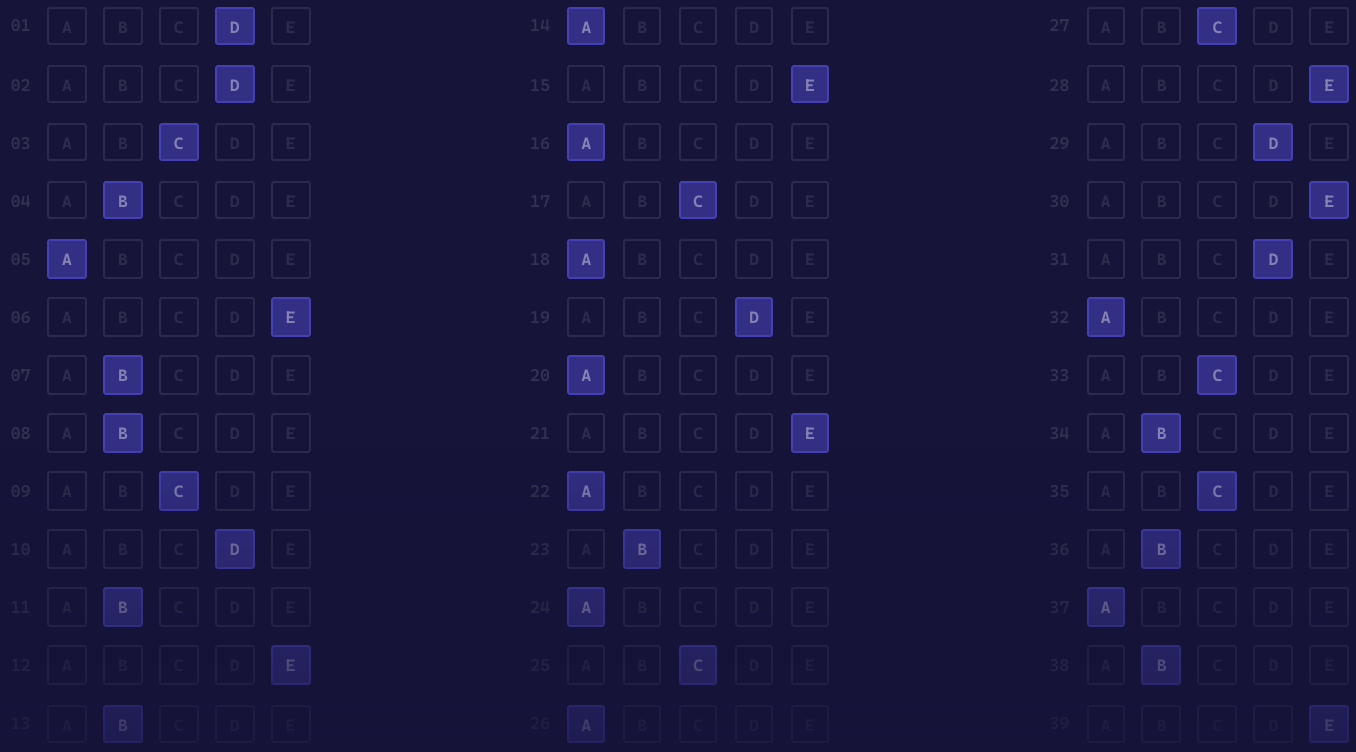

PRACTICE QUESTIONS

Saudi Council of Engineers

FE003

Fundamentals of Engineering (FE) - Electrical Engineering

EDITION	QUESTIONS	FORMAT
Demo	9	Limited Edition PDF

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Before you begin

What this is

9 practice questions for Saudi Council of Engineers `FE003`, each with its answer key and an explanation. Answer a question before you read its key — the explanation is worth more once you have committed.

If something looks wrong

Send us three things and we will check it:

- the exam code, `FE003`
- the question number
- the email address on your order

Write to **support@mometrix.net**. We reply within one business day.

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QUESTION 1 SINGLE CHOICE

For the system of equations represented by the matrix equation A x = b, where A = [[2, 1], [1, 3]] and b = [5, 10]^T, what is the value of x1?

A 1

B 2

C 3

D 5

ANSWER **A**

WHY Solving 2x1 + x2 = 5 and x1 + 3x2 = 10: from the first equation x2 = 5 − 2x1. Substituting into the second: x1 + 3(5 − 2x1) = 10 → x1 + 15 − 6x1 = 10 → −5x1 = −5 → x1 = 1. Option A is correct.

QUESTION 2 SINGLE CHOICE

A continuous random variable X is uniformly distributed on the interval [0, 10]. What is P(2 < X < 6)?

A 0.2

B **0.4**

C 0.6

D 0.8

ANSWER **B**

WHY For a uniform distribution on [a, b], P(c < X < d) = (d − c)/(b − a). Here, (6 − 2)/(10 − 0) = 4/10 = 0.4. Option B is correct.

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QUESTION 3 SINGLE CHOICE

According to engineering codes of ethics, which of the following is the engineer's primary responsibility?

A Maximizing the employer's profit

B **Protecting public safety, health, and welfare**

C Reducing project costs at all times

D Ensuring colleagues are hired preferentially

ANSWER B

WHY Major engineering codes of ethics (e.g., IEEE, NSPE) place the paramount duty on protecting public safety, health, and welfare. Option B is correct.

QUESTION 4 SINGLE CHOICE

If P dollars is invested at an annual effective interest rate i for n years with annual compounding, which expression gives the future value F?

A F = P(1 + i n)

B **F = P(1 + i)^n**

C F = P / (1 + i)^n

D F = P e^(i n)

ANSWER B

WHY With annual compounding, the future value is F = P(1 + i)^n. Option A describes simple interest; option C is present value; option D uses continuous compounding (which the problem did not specify). Option B is correct.

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QUESTION 5 SINGLE CHOICE

A copper conductor has resistivity ρ = 1.68 × 10^−8 Ω·m, length L = 10 m, and cross-sectional area A = 2 × 10^−6 m². What is its resistance?

A **0.084 Ω**

B 0.84 Ω

C 8.4 Ω

D 84 Ω

ANSWER **A**

WHY R = ρL/A = (1.68 × 10^−8 × 10) / (2 × 10^−6) = 1.68 × 10^−7 / 2 × 10^−6 = 0.084 Ω. Option A is correct.

QUESTION 6 SINGLE CHOICE

Two parallel conducting plates of area A separated by distance d (with d small compared to plate dimensions) form a parallel-plate capacitor in vacuum. The capacitance is:

A **C = ε0 A / d**

B C = ε0 d / A

C C = A / (ε0 d)

D C = ε0 A d

ANSWER **A**

WHY The standard parallel-plate capacitance formula in vacuum is C = ε0 A / d. Option B has units of 1/capacitance, option C is dimensionally incorrect, and option D would have units of capacitance times length². Option A is correct.

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QUESTION 7 SINGLE CHOICE

For a continuous-time signal x(t), the Fourier transform X(ω) is defined as:

A X(ω) = ∫ x(t) e^(j ω t) dt

B X(ω) = ∫ x(t) e^(−j ω t) dt

C X(ω) = ∫ x(t) cos(ω t) dt

D X(ω) = ∫ x(t) sin(ω t) dt

ANSWER B

WHY The continuous-time Fourier transform is defined as X(ω) = ∫_{−∞}^{∞} x(t) e^(−j ω t) dt. The inverse transform uses the conjugate sign. Option B is correct.

QUESTION 8 SINGLE CHOICE

A 3-to-8 decoder has three inputs A2, A1, A0 (with A2 the most significant) and eight active-high outputs Y0 through Y7. For input A2 A1 A0 = 101, which output is asserted?

A Y2

B Y3

C Y4

D Y5

ANSWER D

WHY A 3-to-8 decoder asserts output Yk where k is the binary value of the inputs. For inputs 101 (binary) = 5, output Y5 is asserted. Option D is correct.

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QUESTION 9 MULTIPLE CHOICE

Which of the following layers are part of the OSI reference model? (Choose two.)

A **Transport layer**

B **Session layer**

C Internet layer

D Application presentation layer

ANSWER **A** · **B**

WHY The OSI model includes (from top) Application, Presentation, Session, Transport, Network, Data Link, and Physical layers. Both the Transport layer and the Session layer are part of the OSI model. The Internet layer is from the TCP/IP model, and there is no combined 'Application presentation layer'. Options A and B are correct.

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