



ADMISSION NUMBER

School of Business

Master of Business Administration MBA Dual Specialization
Semester End Examination - Aug 2024

Duration : 180 Minutes
Max Marks : 100

Sem IV - MSB23T2006 - Air Traffic and Ramp Operations

General Instructions

Answer to the specific question asked

Draw neat, labelled diagrams wherever necessary

Approved data hand books are allowed subject to verification by the Invigilator

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|----|--|--------|
| 1) | Identify the role of situational awareness in ensuring a stress free work environment for an air traffic controller. | K3(6) |
| 2) | Analyze possible reasons for a recent outage in the air traffic control system, considering factors such as equipment failures, software glitches, cybersecurity breaches, human error, or external interference. | K4(8) |
| 3) | Analyze the impact of technological advancements on air traffic control systems and their implications for safety and efficiency. | K4(8) |
| 4) | Examine the critical role of air traffic control in ensuring safety and efficiency during flight operations. | K4(4) |
| 5) | <p>A spice jet flight was approaching to runway for take-off the crew received clearance from Mumbai Air Traffic Control (ATC). However, due to a miscommunication between the crew and ATC regarding the assigned departure runway, the crew mistakenly aligned the aircraft with the wrong runway. Just as the aircraft was about to lift off, Mumbai ATC spotted the discrepancy and immediately radioed the crew to abort the takeoff. This led to immediate flight abort.</p> <p>1. What communication protocols and procedures should SpiceJet implement to prevent miscommunications between the crew and Mumbai ATC?(3marks)</p> <p>2. Discuss the role of effective crew resource management (CRM) techniques in ensuring clear communication and decision-making.(3marks)</p> <p>3. How can Mumbai ATC enhance its communication procedures and protocols? (3marks)</p> | K3(9) |
| 6) | Imagine you are a consultant hired by a major airport authority to assess the impact of technology integration on modern terminal design. You're tasked with quantifying this impact by identifying key performance metrics and indicators. Your analysis will focus on how advancements in technology, such as biometric authentication systems, self-service kiosks, and real-time passenger information displays, have influenced passenger throughput, operational | K5(10) |

efficiency, and overall satisfaction levels within airport terminals.

Q.1 Evaluate the impact on overall satisfaction levels by conducting passenger surveys or analyzing feedback collected through various channels. (5 marks)

Q.2 Identify key pain points and assess how technology-driven solutions have addressed or exacerbated these issues. (5 marks)

7)

Scenario :

K5(10)

You are the project lead for a consulting firm specializing in airport development and management. Your team has been hired by a rapidly growing city to conduct a feasibility study for the construction of a new airport to accommodate increasing air traffic demand. As part of the study, you need to analyze various types of airports and recommend the most suitable classification for the city's needs. The city, located in a strategic location with thriving economic activities, has seen a significant surge in both business and leisure travel. The existing airport, a small regional facility, is struggling to cope with the growing passenger traffic and lacks the infrastructure to support future expansion. City officials recognize the need for a new airport to enhance connectivity, stimulate economic growth, and cater to the evolving travel demands of residents and visitors.

Q.1 Describe your approach to stakeholder engagement in the feasibility study for the construction of the new airport. (5 marks)

Q.2 How would you ensure active participation and input from city officials, business leaders, aviation experts, and community members to gather diverse perspectives and insights? (5 marks)

8)

Case Study: Transformation of India's Air Traffic Control

K5(15)

India's air traffic control (ATC) is undergoing a significant transformation, driven by advancements in surveillance capabilities and modernization efforts by the Airport Authority of India (AAI). Effective from January 1st, air traffic controllers can now halve the lateral separation between two aircraft, reducing it from 10 nautical miles to 5 nautical miles. This change is expected to optimize airspace usage and increase capacity by over 40%, leading to more direct and fuel-efficient routes for airlines. The modernization efforts include the mandating of automatic dependent surveillance-broadcast (ADS-B) transponders for aircraft, enhancing surveillance capabilities, and implementing modern automation systems at all area control centers to integrate surveillance feeds from multiple sources. Additionally, India has established a central air traffic flow management facility, facilitating better coordination between defense and civilian authorities to optimize airspace usage and reduce route distances, thereby lowering operating costs for airlines. Air traffic controllers said that India has set up a central air traffic flow management facility, where officials from Air Navigation Services, Indian Air Force, and Indian Army work together to allow direct routing whenever restricted air space is not in use. Airlines are benefitting from better coordination between defence and civilian authorities which has led to freeing up of airspace resulting in routes becoming shorter and costs coming down.

Logical Questions:

1. Elaborate how does the reduction in separation between aircraft, from 10 nautical miles to 5 nautical miles, contribute to more efficient airspace usage in India?(3 marks)
2. Discuss the key benefits of mandating ADS-B transponders for aircraft operating in Indian airspace? (3 marks)
3. How does the integration of surveillance feeds from multiple sources through modern automation systems at area control centers improve the effectiveness of air traffic control operations in India? (3 marks)
4. Can you elaborate on the role of the central air traffic flow management facility in facilitating coordination between defense and civilian authorities to optimize airspace usage? (3 marks)
5. With the transformation of India's air traffic control, what are the expected long-term implications for airlines? (3 marks)

9) Air India, a major airline, faces challenges at Bangalore Airport as it grapples with the complexities of passenger handling processes amidst increasing legal and security demands. The airport, while striving to meet safety and security requirements, must also cater to passenger expectations for service and comfort, all while generating revenue from non-aviation sectors like retail. However, recent years have seen system capacity consumed by legal changes, security constraints, and delays, highlighting the need for optimization. The airport operator struggles to predict and define future system states, particularly in landside terminal infrastructure where processes remain opaque. As passenger numbers soar and wide-body aircraft become more prevalent, efficient management of passenger handling processes becomes imperative. Without an integrated approach to landside and airside operations, Air India and Bangalore Airport risk falling short of achieving ambitious SESAR goals. Agent-based terminal research emerges as a vital tool for enhancing overall airport efficiency and air traffic management systems, providing insights to address these complex challenges.

K6(18)

Q.1 In the context of airport operations, what are the implications of failing to integrate landside and airside processes in terms of efficiency, safety, and passenger experience? (6 marks)

Q.2 Compare and contrast aggregated approaches and individual-based models in the optimization of airport processes and infrastructure. How do these modeling techniques differ in terms of their ability to capture the complexity of airport operations, including the behavior of individual entities (agents), environmental considerations, and inter-technological interactions? (6 marks)

Q.3 what role does scientific research, particularly agent-based terminal research, play in shaping the future of airport management and air traffic control systems? (6 marks)

10)

Caselet:

At Goa Airport, a busy hub for Vistara flights, an air traffic controller (ATC) faces a challenging scenario during adverse weather

K6(12)

conditions. Multiple incoming flights are approaching the airport, and the controller must maintain situation awareness amidst reduced visibility and unpredictable wind patterns. The potential challenges include difficulty in tracking aircraft positions accurately, managing airspace congestion, and ensuring timely communication with pilots. Reliance on technology such as radar systems and automated weather monitoring tools is essential but may be hindered by potential malfunctions or data inaccuracies. Effective communication strategies, such as clear and concise instructions to pilots, become paramount in facilitating safe landings and departures.

1. How does the air traffic controller at Goa Airport manage the cognitive workload and stress levels associated with handling multiple incoming flights during adverse weather conditions? (6)
2. What contingency plans does Vistara have in place to adapt to unforeseen disruptions or communication breakdowns? (6)