

**B.Tech. SEM -VI Mechanical 2014 Course (CBCS) : WINTER - 2018**

**SUBJECT: ELECTIVE – I : RELIABILITY ENGINEERING**

Day : Saturday  
Date : 17/11/2018

**W-2018-2497**

Time : 10.00 AM TO 01.00 PM  
Max. Marks : 60

**N. B. :**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Draw neat and labeled diagram **WHEREVER** necessary.
- 4) Assume suitable data, if necessary.

- Q.1** a) Explain the terms: Reliability Function & PDF (04)  
b) Explain the relation between MTTF & reliability (06)

**OR**

- a) The test is conducted on 500 screws & results are tabulated below. Find (06)  
Failure density & hazard rate

Time interval Hr	0-10	10-20	20-30	30-40	40-50
No. failed screw	174	126	85	75	40

- b) Explain engineering failures & their causes consider in reliability engineering (04)
- Q.2** a) Explain conditional probability with example: (06)  
b) A system has failure rate  $10^{-3}$ /hr. what is probability that system will fail (04)  
before  $t=1000$ hr. Find probability that it works at least 1000hrs.

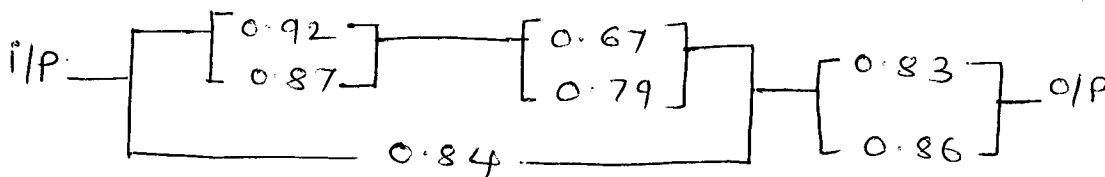
**OR**

- a) Explain Poisson's Distribution with its significance. (06)  
b) Define: Mode, Median, Mean, Random variable. (04)

- Q.3** a) What are the different types of stand by redundancy (06)  
b) Explain active & passive redundancy (04)

**OR**

- a) Explain Delta – star method for system reliability model (06)  
b) Find reliability of following system: (04)



**P. T. O**

- Q 4** a) Explain reliability & availability with example. (04)
- b) A turbine is designed such a that minimum reliability is 0.90 for operation time 1000 hr. Minimum availability value over the same period has to be 0.99. Find time to failure & mean repair time. (06)

**OR**

- a) Describe AGREE apportionment technique. (06)
- b) Define Maintainability & state its affecting factors (04)

- Q. 5** a) Short Note : Fault tree analysis (06)
- b) Explain Risk priority number (RPN) (04)

**OR**

- a) What is mean by FMEA & FMECA (06)
- b) A ship consists of 3 engines independent, active & identical. A least one engine must operate successfully for running the ship. average failure rate of each engine is 0.005 failure / hr. compute reliability of ship for 20 hr. (04)

- Q. 6** a) State the difference between Highly accelerated life Testing (HALT) & Accelerated Life Testing (ALT). (06)
- b) Explain reliability testing in details. (04)

**OR**

- a) Short note : Highly accelerated stress screening ( HASS) (06)
- b) Derive reliability function using Markov model (04)

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