

**MET 352 Engineering Design**  
**Department of Materials and Metallurgical Engineering**  
**South Dakota School of Mines and Technology**

**Short Response 8: Feb 8, 2019**

**Answer any one question.**

Only the first question answered will be graded.

1. Which of the following are the two “Decomposition” categories.

- a)  Theoretical and Practical
- b)  Physical and Theoretical
- c)  Physical and Functional
- d)  Functional and Hypothetical
- e)  Hypothetical and Theoretical

Key: c

OR

2. Which of the following are the steps to a trade study.

- a)  Define the Problem
- b)  Define the Constraints
- c)  Find 3-5 Solution Alternatives
- d)  Define the Evaluation Criteria
- e)  Define the Weight Factors
- f)  Define the Normalization Scale
- g)  Populate the Trade Matrix
- h)  Rank the Solutions

Key: all

OR

3. Cite three common Trade Study evaluation criteria.

Key:

- Development cost
- Lifecycle cost
- Requirements compliance
  - Functional
  - Performance
  - Operational
  - Programmatic
- Technical risk (Maturity)
  - 1. Reliability, Maintainability, Availability
  - 2. System Safety
  - 3. Quality
  - 4. Human Factors
  - 5. Electromagnetic Environmental Effects
  - 6. Hazardous Materials
- Budget risk
- Schedule risk
- Operational complexity
- Vendor assessment
- System maturity
- Development support tools
- Test support tools
- Development team familiarity with candidate hardware and software
- Quality of logistics support