

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
THIRD SEMESTER M.TECH DEGREE EXAMINATION, FEBRUARY 2021

Mechanical Engineering
(Thermal Engineering)
03ME7013 Reliability Engineering

Max. Marks: 60**(Answer All Questions)****Duration: 3 Hrs****PART-A****(4 x 5 = 20 Marks)**

- I) How do reliability and maintainability related to availability
 II) Explain the process de-rating. How this helps to improve reliability
 III) Define MTTF and MTBF with usual mathematic notations.
 IV) In the life testing of 10 specimens of a mini-mixer, the time to failure of each specimen is recorded as given in the following table. Calculate the mean failure rate for 900 hours and the mean time to failure for all ten specimens.(Specimen No 1 to 10 has Time to failure of 805,810,815,820,825,832,842,856,875,900 hours respectively)

PART B**(4 x10=40 Marks)**

- V)Derive an expression for the reliability, hazard rate and failure density for an constant failure rate with basic assumptions

OR

- VI) Explain the various methods by which the reliability can be improved at the design stage

- VII) A hazard model is model is expressed by ~~$R = K e^{-\lambda t}$~~ . Compare it with any known distribution model and explain the significance

OR

- VIII. Describe the construction of bath Tub curve. Explain the three different stages and its significance

- IX) List the design guidelines for maintainability and explain the significance of each steps.

OR

- X) Explain a test strategy and steps for software testing

- IX. Explain the significance of accelerated life tests. How it is carried out in Electronic components . Name any two models.

OR

- X. The following reliability requirements have been set on the subsystems of a communication system. What is the expected reliability of the overall system?

Subsystem	Reliability (for a 4 – hour period)
Receiver	0.97
Control System	0.989
Power Supply	0.995
Antenna	0.996