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**School of Business**  
**Bachelor of Business Administration**  
**Mid Term Examination - May 2024**

**Duration : 90 Minutes**  
**Max Marks : 50**

**Sem IV - D1UB404T - Environment Issues in Aviation Industry**

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*

- 1) Identify the difference in usage between Jet Fuel and Aviation Gasoline. K3 (6)
  
- 2) Transitioning to Electric Ground Support Equipment at Mumbai International Airport K3 (9)  
Mumbai International Airport, one of India's busiest airports, recognized the urgent need to address environmental and health concerns arising from the extensive use of diesel-powered Ground Support Equipment (GSE). This transition not only significantly reduced on-site CO<sub>2</sub> emissions but also improved the respiratory health of airside workers, who were previously exposed to harmful diesel exhaust fumes. Moreover, the adoption of e-GSE led to a quieter and safer work environment due to the elimination of noise pollution.  
Based on above answer the following:
  1. Identify how transitioning to electric Ground Support Equipment (e-GSE) help in reducing emissions at airports?(3 marks)
  2. Identify what initiatives can domestic airlines in India undertake to support the adoption of electric GSE and contribute to reducing their carbon footprint in ground operations? (3 marks)
  3. What is the principle of operation of a Ground Power Unit (GPU)? (3 marks)
  
- 3) Analyze the effectiveness of current technological advancements in reducing carbon emissions from aircraft. K4 (4)

4) Situation: Understanding Aircraft Exhaust Pollution

K4 (8)

As aircraft engines burn jet fuel, exhaust gases are emitted into the atmosphere through exhaust pipes, flue gas stacks, or propelling nozzles. These emissions disperse downwind in exhaust plumes, contributing to air pollution on both a global and local scale.

To address these concerns, efforts are underway to develop aircraft engines that reduce exhaust gas emissions and produce non-visible smoke emissions. Additionally, researchers are exploring the effectiveness of water injection into engines to mitigate the impact of aircraft exhaust on the environment and human health.

Questions:

1. Analyse how do aircraft exhaust emissions contribute to air pollution, and what are the environmental and health implications of high-altitude emissions?( 4 marks)

2. Examine the potential strategies and technologies to reduce the impact of aircraft exhaust pollution, and how might these innovations improve air quality and mitigate environmental damage?( 4 marks)

5) The Adani Group's \$2.1 billion project in Navi Mumbai symbolizes India's ambitious infrastructure overhaul, aiming to establish the country as a global aviation hub. Scheduled to begin operations in March next year, the airport's capacity is set to increase from 20 million to 90 million passengers annually by 2032, rivaling international transit hubs like Dubai and Singapore.

K4 (8)

Questions:

1. Examine why is airport planning crucial for India's goal of becoming a global aviation hub. what factors should be considered in developing airport infrastructure to meet increasing demand for air travel?( 4marks)

2. Analyse the impact of this new airport will have on the Indian economy. Do you think the passenger will increase be justified in the next year? ( 4marks)

6) Explain how the use of Sustainable Aviation Fuel (SAF) can contribute to reducing emissions in the aviation industry.

K5 (5)

## 7) Case Study: Utilizing Smart Materials in Airport Construction

K5 (10)

Introduction: The Noida International Airports have partnered with Nanogence Catalysts to utilize their patented smart activators, revolutionizing the construction process. These smart activators enhance the binding efficiency of cementitious materials, allowing for significant reductions in cement usage while maintaining high material performance and incorporating eco-friendly substitutes.

Key Features of Nanogence Catalysts:

1. **Reduced Carbon Emissions:** By directly reducing or replacing up to 20% of the cement requirement, the use of Nanogence Catalysts has resulted in a substantial decrease in carbon emissions at the airport construction site.
2. **Cost Efficiency:** By leveraging this technology, the project can see improved cost efficiency through reduced production costs.
3. **Enhanced Performance:** The concrete packing at the nano level not only reduces carbon emissions but also enhances long-term weather resistance and corrosion resistance of the concrete structures.

Challenges and Future Prospects:

1. **Initial Investment:** While the initial investment in adopting this technology might be significant, the long-term cost savings and environmental benefits are promising.
2. **Trial Period:** Tata Projects, the implementing agency, has just begun trials with Nanogence Catalysts. Further monitoring and assessment during the trial period will be crucial to gauge the technology's efficacy in real-world construction scenarios.
3. **Scalability:** Assessing the scalability of this technology for large-scale airport construction projects will be essential. It's important to ensure consistent performance and cost-effectiveness across various phases of construction.

Logical Questions:

1. Explain how the utilization of Nanogence Catalysts contribute to reducing carbon emissions in airport construction?(2 marks)
2. Explain what role does cement play in traditional airport construction, and how does the Nanogence Catalyst technology aim to address associated challenges? (2 marks)
3. In what ways does the incorporation of smart materials like Nanogence Catalysts enhance the long-term durability of airport structures? (2 marks)
4. What are the potential cost implications of adopting Nanogence Catalyst technology in airport construction, considering both initial investment and long-term savings? (2 marks)
5. What steps are necessary to ensure the scalability and consistent performance of smart materials like Nanogence Catalysts across different phases of airport construction projects? (2 marks)