No. of Printed Pages : 4

BAS-018

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B.TECH. (AEROSPACE ENGINEERING) (BTAE)

Term-End Examination

June, 2013

BAS-018 : AIRCRAFT SAFETY AND MAINTENANCE ENGINEERING

Time : 3 hours *Maximum Marks : 70*

Note : 1. *Question no.* **1** *(one) is* ***compulsory.***
2. *Answer* ***any four*** *questions from the Q.No 2-8.*

1. Choose the correct answer from the following objective type questions.

(a) Which of the following will improve systems availability ? 2

(i) More failure rate

(ii) Less Time to repair

(iii) Poor accessibility

(iv) None of the above

(b) Bath Tub curve depicts the relation between- _____ and time. 2

(i) Hazard rate

(ii) Useful life

(iii) Life cycle cost

(iv) Manufacturing defects.

(c) Which of the following is unscheduled maintenance ? 2

(i) Preventive maintenance
(ii) Active maintenance
(iii) Expensive maintenance
(iv) Corrective maintenance

(d) The portion of down time occupied by wait for a required part or tool is called. 2

(i) Maintenance Time
(ii) Mission Time
(iii) Logistic Time
(iv) Repair Time

(e) Which of the following value of safety margin is an indication of failure of component ? 2

(i) Greater than unity
(ii) Positive
(iii) Negative
(iv) None of the above

(f) Inspect and repair type maintenance is known as 2

(i) Overhaul (ii) Salvage
(iii) Servicing (iv) Rebuild

(g) Which of the following is not a recurring cost ? 2

(i) Maintenance cost
(ii) Operating cost
(iii) Labour cost
(iv) Installation cost

2. (a) What are the functions of Maintenance Department ? 7

(b) Enumerate the factors affecting maintenance management. 7

3. The reliability of an item follows an exponential relation given by. 5+5+4

$R(t) = \exp(-\lambda t)$ where λ is the item's constant failure rate. Derive the following :

(a) Failure density function

(b) Hazard rate functions

(c) Mean Time to Failure

4. Write short notes on the following failures of mechanical components. 4+4+4+2

(a) Fatigue failure

(b) Stress concentration failure

(c) Metallurgical failure

(d) Material flaw failures

5. (a) What do you understand by condition based maintenance system ? 5+5+4

(b) What are different types of condition monitoring ?

(c) What are 'on line' and 'off line' condition monitoring ? Briefly explain.

6. (a) Discuss the role of Built-In-Test (BIT) in relation to monitoring and detection of faults. 7

(b) Discuss in brief the reasons for false alarms in BIT set ups. 7

7. (a) What is accelerated life testing of a components or system? Explain in brief. 7

(b) The compressor of an aircraft air-conditioning unit was tested at an accelerated cycling level of 100 cycles per hour and the resulting mean time to failure was estimated at 1000 hrs. If the normal cycle time is 5 cycles per hour, then what will be the normal life of the compressor at 95% reliability ? 7

8. (a) What is life extension and how it is carried out ? 7

(b) Time to failure distribution of a digital engine control unit follows an exponential distribution with mean time between failures of 1200 hrs and the mean time to repair of 400 hrs. Calculate the study state availability. 7