FE Civil Practice Sampler

14 original questions with complete worked answers

One introductory question per knowledge area. This short sampler is not a full-length mock, not a representative exam blueprint, and not an official NCEES practice exam. It cannot predict whether you will pass.

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Try the questions before reading the answer section. Use consistent units and record your working. Answers and explanations start after question 14.

Online questions and accessible worked answers: acefeexam.com/fe-civil-practice-exam-pdf

1. Mathematics and Statistics

A circle has a radius of 3 m. What is its area?

A. 28.27 m²

B. 18 m²

C. 9 m²

D. 56.55 m²

2. Ethics and Professional Practice

An engineer finds a calculation error that could threaten public safety in a submitted design. What is the most appropriate first response?

A. Ignore it because the design is submitted

B. Promptly inform the responsible parties and work to correct the risk

C. Wait for a complaint

D. Delete the calculation record

3. Engineering Economics

What is the future value of $1,000 invested for two years at 5% interest compounded annually?

A. $1,050

B. $1,100

C. $1,102.50

D. $1,200

4. Statics

A simply supported 6 m beam carries a 12 kN point load at midspan. Ignoring self-weight, what is the vertical reaction at each support?

A. 3 kN

B. 24 kN

C. 12 kN

D. 6 kN

5. Dynamics

A 1,000 kg object has a net force of 2,000 N acting on it. What is the acceleration?

A. 2 m/s²

B. 0.5 m/s²

C. 20 m/s²

D. 2,000 m/s²

6. Mechanics of Materials

An axial tensile load of 20 kN acts on a bar with a cross-sectional area of 400 mm². What is its average normal stress?

A. 5 MPa

B. 50 MPa

C. 20 MPa

D. 80 MPa

7. Materials

A concrete cylinder with a loaded area of 20,000 mm^2 fails under a compressive load of 600 kN. What is its measured compressive strength?

A. 3 MPa

B. 12 MPa

C. 30 MPa

D. 300 MPa

8. Fluid Mechanics

Water flows at 3.0 m/s through a pipe with a cross-sectional area of 0.020 m^2. What is the volumetric flow rate?

A. 0.006 m^3/s

B. 6.0 m^3/s

C. 0.60 m^3/s

D. 0.060 m^3/s

9. Surveying

A benchmark has an elevation of 100.00 m. A level setup reads a 1.50 m backsight on the benchmark and a 0.80 m foresight on a new point. What is the new point’s elevation?

A. 100.70 m

B. 99.30 m

C. 97.70 m

D. 102.30 m

10. Water Resources and Environmental Engineering

A completely mixed tank holds 120 m^3 of water and has a steady flow of 0.50 m^3/min. What is its nominal hydraulic detention time?

A. 60 min

B. 240 min

C. 120 min

D. 600 min

11. Structural Engineering

A simply supported beam of span 4 m carries a uniformly distributed load of 2 kN/m over the full span. What is the maximum bending moment?

A. 2 kN·m

B. 8 kN·m

C. 4 kN·m

D. 16 kN·m

12. Geotechnical Engineering

A soil has a liquid limit of 45 and a plastic limit of 20. What is its plasticity index?

A. 20

B. 65

C. 45

D. 25

13. Transportation Engineering

Vehicles pass a point at a steady average rate of 900 vehicles per hour. What is the average time headway?

A. 4 s/vehicle

B. 2 s/vehicle

C. 15 s/vehicle

D. 40 s/vehicle

14. Construction Engineering

A crew places 120 m^3 of concrete in 8 hours at a constant average production rate. How long would 180 m^3 take at the same rate?

A. 8 h

B. 12 h

C. 10 h

D. 16 h

Answers and worked solutions

1. Mathematics and Statistics — Answer A

Area = pi × r² = pi × 3² = 28.274 m², which rounds to 28.27 m². Radius and diameter must not be interchanged.

2. Ethics and Professional Practice — Answer B

Protecting public safety requires promptly communicating the error to the responsible parties and addressing the risk. Concealing records or waiting for harm does not address the known hazard. Follow applicable professional duties and escalation requirements.

3. Engineering Economics — Answer C

F = P(1 + i)^n = 1,000 × 1.05² = $1,102.50. The second year earns interest on both the principal and the first year’s interest.

4. Statics — Answer D

Symmetry gives equal reactions. Vertical equilibrium gives RA + RB = 12 kN, so each reaction is 6 kN. Taking moments about one support gives the same result: RB × 6 = 12 × 3.

5. Dynamics — Answer A

From Newton’s second law, a = F/m = 2,000/1,000 = 2 m/s². The given force is the net force, so no additional force terms are needed.

6. Mechanics of Materials — Answer B

Stress = P/A = 20,000 N / 400 mm² = 50 N/mm² = 50 MPa. Convert kilonewtons to newtons before dividing.

7. Materials — Answer C

Compressive strength = maximum load / loaded area = 600,000 N / 20,000 mm² = 30 N/mm² = 30 MPa.

8. Fluid Mechanics — Answer D

Q = Av = 0.020 m² × 3.0 m/s = 0.060 m³/s. Area multiplied by velocity gives volume per time.

9. Surveying — Answer A

Height of instrument = benchmark elevation + backsight = 101.50 m. New elevation = height of instrument − foresight = 101.50 − 0.80 = 100.70 m.

10. Water Resources and Environmental Engineering — Answer B

Nominal detention time = volume / flow = 120 m³ / 0.50 m³/min = 240 min, or 4 hours. This is a nominal hydraulic value, not a guarantee for every water parcel.

11. Structural Engineering — Answer C

For this support and loading case, Mmax = wL²/8 = 2 × 4²/8 = 4 kN·m, at midspan. The total applied load is 8 kN, but load and moment have different units.

12. Geotechnical Engineering — Answer D

PI = LL − PL = 45 − 20 = 25. The index measures the numerical range of water contents between the plastic and liquid limits.

13. Transportation Engineering — Answer A

Average headway = 3,600 seconds per hour / 900 vehicles per hour = 4 seconds per vehicle. This is an average and does not imply all gaps are identical.

14. Construction Engineering — Answer B

Average production = 120/8 = 15 m³/h. Required time = 180/15 = 12 h. The assumption is unchanged productivity; mobilization and other delays are excluded.

Next: Take a full-length timed FE Civil mock or try the 8-question diagnostic.