SE3910 Review Questions (part 1 of 2)

1. What are potential drawbacks of a single expert review?
2. Suppose you’re tasked to run a Delphi Study to forecast the technical needs for Army vehicles. Write a single question for the first round of the Delphi Study. For this question, in the second round, what question would you pose?
3. What are some reasons that technology advancement is often exponential?
4. Why is an ‘S’ curve often a good prediction for how technology will evolve?
5. Which comes first, the technology or the science? Provide examples to help justify your answer.
6. Explain the argument for a combinatorial perspective on technology that says new technologies are composed of previous technologies.
7. In military acquisition, which comes first the capability need or the technology looking for an application? Provides examples to help justify your answer.
8. Do you agree with Plato’s widely quoted statement that necessity is the mother of invention? Explain why or why not.
9. Write a definition of technology.
10. Making an internal combustion engine that obtains better fuel mileage is an example of: (i) innovation by context, (ii) innovation by development, or (iii) invention? Explain your answer.
11. Does Arthur’s theory of technology evolution utilize the same mechanisms of natural selection and survival of the fittest as the Darwinian theory of evolution for species?
12. Explain the tenets that build Arthur’s theory of technology evolution?
13. How can we test whether Arthur’s theory of technology evolution is valid?
14. Use the principles from systems architecting to explain the mechanisms defined in Arthur’s theory of technology evolution.
15. Explain why there is variety in technologies? Why not just have a single car design? A single vacuum cleaner design? Or a single design for any technology.
16. Why is it argued that technology is culture-bound? Provide some examples.
17. Suppose the tensile strength of carbon nano-tubes is observed to follow exponential growth that results in doubling every 3 years. If the current tensile strength is x MPA (mega Pascals), then what will the tensile strength be in 3 years? In 6 years? In 12 years?
18. What makes a good forecast?
19. Name some reasons that most technologies cannot continue to evolve exponentially forever.
20. What is a technology roadmap?
21. What is backcasting?
22. What is a revolution in military affairs? What makes it revolutionary?
23. Does technology provide a decision advantage that has affected the outcome of a war?
24. What are the elements required for a revolution in military affairs according to Krepenivich?
25. What is military doctrine?
26. Why does Hughes argue that technology usually does not affect the outcome of a war?
27. Describe the current revolution in military affairs and how it affects defense acquisition, strategy, and other aspects of the military.
28. What does a lead systems integrator do?
29. How does adoption of a technology affect our environment? Consider a major technology, and explain how it has affected our environment.
30. How does the theory of technology evolution support the outcome of exponential growth in technology?
31. What is Augustine’s Law?
32. What is the difference between forecasting evolutionary technologies and disruptive technologies? What is a disruptive technology?
33. What is the technology readiness level? What does a value of 1 imply compared to a value of 9?
34. How is the technology readiness level used by the DoD?