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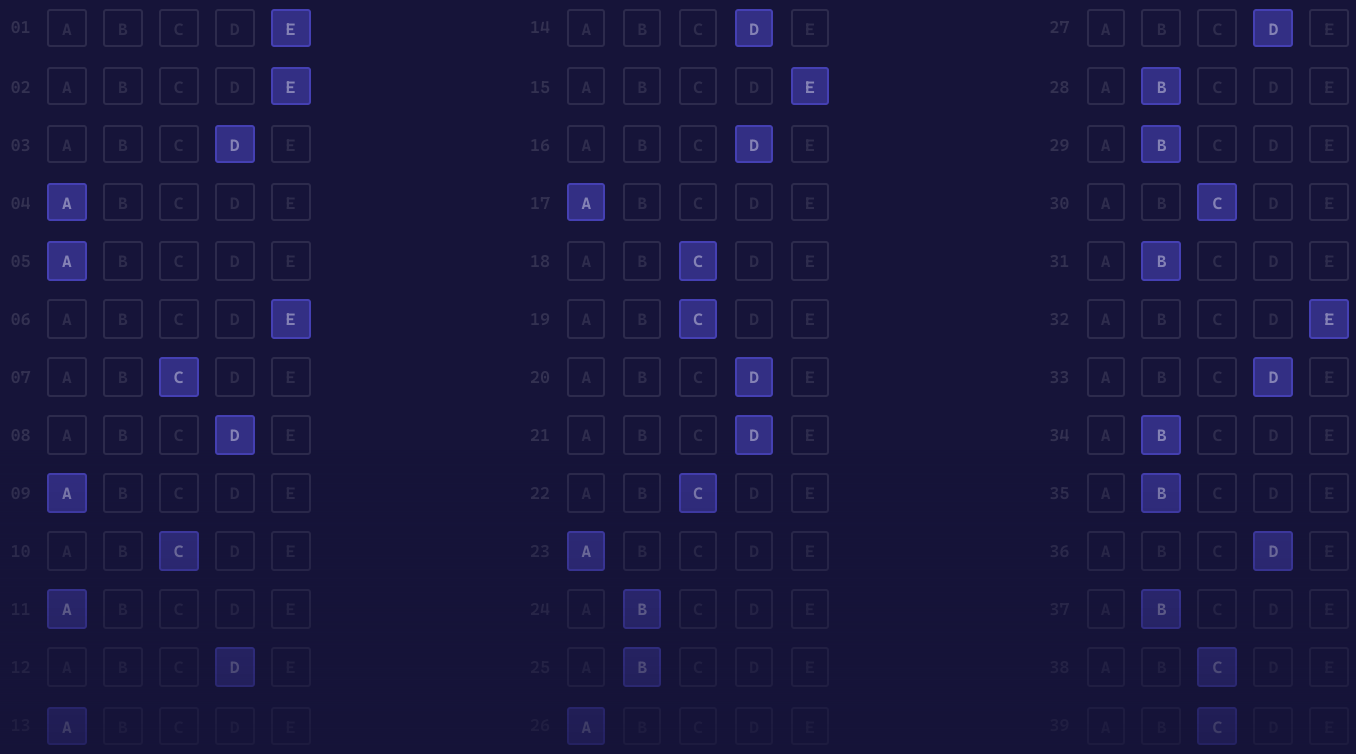

PRACTICE QUESTIONS

Saudi Council of Engineers

FE006

Fundamentals of Engineering (FE) - Other Disciplines

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 `FE006`, 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, `FE006`
- 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

Solve for x in the equation $\log_2(x) + \log_2(x - 2) = 3$.

A x = 1

B x = 4

C x = 2

D x = 8

ANSWER B

WHY Combine the logarithms: $\log_2[x(x - 2)] = 3$, which gives $x(x - 2) = 2^3 = 8$. Solving $x^2 - 2x - 8 = 0$ yields $(x - 4)(x + 2) = 0$, so $x = 4$ or $x = -2$. Since the arguments of both logarithms must be positive ($x > 0$ and $x - 2 > 0$), only $x = 4$ is valid.

QUESTION 2 SINGLE CHOICE

A box contains 4 red balls and 6 blue balls. Two balls are drawn at random without replacement. What is the probability that both balls are red?

A 2/15

B 4/25

C 1/3

D 16/100

ANSWER A

WHY The probability of the first ball being red is 4/10 = 2/5. After removing one red ball, the probability of the second ball being red is 3/9 = 1/3. Multiplying gives (2/5)(1/3) = 2/15.

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QUESTION 3 SINGLE CHOICE

According to fundamental engineering ethics principles, what is the paramount duty of a professional engineer?

A **Protecting the welfare and safety of the public**

B Maximizing profit for the client

C Maintaining confidentiality of all client information

D Following the employer's directives without question

ANSWER **A**

WHY The paramount duty of a professional engineer, as stated in widely adopted engineering codes of ethics (such as those of the NSPE and similar bodies), is the protection of the public welfare, health, and safety. This duty supersedes obligations to the client or employer.

QUESTION 4 SINGLE CHOICE

What is the present worth of a future payment of $5,000 received 6 years from now at an interest rate of 10% per year, compounded annually?

A **$2,822**

B $3,000

C $4,500

D $7,815

ANSWER **A**

WHY Using the present worth formula $P = F / (1 + i)^n$, we get $P = 5000 / (1.10)^6 = 5000 / 1.771561 \approx \$2,822$.

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QUESTION 5 SINGLE CHOICE

A simply supported beam of length L carries a uniformly distributed load w over its entire length. What is the maximum bending moment?

A $wL^2/2$

B $wL^2/4$

C **$wL^2/8$**

D $wL^2/12$

ANSWER C

WHY For a simply supported beam with a uniformly distributed load w over its full length L, the maximum bending moment occurs at midspan and equals $wL^2/8$. The maximum shear force at the supports is wL/2.

QUESTION 6 SINGLE CHOICE

A manometer is used to measure the pressure of a gas in a tank. The fluid used has a specific gravity of 13.6, and the manometer reading shows a height difference of 500 mm. What is the gauge pressure of the gas in kPa? (Use g = 9.81 m/s^2)

A 6.67 kPa

B **66.7 kPa**

C 147 kPa

D 6.67 MPa

ANSWER B

WHY Gauge pressure is given by P = ρgh. For mercury (SG = 13.6), ρ = 13.6 × 1000 = 13,600 kg/m^3. With h = 0.500 m, P = 13,600 × 9.81 × 0.500 ≈ 66,708 Pa ≈ 66.7 kPa.

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QUESTION 7 SINGLE CHOICE

An ideal gas undergoes an isothermal compression from an initial volume of 0.5 m^3 to a final volume of 0.1 m^3 at a constant temperature of 300 K. If the initial pressure is 100 kPa, what is the work done ON the gas? (R = 8.314 J/(mol·K), assume n = 1 mol)

A −4014 J

B +4014 J

C −200 J

D +200 J

ANSWER B

WHY Work done ON the gas in isothermal compression is $W_{on} = nRT \ln(V_1/V_2) = (1)(8.314)(300) \ln(0.5/0.1) = 2494.2 \times \ln(5) \approx 2494.2 \times 1.6094 \approx 4014$ J. The work done on the gas is positive during compression.

QUESTION 8 SINGLE CHOICE

In a purely inductive AC circuit with an inductance of 0.1 H connected to a 60 Hz supply, what is the inductive reactance?

A 6.28 Ω

B 37.7 Ω

C 188.5 Ω

D 376.99 Ω

ANSWER B

WHY Inductive reactance $X_L = 2\pi fL = 2\pi(60)(0.1) = 120\pi \times 0.1 = 12\pi \approx 37.7$ Ω.

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QUESTION 9 MULTIPLE CHOICE

Which of the following are mechanical properties of materials? (Choose two.)

A **Hardness**

B Thermal conductivity

C **Ductility**

D Electrical resistivity

ANSWER **A** · **C**

WHY Mechanical properties describe how a material responds to applied forces. Hardness (resistance to indentation/scratching) and ductility (ability to undergo plastic deformation before fracture) are mechanical properties. Thermal conductivity and electrical resistivity are physical properties related to heat and charge transport.

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