

PIET's COLLEGE OF ENGINEERING, PUNE
(An Autonomous Institute of Government of Maharashtra)
Test: End Sem Examination
(PE-464) Terotechnology

Final B Tech Production S/w

Year: 2013-14
Duration: 1 hrs

Semester I
Max. Marks: 60

Instructions:

1. All questions are compulsory
2. Assume suitable data if required.
3. Figures to right indicate full marks.
4. Draw neat figures where ever required.

- Q.1 a) Discuss the method of allocations of reliabilities of the various components of the system using ARINC method. (5)
- b) A system consists of three subsystems A, B, C having failure rates 0.006, 0.004 and 0.001 respectively per hour. If the mission time is 20 hours and the system reliability required is 0.92, find the failure rate as well as reliability of each subsystem for the entire mission period. (5)
State any assumptions used.
- Q.2 a) The following data refer to predicted reliability of six components in series. In case the desired reliability of the system is not fall below 0.85 find the reliability goal for individual components. (5)

Components	1	2	3	4	5	6
Predicted reliability	0.994	0.998	0.990	0.996	0.990	0.980

- b) Explain briefly the various methods of assessing reliability of a component through accelerated tests. (5)
- Q.3 a) Define Availability & Maintainability. (5)
- b) How operational availability is different from Inherent availability? If an Inherent availability of the system is 0.95 when MTBF is 150 Hrs, what will be the maximum value of MTTR? Assuming logistic time for administrative support as 40% of total downtime. Find out the Adm. Logistic time and operational availability. (5)
- Q.4 a) Explain the meaning & significance of Terotechnology referring its various objectives & techniques involved. (5)
- b) Find out the failure rates of the components so that the system reliability becomes 0.96 using AGREE method, the data being given below.

Sr. No. Components	No. of Component Modules (n_i)	Optg Time (t_i)	Prob. of system due to failure of subsystem (w_i)
1	4	12	0.10
2	8	4	0.20
3	6	10	0.25
4	13	15	0.25
5	10	10	0.20

State any assumptions made.

(5)

- Q.5 a) Explain the systematic methodology for ferrographic analysis of wear debris, for finding out the trend of wear particle concentration (WPC) and Wear Severity Index (W.S.I.). (5)
- b) Explain Reliability Effort function. (5)
- Q.6 a) From the following failure data find the reliability based on “Mean Rank” and “Medium Rank” methods. Plot these two curves against MTTF.

Failure Number	MTTF Hours
1	10
2	15.5
3	21.5
4	26
5	32
6	35

- b) A system consists of 4 identical F.M.C.s placed in series. According to management, the system works satisfactorily even if, upto two FMCs go out of order. The average failure rate of FMC is one in 1000hrs. Find out the reliability of the system after 200 hours of working. (5)