

**Centre for Aerospace & Defence Laws (CADL)
DIRECTORATE OF DISTANCE EDUCATION
NALSAR UNIVERSITY OF LAW, HYDERABAD**

M.A. (AVIATION LAW & AIR TRANSPORT MANAGEMENT)

Academic Year: 2023-2024

Third Semester Repeat Examination (June, 2024)

**Paper II – 2.3.8. Air Space & Air Traffic Management
1.2.8. Air Space & Air Traffic Management (Batch 2020-2022)**

Duration of the Examination: 2 ½ hours

Total Marks: 70 marks

INSTRUCTIONS TO CANDIDATES

- a) Read the instructions carefully and adhere to the same.
 - b) Please mention your DDE ID No., date of the exam, name of the programme & subject on the Answer Sheet and the Additional Answer Sheets, if any.
 - c) The questions to be interpreted as given and no clarification can be sought from the Invigilator.
 - d) Clearly indicate the question numbers while answering them. Answers without question numbers / wrong question numbers will not be evaluated.
 - e) Write the answers clearly and neatly. Answers in illegible handwriting will not be taken into consideration.
 - f) Candidates are prohibited to carry phones or any other electronic devices, books, material etc. in the Examination Hall.
 - g) Copying is strictly prohibited and is considered as a serious academic misconduct and the University will take action as it deems fit.
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Section – A

**Answer FIVE questions out of SEVEN questions and each question carries 10 marks.
(5 x 10 marks = 50 marks)**

1. International agreements like the Chicago Convention and some others outlined the regulatory framework regarding the legal implications and operational challenges associated with providing air navigation services over the high seas. Write an overview on the same by addressing any five of the following aspects:
 - a. Legal obligations
 - b. Scope of applicability
 - c. ICAO Standards
 - d. Regional Air Navigation Plans
 - e. Jurisdiction and Responsibility
 - f. Safety Considerations
 - g. Pilot Responsibilities.

2. Imagine that you are appointed as an aerodrome operations manager at an international airport in India. The major challenges faced include frequent adverse weather conditions, including heavy snow, strong winds, and low visibility due to fog particularly during the winter season. Just prior to your joining, a series of severe snowstorms have been forecasted to hit your region, potentially affecting airport operations significantly in the coming weeks. Based on your understanding of the ICAO norms on the aerodrome data and warnings, outline the steps you would take to ensure the safety and operational efficiency of your airport during this period. Develop a comprehensive plan to enhance your airport's ability to handle these adverse weather conditions while complying with ICAO standards.
3. Air Traffic Management (ATM) is a crucial service for ensuring the safe and efficient movement of aircraft. Based on your understanding of ATM operations and the roles of various ATM units, imagine you are an air traffic controller at a busy international airport. An approaching aircraft has been cleared for landing but encounters unexpected severe weather conditions, reducing visibility to near zero. Simultaneously, another aircraft is ready for take-off on the same runway. Describe the step-by-step procedures you would follow to manage this situation, ensuring the safety of both the aircrafts. In your answer, consider the roles of Ground Control, Local Control, and any other relevant ATM units.
4. You are a flight operations manager for an airline planning to expand its services to inclusion of flights in remote and oceanic airspaces. Given your understanding about the navigation procedures, Required Navigation Performance (RNP), and Global Navigation Satellite System (GNSS), outline a comprehensive plan to ensure that your aircrafts are properly equipped and capable of meeting the navigation requirements for these new routes. Include in your plan the following elements:
 - a. The specific GNSS augmentations (ABAS, GBAS, SBAS) you would implement and why.
 - b. How you would ensure compliance with international RNP standards for en-route, approach, landing, and departure phases?
 - c. The type of avionics equipment upgrades necessary to meet RNP and GNSS requirements.
 - d. Strategies to mitigate the risks associated with GNSS reliance, such as intentional interference or jamming.
5. Given the concepts of Required Communication Performance (RCP) and Required Navigation Performance (RNP) as outlined in the syllabus, design a comprehensive communication and navigation strategy for an aircraft operating in high-density airspace with severe weather conditions by considering the below areas:
 - a. Communication Systems
 - b. Navigation Systems
 - c. Surveillance Systems.

Consider the potential challenges posed by the high-density airspace and severe weather conditions, and propose solutions to address these challenges within your strategy.

6. The implementation of CNS/ATM systems provides multiple benefits for airlines to navigate in the global markets. CNS/ATM systems also poses additional challenges to the airlines. List some of the major benefits and challenges associated with the implementation of CNS/ATM systems by keeping in view the role of international cooperation, financial considerations, and assistance requirements for states in planning and implementing these systems. Provide examples of direct and indirect benefits, and outline the assistance needs identified by ICAO for States in their CNS/ATM planning and implementation.
7. Explain the phenomenon of turbulence and clear-air turbulence (CAT) in aviation. Discuss the factors that cause or indicate CAT, including the role of jet streams, wind shear, temperature gradients, and special cloud formations. Describe the effects of turbulence on aircraft and the measures pilots take to mitigate its impact. Finally, analyze the potential risks associated with turbulence in commercial aviation and the advancements in aircraft design and detection systems to address these risks.

Section – B

Answer/write notes on any FOUR questions out of SIX questions and each question carries 05 marks. (4 x 5 marks = 20 marks)

- A. What are aerodrome warnings? Explain any FOUR criteria of Aerodrome warnings.
- B. The future of airspace and air traffic management in India.
- C. Roles and responsibilities of Directorate General of Civil Aviation.
- D. Air transport management in India.
- E. Supporting role of aeronautical information services to international civil aviation.
- F. Communication systems in CNS/ATM (Aeronautical Telecommunication Network).