



I SEMESTER M.TECH. (DEFENCE TECHNOLOGY)
END SEMESTER MAKEUP EXAMINATIONS, APRIL 2022
SUB: SYSTEMS AND WARFARE PLATFORMS [AAE-5175]

REVISED CREDIT SYSTEM

(18/04/2022)

Duration: 3 Hours

Max. Marks: 50

Instructions to Candidates:

- ❖ Answer **ALL** the questions.
- ❖ Missing data if any, may be suitably be assumed.

- 1A Explain the process of a fighter aircraft take off and land from aircraft carrier (2M)
- 1B Draw a sketch and explain the process of filling and emptying the Main Ballast /trim Tanks of a submarine (3M)
- 1C Define the warship termed as Frigate with one example of a Frigate currently in service of Indian Navy. List out and explain the various sensors and armaments on board such Frigate of Indian Navy (5M)
- 2A Describe the process of firefighting on a warship and briefly explain the function of the various firefighting equipment on a warship (2M)
- 2B Define and explain the differences between the weapon ballistic and cruise missiles (3M)
- 2C Define the weapon termed as Bomb and explain the functions of the various parts of a Bomb with a sketch (5M)
- 3A What are the primary and secondary control surfaces of an aircraft? (2M)
- 3B (i) Write the equation relating Static Pressure, Dynamic Pressure and Total Pressure. (3M)
- (ii) Consider an airfoil in a flow at standard sea level conditions with a freestream velocity of 50 m/s. At a given point on the airfoil, the pressure is $0.9 \times 10^5 \text{ N/m}^2$. Calculate the velocity at this point.
- 3C (i) Derive the aerodynamic condition for minimum thrust required. (5M)

- (ii) An aircraft is flying unaccelerated straight and level at a velocity of 360 km/hr at sea level satisfying the aerodynamic condition for minimum thrust. The parasite drag coefficient is 0.10. If the wing area is 40 m², calculate the thrust required.
- 4A Define the small arms Pistol and Revolver and explain the differences (2M)
- 4B Explain with a sketch the functions of various parts of the underwater weapon Torpedo (3M)
- 4C Briefly answer the following questions: (5M)
- i) Define aspect ratio
 - ii) What are the three traditional factors which determines the effectiveness of a tank?
 - iii) Properties of Kevlar.
 - iv) Why tail rotor is required in a helicopter?
 - v) What is killability of a combat aircraft
- 5A What are the advantages and disadvantages of tracked vehicles? (2M)
- 5B Explain Armour-piercing fin-stabilized discarding sabot (APFSDS) (3M)
- 5C (i) What is error in measurement system. Classify different types of errors in instrumentation. (5M)
- (ii) The expected value of the voltage across a resistor is 80V. However, the measurement gives a value of 79 V. Calculate absolute error and percentage error.