



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

(Regulation 2024)

First Semester

**DEFENCE TECHNOLOGY**

24DTT503: Warfare Simulations and Strategies

**COURSE OUTCOMES**

**CO1:** Understand the systems used in warfare scenario

**CO2:** Understand combat simulation & modelling

**CO3:** Understand the war gaming simulation & modelling and human factor representation

**CO4:** Understand modern technologies and their impact on warfare strategies

**CO5:** Understand international geopolitics with reference to warfare strategies

**Time: Three Hours**

**Maximum Marks: 100**

**PART A (4\*20 = 80 Marks)**

- |    |    |  |   |     |                   |
|----|----|--|---|-----|-------------------|
| 1. | a) | In geopolitical terms distinguish between Conflict and State of War.   | 4 | CO1 | [K <sub>1</sub> ] |
|    | b) | Describe Indian Naval Command Structure and its warfare strategies.  | 4 | CO5 | [K <sub>1</sub> ] |
|    |    | <b>Scenario:</b> Country A and Country B, are engaged in a hypothetical conflict over control of a strategic mountain pass. This pass is critical for trade and military movement, making it a focal point of contention.  |   |     |                   |
|    |    | <b>Country A:</b> Known for its advanced technology, precision weaponry, and disciplined forces but has a smaller deployment in the region. Initial Troop Strength: $A_0=300$ , Effectiveness Coefficient: $k_A=0.03$ , <b>Country B:</b> Known for its larger manpower and endurance, compensating for relatively less advanced weaponry. Initial Troop Strength: $B_0=500$ , Effectiveness Coefficient: $k_B=0.01$ . |   |     |                   |
|    | c) | State the Lanchester's Square Law to describe the above situation.   | 5 | CO2 | [K <sub>1</sub> ] |
|    | d) | Derive the state equations for the two countries in conflict, theoretical expressions for battle results.  | 5 | CO2 | [K <sub>2</sub> ] |
|    | e) | Discuss the outcomes based on the initial parameters provided in the scenario.   | 2 | CO3 | [K <sub>3</sub> ] |
| 2. | a) | Discuss about military simulators and their types.   | 4 | CO2 | [K <sub>2</sub> ] |

b)	Discuss the significance of buoyancy and gravitational force in submarine motion simulation.	4	CO1	[K <sub>2</sub> ]
c)	Discuss the advantage of space based military satellites detecting ship wake detection.	2	CO4	[K <sub>2</sub> ]
d)	Evaluate the strategic impact of India's nuclear submarine capabilities on South Asia's regional security environment. Discuss the potential implications for neighboring countries, including Pakistan and China.	5	CO3	[K <sub>5</sub> ]
e)	What are the primary objectives of <i>Operation Tarang Shakti 2024</i> held in India, such as improving joint operational capabilities, testing new technologies in warfare, and enhancing combat readiness?	5	CO3	[K <sub>5</sub> ]
3. a)	Discuss Cournot Duopoly.	3	CO2	[K <sub>2</sub> ]
b)	Discuss a payoff matrix with a suitable example applicable to defense weapon manufacturing industry.	5	CO3	[K <sub>3</sub> ]
c)	Explain Prisoner's Dilemma.	3	CO2	[K <sub>2</sub> ]
d)	Discuss a payoff matrix with a suitable example applicable to strategic situation.	5	CO3	[K <sub>3</sub> ]
e)	How real-time warfare strategies can be developed using Game Theory approaches?	4	CO5	[K <sub>5</sub> ]
4. a)	What is India's National Quantum Mission?	6	CO4	[K <sub>1</sub> ]
b)	Discuss the strategic advantages of quantum technologies.	6	CO5	[K <sub>2</sub> ]
c)	Briefly distinguish between classical and quantum computing systems.	4	CO4	[K <sub>2</sub> ]
d)	Describe in brief how the developments in quantum technologies can be of advantage in warfare scenarios.	4	CO5	[K <sub>5</sub> ]

**Answer any ONE Question**

**PART B (1\*20 = 20 Marks)**

5. a)	Discuss in brief the physical modelling approach of ballistic missile defense.	8	CO1	[K <sub>2</sub> ]
b)	Highlight aspects of ongoing conflicts faced by Israel.	4	CO5	[K <sub>5</sub> ]
c)	Provide insights into how threats were neutralized by Israel's iron dome.	4	CO4	[K <sub>2</sub> ]
d)	What may be the possible challenges to Iron Dome technologies?	2	CO4	[K <sub>4</sub> ]
e)	Give your inputs on how the future air defense challenges to Iron Dome technologies can be further improvised with modern technologies.	2	CO4	[K <sub>5</sub> ]

OR

6.	a)	Explain about India's Cold Start Doctrine.	8	CO4	[K <sub>2</sub> ]
	b)	Provide details on the emergence of India's Cold Start Doctrine.	4	CO1	[K <sub>2</sub> ]
	c)	How India's Cold Start Doctrine may evolve with time.	4	CO2	[K <sub>4</sub> ]
	d)	What are possible enemy counter strategies to India's Cold Start Doctrine ?	4	CO5	[K <sub>5</sub> ]

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