Thinking Like an Engineer 5th edition Stephan Solutions Manual

SKU: 9780136932208-SOLUTIONS

Review 1 – 1 Answer

a) The practice of using mathematical equations.
(Mathematics is only a part of engineering.)

b) The application of science.
(Correct: Engineers apply science to solve problems.)

c) The discovery of technological inventions.
(Discovery is the focus of science, not engineering.)

d) The supervision of project design.
(This is a better definition of management.)

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Review 1 – 2 Answer

a) I want to understand things.
(Correct: mastery seeks understanding all of the other options are external.)

b) I want to get excellent grades
(This is an external motivation.)

c) I want my parents to be proud of me.
(This is an external motivation.)

d) I want to earn a lot of money.
(This is an external motivation.)

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Review 1 – 3 Answer

a) I want to understand things.
(This is an internal motivation.)

b) I want to get excellent grades.
(Correct: Grades are 'rewards for hard work' and performance oriented goals seek rewards.)

c) I want to help people succeed.
(This is an internal motivation.)

d) I want to solve problems.
(This is an internal motivation.)

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Review 1 – 4 Answer

a) Your family and friends feel it is a good fit.
(Yes, but do you feel it is a good fit?)

b) You are satisfied and challenged.
(Correct: You are the only one who can know that you've chosen the right career.)

c) Your boss is happy with your work.
(Yes, but are you happy with your work?)

d) You are appropriately compensated.
(Money is important, but not the most important part of a career.)

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Review 1 – 5 Answer

a) Discover new uses for fixed nitrogen compounds.
(This could help, but isn't the focus of the challenge.)

b) Reduce the amount of nitrogen being used in fertilization.
(This would help, but could result in restrictions that reduce crop yield.)

c) Discover ways to augment natural denitrification.
(Correct: Extensive use of the Haber-Bosch process of fixating nitrogen is causing an imbalance in the nitrogen cycle.)

d) Reduce the rate of nitrogen uptake in plants.
(This would make matters worse, because more fixated nitrogen would be required.)

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Review 1 – 6 Answer

a) 1%
(Too low)

b) 10%
(Too low)

c) 50%
(Correct)

d) 90%
(Too high)

e) 99%
(Too high)

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Review 1 – 7 Answer

a) A biosystems engineer.
(Not the best answer, a biosystems engineer would typically know about filtration, but not necessarily how to integrate such a system into the human body)

b) An electrical engineer.
(Not the best answer, an electrical engineer might design systems to control the artificial kidneys, but not necessarily how to integrate such a system into the human body)

c) A mechanical engineer.
(Not the best answer, a mechanical engineer would typically know about pumps and filters, but not necessarily how to integrate such a system into the human body)

d) A biomedical engineer.
(Correct, this will require knowledge of how devices interact with human biological systems.)

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Review 1 – 8 Answer

a) Civil Engineering.
(Correct, of these choices, civil engineering would be concerned with the design, construction, and operation of large-scale facilities. Industrial engineering might also be particularl involved in the planning and operation stages.)

b) Mechanical Engineering.
(Incorrect, mechanical engineering would be concerned with the design of the equipment in those facilities, but not necessarily the design of the facilities as a whole.)

c) Bioengineering.
(Incorrect, it doesn't seem like either of these would feature substantial biological processes.)

d) Chemical engineering.
(Incorrect, chemical engineering would be concerned with the design of certain equipment in those facilities, but not necessarily the design of the facilities as a whole.)

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Review 1 – 9 Answer

a) Computer engineers.
(Not the best answer; in this scenario, computer engineers would design the hardware and the communications protocols.)

b) Industrial engineers.
(Not the best answer; in this scenario, industrial engineers might design or improve the manufacturing process.)

c) Electrical engineers.
(Correct, communication and control systems are typically designed by electrical engineers.)

d) Materials engineers.
(Not the best answer; in this scenario, materials engineers might design a PCB-free circuit board manufacturing process for the microcontroller.)

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Review 1 – 10 Answer

a) A materials engineer.
(Not the best answer; a materials engineer might help improve a part design through the use of a new material, but would not be likely to study the overall manufacturing process.)

b) An industrial engineer.
(Correct, an industrial engineer would be most likely to improve the manufacturing process.)

c) A mechanical engineer.
(Not the best answer; a mechanical engineer might help improve the process for manufacturing certain parts, but would not be likely to study the overall manufacturing process.)

d) A civil engineer.
(Not the best answer; a civil engineer might help redesign the manufacturing facility, but would not be likely to study the overall manufacturing process.)

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Review 1 – 11 Answer

a) An industrial engineer.
(Not the best answer; an industrial engineer would not be likely to have the expertise to design composite materials.)

b) A mechanical engineer.
(Not the best answer; a mechanical engineer might test the properties of the new plane, but would not be likely to have the expertise to design composite materials.)

c) A materials engineer.
(Correct, a materials engineer would design the structure and manufacturing of special materials.)

d) An electrical engineer.
(Not the best answer; an electrical engineer would not be likely to have the expertise to design composite materials.)

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