Important Questions

Q1. a) Describe various Radar bands.

b) Briefly describe applications of Radar.

Q2. a) What is the difference between the pulse interval and PRF? What are the factors that govern the selection of the PRF for particular radar?

b) What do you understand by unambiguous range.

Q3. Draw the block diagram of simple pulse radar and explain the sequence of events that occur in its operation?

Q4. a) Derive simple Radar range equation.

b) A radar is to have a maximum range of 60 Km. What is the maximum allowable pulse repetition frequency for unambiguous range?

Q5. Describe the essential characteristics, functions and major applications of search radar system?

Q6. What is Doppler effect? What is the significance of Doppler Effect in radar and where does this effect find applications? Derive $\mathbf{fd = 2v_r / \lambda}$

Q7. Explain with the help of diagram, the principle of operation of the FM-CW radar.

Q8. Explain the principle of operation of the multiple frequency CW radar.

Q9. What is meant by the terms 'Range ambiguity' and 'Doppler ambiguity'? How can these ambiguities be resolved?

Q10. a) Explain with help of suitable diagrams, the principle of operation and the limitations of MTI radar.

b) What is a delay line canceller?

Q11. Draw the block diagram of MTI radar using a power amplifier as a transmitter and also explain its operation.

Q12. a) Explain what is the basic difference between a MTI and a pulse Doppler radar? List the advantages and disadvantages of range gating?

b) Briefly describe coherent MTI.

Q13. List the various common tracking methodologies used to develop angular errors in tracking radars.

Q14. With the help of neat diagrams, explain the sequential lobing tracking radar technique. What is the disadvantage of lobe switching as compared to mono pulse tracking?

Q15. What is tracking radar? Briefly describe the lobe switching and conical scan tracking techniques. What is a Monopulse radar?

Q16. How does track – while – scan radar operate? In what ways is it a compromise?

Q17. A) With the aid of a sketch showing a typical display, explain fully the PPI radar indicator. Why this method is called intensity modulation?

B) What is an offset PPI? What are the advantages of an offset PPI over a conventional PPI?

Q18. Explain the various types of mixer.

Q19. What are the properties that a good receiver should have? What are the main functions of a radar receiver?

Q20. Define receiver noise figure? Give the noise figure of N networks in cascade. What is the effective noise temperature of a network? Give the relationship between the system noise temperature, the antenna temperature and system noise figure.

Q21. List the various types of radar duplexers in use. With the help of neat diagrams, explain the principal of operation of the circulator duplexer?

Q22. With the help of neat diagram, explain the function of TR duplexer. What is a receiver protector?

Q23. Draw a typical SVP, marking clearly the various regions including the SOFAR channel.

Q24. a) What are the different propagation modes of sound underwater? Draw a neat diagram showing the various propagation paths.

b) What is a Sonobuoy?

Q25. Draw the generic active sonar system block diagram and explain its working.