

Eighth Semester B.Tech Degree Examination, April /May 2016

(2008 scheme)

Branch: Aeronautical Engineering

0.8.801 RELIABILITY ENGINEERING

Time. 3 Hours

Max.Marks : 100

Answer all questions from part-A and one full question from each module of Part-B.

PART A

(10x4=40 Marks)

1. Difference between reliability and quality.
2. What is F- distribution?
3. What are the causes of unreliability.
4. Define terms Failure and reliability
5. What is objective of life testing?
6. What is standby Redundancy?
7. What is product life cycle?
8. Define the following:
 - 1) Random Experiment
 - 2) Sample space
 - 3) Random event
 - 4) Empty event
9. A Cinema home gets electrical power from generator run by a diesel engine. On any given day, the probability that the generator is down (event A) is 0.025 and the probability that the diesel engine is down (event B) is 0.04. What is the probability that the cinema home will power on in any given day?
10. What are the classifications of life test?

PART B

(3x20=60 Marks)

MODULE -I

- 11.A. (i) Given the following failure time as a result of 50 items on test with 30 failure generated ,compute point and interval estimate for the parameters of the two-parameter exponential distribution. (14)

27.4	34.2	34.6	39.7	40.3	45.0
45.2	47.3	47.8	50.8	53.1	53.4
54.7	54.9	55.6	58.3	58.4	61.8
65.3	67.8	68.5	74.2	75.1	75.2
77.9	78.0	82.4	86.0	99.3	105.4

- (ii) The working life of a certain type of electric bulb follows normal distribution with standard deviation $\sigma = 50$ hour and mean $\mu = 500$ hours if an organisation uses thousands of these bulbs, determine the expected number of bulbs to be replaced on or before 400 hours? (6)

(OR)

B (i) . Perform a Chi square goodness of fit test at the 10% significance level on the following grouped data to fit a rectangular failure distribution with $b = 1000\text{hr}$ (10)

Interval	No. of Failures
0-200	16
200-400	18
400-600	25
600-800	23
800-1000	24

(ii). During the transport of a large number of electronic components the probability of the failure of any component is 0.2. if we take a random sample of 10 components received. Determine the probability of

Getting just two defective component

- i. Getting exactly six good component
- ii. 5 or more of them being good

(10)

MODULE -II

12.A.Explain the Failure Characteristics with the help of a sketch. (20)

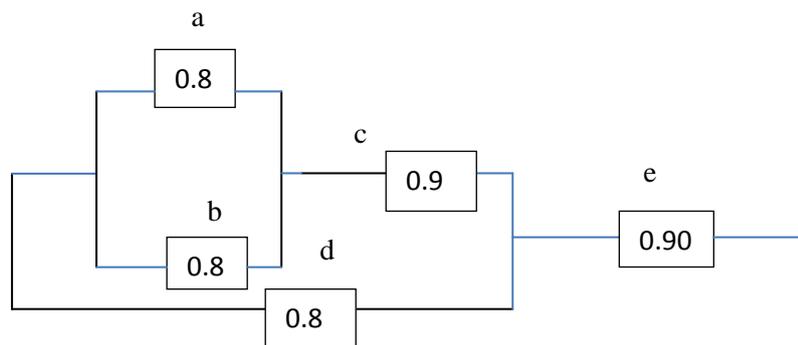
(OR)

B. Explain fault tree analysis, Event Analysis, Effect analysis and criticality analysis in detail. (20)

MODULE -III

13.A. (i) Two electrical resistance having their failure rates $\lambda_1 = 0.1$ and $\lambda_2 = 0.2$ per hour. Calculate their reliability after 10 hours if they are (a)in parallel system (b)in series system (4)

(ii)Five elements (a,b,c,d and e) of a system are connected as shown in fig. which also indicates the reliability of each element. Determine the reliability of the system (16)



(OR)

B. Explain Reliability, maintainability and availability in detail. (20)