

### **Concept K1, Definition of a Truss, factual**

#### **Q1 A: Which of the following best describes a truss?**

[source: [https://quizizz.com/admin/quiz/652c89be3816241662d50a88/trusses-1?utm\\_source=chatgpt.com](https://quizizz.com/admin/quiz/652c89be3816241662d50a88/trusses-1?utm_source=chatgpt.com)]

- A. A bridge made from beams joined into triangular members
- B. A structure comprised of members joined at their ends by friction pins
- C. A structure comprised of members joined at their ends by friction-free pins
- D. A structure comprised of beams joined in triangles, spanning between two supports

**Correct answer: C**

#### **Q1 B: Which statement accurately defines a truss?**

- A. A framework of beams connected by rigid joints to form rectangles
- B. An assembly of members connected at their ends by pinned joints, forming triangular units
- C. A network of beams and columns supporting loads through fixed connections
- D. A series of arches connected to span between supports

**Correct answer: B**

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### **Concept K2, Types of Forces in Truss Members**

#### **K2 A: Which types of internal forces are primarily carried by members in a simple truss?**

- A. Bending and torsion
- B. Tension and compression
- C. Shear and axial rotation
- D. Buckling and shear

**Correct answer: B**

#### **K2 B: Which two internal forces are most commonly found in truss members?**

- A. Torsion and bending
- B. Tension and compression
- C. Shear and deflection
- D. Axial force and shear stress

**Correct answer: B**

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### **Concept K3, Definition of Zero-Force Members**

#### **K3 A: In a truss structure, what is a zero-force member?**

- A. A member that carries no force under specific loading conditions
- B. A member that always carries the maximum load
- C. A member designed to carry shear forces only
- D. A member that connects the truss to external supports

**Correct answer: A**

**K3 B: In a truss structure, what is a zero-force member?**

- A. A member that carries no load under specific conditions but may enhance structural stability.
- B. A member that consistently bears minimal load regardless of external forces.
- C. A member designed to resist shear forces between connected elements.
- D. A member that primarily transfers torsional forces within the truss.

**Correct Answer: A**

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**Logic K4, Apply understanding of truss determinacy using joints and members ( $M=2j-3$ )**

**K4 A: A truss has 8 joints and 13 members. Is this truss statically determinate and internally stable?**

- A. Yes, it meets the condition for internal stability
- B. No, it has too many joints
- C. Yes, because all members are in triangles
- D. No, it needs more supports to be stable

**Correct answer: A**

**K4 B: A truss contains 10 joints and 19 members. Is this truss statically determinate and internally stable?**

- A. No, it has more members than needed and is over-constrained
- B. Yes, the number of members and joints satisfies the condition for stability
- C. No, it requires additional zero-force members to be stable
- D. Yes, as long as supports are placed at each joint

**Correct answer: B**

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**Logic K5, Recognizing when zero-force members are important**

**K5 pre: In which of the following situations would keeping a zero-force member in a truss be most justified?**

- A. The structure carries a constant, predictable load in a controlled environment
- B. The structure may experience varying loads from different directions over time
- C. The truss is small and intended for short-term use with minimal weight
- D. The design prioritizes aesthetics over structural performance

**Correct answer: B**

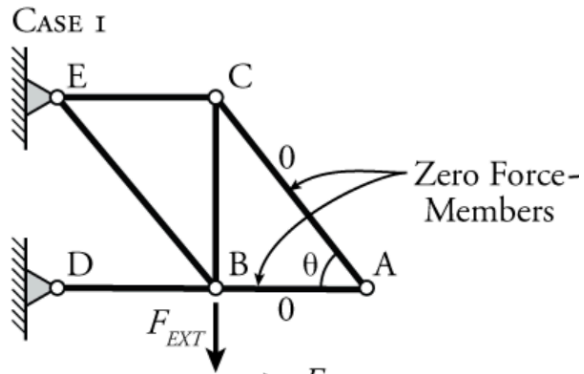
**K5 post: In which of the following situations is the inclusion of zero-force members in a truss most critical?**

- A. A truss located in a region prone to frequent earthquakes.
- B. A truss used in a climate-controlled warehouse with stable conditions.
- C. A decorative truss installed in a residential interior.
- D. A temporary truss erected for a short-term event with minimal loads.

**Correct answer: A**

## Logic K6, Zero-force analysis

### K6 A. Find the zero force members



### K6 B. Find the zero force members

- (a) BE is a zero force member
- (b) BG and BH are zero force members

