Question 1
This question is about the principle of continued airworthiness.

(a) What is meant by airworthiness?  

(b) Most equipment reliability estimates are based on the use of \( \lambda \) (failure rate). Describe some of the pitfalls of using this approach.  

(c) Discuss the effects of varying operational and geographic environments on aircraft and systems reliability. Your discussion should include explanation of why reliability might be improved or worsened under each environment. 

(d) What part does condition-based maintenance have to play in addressing certain types of operational events? 

Question 2
What are the primary objectives of aircraft maintenance? Your answer should include consideration of operational, safety, human and economic issues. 

Question 3
(a) Describe the principal of equipment maintainability. What are some of the areas to be considered by a designer when looking at the maintainability aspects of his equipment design? What are the operational impacts of poor maintainability? 

(b) What impact might enhanced zonal analysis have on maintainability? What is the significance about the optimum timescales for performing effective maintainability analysis and zonal analysis? Who performs zonal analysis?
Question 4

(a) Describe the selection process for deciding which items in an aircraft system should be subjected to MSG3 analysis.
[7 marks]

(b) Having selected items for the MSG-3 process, what information about each of them must you know and list in the documentation before you can perform a failure impact analysis?
[8 marks]

(c) Items assessed under MSG-3 may have a maintenance task identified, but what else must be established about the task before it can be accepted? Where no task has been identified, why do some items have to be re-designed while others do not?
[5 marks]

Question 5

(a) What is meant by Initial Provisioning (IP) and what is its purpose? What are some of the options for location of, and payment for, IP spares?
[7 marks]

(b) Describe the main factors to consider in on-going spares provisioning in order to ensure cost-effectiveness.
[7 marks]

(c) What is AOG? How can a small operator protect himself against the negative effects of an AOG situation?
[6 marks]

Question 6

What are the JAA regulations that require an airline to establish a reliability monitoring programme? What is the guidance document that describes the best procedure for setting up and running such a programme? Where does it suggest input data for the programme should come from? What are the key issues requiring the use of engineering judgement for a small airline trying to run a reliability programme?
[20 marks]
Question 7

(a) What is scheduled maintenance? Describe some of the ways in which an operator can minimise the aircraft downtime required to complete scheduled maintenance.

[8 marks]

(b) An aircraft system suffers a failure at the gate before departure. What are the principals that may allow the aircraft to still despatch for flight and how can system designers help this process? What are the rules about delaying repair to a later date? What are the implications for engineering expertise of the principles you have described?

[12 marks]

Question 8

(a) Describe the structure of the maintenance manual system; for example, which manuals are used for activity on and off aircraft? What standards are used for writing maintenance manuals?

[10 marks]

(b) How are components to different modification standards identified in an IPC? How would an engineer know which of these components he could fit to an aircraft during maintenance?

[4 marks]

(c) Discuss the principle of Simplified English. Why was it introduced? What is its purpose? What are the language principles on which it operates?

[6 marks]

Examiner: S J Bond
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