



M.E/M.TECH/MCA DEGREE EXAMINATIONS: NOV/DEC 2024

(Regulation 2018)

Second Semester

DEFENCE TECHNOLOGY

P18DTE0016: Jamming and ECM/ECCM Technologies

COURSE OUTCOMES

CO1: Understand the concept of electronic attacks.

CO2: Understand the principles and the practical applications of current and evolving electronic jamming technology

CO3: Understand the different types of electronic counter measures and counter – counter measures.

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Arrange the following ECM systems in order of priority, from highest to lowest, for protecting an aircraft in an electronic warfare scenario. CO2 [K₃]
 - a) On-Board ECM Systems
 - b) Off-Board ECM Systems
 - c) Self-Protection Jamming
 - d) Increase in Jamming-to-Signal Ratio
2. Which type of jamming is most efficient for self-protection in Electronic Countermeasure (ECM) systems? CO2 [K₃]
 - a) Spot Jamming
 - b) Barrage Jamming
 - c) Deceptive Jamming
 - d) Sweep Jamming
3. What is the main objective of employing Self-Protection Jamming in electronic warfare operations? CO2 [K₁]
 - a) Enhancing enemy radar capabilities
 - b) Protecting friendly platforms from electronic threats
 - c) Improving communication networks
 - d) Disrupting friendly electronic systems

4. Match the ECM system with the most appropriate description from the list CO3 [K₄]

List I	List II
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| 11. Summarize the core principles behind Electronic Attack (EA) and how they are applied in modern warfare. | CO1 | [K ₂] |
| 12. Compare the effectiveness of Repeater Jamming and Noise Jamming in electronic warfare operations. | CO3 | [K ₄] |
| 13. Contrast the benefits of Repeater Jamming and Transponder systems in warfare. | CO3 | [K ₄] |
| 14. Describe the concepts of Stand-Off Jamming | CO2 | [K ₃] |
| 15. Explain the functionality of Infrared Countermeasures (IRCM) | CO3 | [K ₃] |
| 16. Discuss the limitations, and applications of the Airborne Tactical Jamming | CO1 | [K ₃] |
| 17. List the impact on the effectiveness of radar communication in modern warfare. | CO1 | [K ₄] |
| 18. Examine the role and effectiveness of jamming based Self-Defense Systems in naval warship. | CO2 | [K ₄] |
| 19. Assess the susceptibility of naval vessels against radar-guided missiles | CO3 | [K ₅] |
| 20. Analyze the techniques used in tracking radar. | CO1 | [K ₆] |

PART C (6 x 5 = 30 Marks)

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| 21. Describe the concept of frequency matching in jamming systems. | CO2 | [K ₂] |
| 22. How does noise jamming system contribute to disrupting enemy communication systems? | CO1 | [K ₃] |
| 23. Describe the architecture of ECM (Electronic Countermeasure) systems. | CO2 | [K ₄] |
| 24. Explain the stand-off jamming equation in detail. | CO3 | [K ₄] |
| 25. Solve the Burn-Through range equations for monostatic radar systems used in electronic warfare. | CO3 | [K ₅] |
| 26. Differentiate the effectiveness of bi-static and monostatic jamming ECM | CO1 | [K ₄] |

**Answer any FOUR Questions
PART D (4 x 10 = 40 Marks)**

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| 27. Explain the primary purpose of Stand-Off Jamming in ECCM | CO1 | [K ₃] |
| 28. Analyze the principles behind Communication Countermeasures (COM-ECM) | CO3 | [K ₄] |

used to defend against guided missiles.

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| 29. | Describe the concept of Repeater and Transponder | CO2 | [K ₂] |
| 30. | Evaluate the effectiveness of side lobe jamming | CO3 | [K ₅] |
| 31. | Discuss the capabilities in tactical jamming for aircraft | CO2 | [K ₃] |
