SE3910 Review Questions (part 2 of 2)

1. In Gunfire at Sea, Morrison describes the Navy as going through three phases in the change management process. What are these three phases?
2. List and describe three key components of network centric warfare?
3. How has technology made network centric operations possible?
4. What is the nature of the relationship between military tactics and technology?
5. **Does a new technology necessarily give the holder a military advantage?**<https://cle.nps.edu/access/content/group/0230bdf9-b948-407a-a35d-99ce7f579739/Military%20Affairs/hughes-ChapterTrendsConstantsofTechnology.pdf>  
   CAPT Hughes article  
   No. For example, the French had better tanks, but the Germans exploited tank technology better with the blitzkrieg. Tactics definitely play a crucial role in utilizing technology.
6. **Compare and contrast technology development during wartime and peacetime.**Same CAPT Hughes article  
     
   Technological Surprise during times of war can turn a war much faster. For example, the torpedoes developed by the Japanese in the late 1930’s, and the atomic bomb. During peacetime, the enemy can anticipate and even build countermeasures (either technology or tactics) against new breakthroughs. However, if the enemy underestimates this (such as Iraqis underestimating effectiveness of C2 systems before Desert Storm), they will potentially be in an even worse position.
7. **How fast can the military adopt new technologies and what can be done to facilitate the adoption of new technologies?**[**https://cle.nps.edu/access/content/group/0230bdf9-b948-407a-a35d-99ce7f579739/Military%20Affairs/Krepinevich-Military-Technical-Revolution.pdf**](https://cle.nps.edu/access/content/group/0230bdf9-b948-407a-a35d-99ce7f579739/Military%20Affairs/Krepinevich-Military-Technical-Revolution.pdf)Revolution in Military Affairs Article.  
   “Due to the many factors involved in bringing such a revolution about, the transition from the Cold War period of warfare to a new military-technical era may take several decades. For example, the revolution from relatively immobile, positional warfare in World War I to mobile, mechanized warfare in World War II took a generation. The emergence of nuclear weapons and doctrine took roughly 10-15 years.”  
     
   One way to facilitate adoption of new technology is to use simulations to identify and solve tactical issues before actual fighting begins. It also supports training so that new technology can be implemented more quickly and effectively. Tactics may need to be changed to fully utilize the technology also, along with all the other factors in DOTMLPF. Organizational and physical structures (such as battleships) that allow for new technology to be quickly integrated also facilitates technology adoption (modularity). Identifying “core competencies” within R&D and acquisition are crucial for focusing development efforts.
8. **Define risk.**Covered during Lecture 8 – R&D Portfolio management.  
   In systems engineering terms, risk is a combination of the likelihood of an undesirable event occurring and the consequence of that event.
9. Why does diversification reduce risk in a portfolio?
10. In R&D portfolio management, aside from seeking to maximize portfolio value while managing risk, what other objectives are there?
11. What are two criteria to consider when deciding whether the DoD should lead, initiate, participate, or monitor a technology R&D project?
12. How does the Navy (the Office of Naval Research) categorize technology?
13. What does it mean to say a R&D project is aligned with the Army’s strategy?  
    It means there is a pathway to transition of the technology. (I am making this up based on the lecture notes for less on 8, slide 18).
14. Define technology transition.  
    From the lecture notes for lesson 8, “Technology transition is the process to adopt technology from a science and technology community to the operational military in the quantity and quality needed by the warfighter to carry out assigned missions at the best value as measured by the warfighter”
15. What are challenges of transition technology to military operations?  
    See “MANAGER’S GUIDE TO TECHNOLOGY TRANSITION IN AN EVOLUTIONARY ACQUISITION ENVIRONMENT” Chapter 4 (lesson 8).   
    From less on 8 lecture notes (slide 4):
    1. Rapid technological change
       1. Rate of technology change compared to development time of new systems
       2. Obsolescence
       3. Countermeasures
    2. Availability of commercial technology adaptable to military use
    3. Low barriers to adversaries developing defense technology
       1. Proliferation of military technologies beyond U.S. military
       2. Other countries have significant R&D and prowess in many technologies
16. What is a motivation for using an evolutionary acquisition process?  
    This response was derived from lesson 8 lecture notes.
    1. Slide 12 cites acquisition response time
    2. Slide 13 cites risk minimization vs. risk management
17. Explain how does system modularity accommodate technology evolution?
18. What are reasons for exponential growth in technology performance?
19. What are reasons a technology will converge to a small number of variants as it matures?
20. What aspects of technology are predictable and what aspects are not?
21. Ray Kurzweil argues for exponential growth in all technologies, not just semiconductors. What about his viewpoint seems reasonable, what seems unreasonable?
22. What is Augustine’s Law?
23. What is the difference between forecasting evolutionary technologies and disruptive technologies? What is a disruptive technology?
24. What is the technology readiness level? What does a value of 1 imply compared to a value of 9?
25. How is the technology readiness level used by the DoD?