The Evolving Landscape of Engineering

Engineering · Answer Key · 30 Questions

1. What was the primary focus of engineers in the past regarding their designs?

A) Innovation and new materials
B) Form, fit, and function
C) Economic viability
D) Environmental impact

2. What technological advancement, while simplifying design, also increased the complexity of problems faced by modern engineers?

A) 3D printing
B) Artificial intelligence
C) Computer Aided Design (CAD)
D) Robotics

3. According to the text, why do engineers sometimes resist learning soft skills?

A) They are too expensive to teach
B) They are considered less important than technical skills
C) Universities do not offer them
D) They are too difficult to understand

4. What is a key characteristic of soft skills that makes them difficult for logical personalities to grasp?

A) Their rigidity and black-and-white answers
B) Their subjective nature and "shades of gray"
C) Their reliance on mathematical formulas
D) Their dependence on historical data

5. Which author's research suggests that professionals who successfully utilize soft skills generally outperform those who rely solely on technical knowledge?

A) Daniel Goleman
B) David Socha
C) Richard Serby
D) Craig Watson

6. What is a consequence of engineers lacking the ability to work and communicate effectively, according to the text?

A) Increased project efficiency
B) Limited growth opportunities and success
C) Enhanced team collaboration
D) Greater personal satisfaction

7. According to the case study, what would be the likelihood of success if team members could not communicate together?

A) High probability of success
B) Success would depend on leadership
C) Success would be unlikely
D) Communication issues would not affect success

8. What is a fundamental difference between science and engineering according to Gordon Rogers' theory?

A) Science focuses on 'how' and engineering on 'why'
B) Science aims to establish theories, while engineering aims to improve product efficiency
C) Science is about observation, and engineering is about experimentation
D) Science deals with the abstract, and engineering with the practical

9. Howard Rase suggests engineers should not be content with what type of work?

A) Creative problem-solving
B) Efficient execution of tasks
C) Memorization and uninspired work
D) Engaging in wider tasks

10. What is a core element of Howard Rase's notion of engineering?

A) Theories and laws
B) Techniques and tools
C) How engineers make decisions
D) The history of engineering

11. According to Gerhard Pahl and Wolfgang Beitz, what is the primary need for a systematic approach in engineering design?

A) To increase the speed of design
B) To rely solely on intuitive skills
C) To manage complex designs and increase the probability of technical and economic success
D) To reduce the need for creativity

12. Pahl and Beitz suggest that designers should balance which two aspects in each design step?

A) Theory and practice
B) Systematic approach and intuition
C) Cost and quality
D) Innovation and tradition

13. In the conceptual design phase, what is the importance of abstracting the task?

A) To identify the essential problem and avoid non-optimum solutions
B) To immediately proceed to detail design
C) To focus only on technical aspects
D) To ensure commercial motivation

14. What is the purpose of the 'Embodiment Design' stage in Pahl and Beitz's systematic design process?

A) To correct a poor solution concept
B) To finalize the general layout and check if requirements are met
C) To begin the conceptual design phase
D) To solely focus on aesthetic details

15. Frederick Winslow Taylor's theory of scientific management aimed to replace older methods with what approach?

A) Craft-based manufacturing
B) Individual worker intuition
C) Standardization of tools and steps
D) Team-based problem solving

16. What was a significant limitation of scientific management as observed by Taylor?

A) It was too complex for workers to understand
B) It was not suited for work that could not be atomized
C) It led to excessive worker creativity
D) It did not consider economic factors

17. According to Henry Petroski, what is the greatest tool for an engineer?

A) New technologies
B) Failure analysis
C) Experience
D) Theoretical knowledge

18. What does Henry Petroski stress that an engineer must focus on to prevent structural failures?

A) Lists of potential failures
B) Communication and organization, inspection, good quality design, etc.
C) Avoiding all new features and techniques
D) Re-examining standards only after catastrophic failure

19. Genrich Altshuller's theory of Inventive Problem Solving (TRIZ) aims to systematically approach what task?

A) Cost reduction
B) Quality control
C) Inventiveness
D) Project management

20. What is a basic method presented by Altshuller in TRIZ?

A) The 'Go Between' Principle
B) Eliminating all contradictions
C) Focusing on accidental factors
D) Reliance on intuition

21. According to the text, what is the primary role of engineering?

A) To create abstract theories
B) To solve societal issues
C) To solely focus on technological advancement
D) To achieve personal financial gain

22. What is the main implication of the statement that 'engineering is for people, by people'?

A) Engineers are isolated from society
B) Engineering requires profound creativity
C) Engineering is solely an economic endeavor
D) Engineering focuses only on technical aspects

23. What is the role of 'hard' skills in engineering?

A) They are the primary skills for success
B) They are technical and specific to a branch of engineering
C) They are less important than soft skills
D) They are interchangeable with soft skills

24. Why are soft skills considered crucial for engineers to be effective in the industry?

A) They guarantee higher salaries
B) They allow engineers to work in isolation
C) They promote career success and effective collaboration
D) They reduce the need for technical knowledge

25. What is a key characteristic of teamwork in engineering as described in the text?

A) Engineers work in isolation
B) It involves collaboration with diverse individuals
C) It is only necessary for leadership roles
D) It does not require intercultural communication

26. How are analytical skills described in relation to problem-solving?

A) They are not important for problem-solving
B) They enable breaking down problems into manageable pieces
C) They rely on luck and chance
D) They are only useful for theoretical research

27. Why do employers highly value analytical skills in the competitive engineering industry?

A) They are easy to learn
B) They allow for efficient problem scrutiny and solution finding
C) They guarantee a high starting salary
D) They reduce the need for teamwork

28. What does the text suggest about the relevance of Howard Rase's views on engineering today, particularly regarding computerization?

A) Computerization has made his views obsolete
B) Judgment and experience remain crucial, especially for complex systems
C) His theories are only applicable to mechanical engineering
D) Engineering experience is no longer valued

29. What is a key outcome of Pahl and Beitz's systematic design approach?

A) It eliminates all errors
B) It creates a predictable project timetable and allows recovery from errors
C) It prioritizes intuition over planning
D) It is only applicable to simple designs

30. What is a fundamental element of Taylor's scientific management regarding the division of responsibility?

A) Workers bear the entire responsibility for planning and execution
B) Management is responsible for planning, and workers for execution
C) Tasks are left to individual worker discretion
D) Management plans, and workers execute without specific guidance