PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2023

Semester : Semester V - 2020
Course Code : MEC3015
Course Name : Sem V - MEC3015 - Reliability Engineering
Program : B.Tech. Mechanical Engineering

Date : 9-JAN-2023
Time : 9.30AM - 12.30PM
Max Marks : 100
Weightage : 50%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.

PART A

ANSWER ALL THE FIVE QUESTIONS   **5 X 2 = 10M**

1. Define Breakdown Maintenance.

(CO1) [Knowledge]

2. Define Condition Based Monitoring.

(CO1) [Knowledge]

3. Define Mean Time Between Failure.

(CO2) [Knowledge]

4. Define Reliability.

(CO2) [Knowledge]

5. Define Maintainability.

(CO4) [Knowledge]

PART B

ANSWER ALL THE SIX QUESTIONS   **6 X 10 = 60M**

6. By considering any Industry how do you divide the Objectives of Maintenance in terms of Operational and Cost Objectives?

(CO1) [Comprehension]

7. By considering the Indian Industries what are the main reasons for the higher Maintenance Cost in Indian Industries?

(CO1) [Comprehension]

8. a) What can MTTF tell you?
   b) How to increase MTTF?

(CO2) [Comprehension]

9. Why the terms Repair, Down Time, Uptime, Repairable System & Non-Repairable System are important in Failure Data Analysis, justify your answer?

(CO2) [Comprehension]

10. How the Reliability of systems which are connected in Parallel are calculated justify your answer with an example?

(CO3) [Comprehension]

11. How the dependence of Availability on Reliability & Maintainability can be demonstrated by means of geometrical model.

(CO4) [Comprehension]

PART C

ANSWER ALL THE TWO QUESTIONS   **2 X 15 = 30M**

12. The series of tests conducted under certain stipulated conditions on 700 electronic components. The total duration of the tests is 5 hours. The number of components that fail during each hourly interval is noted. The results obtained are tabulated as shown in below table.

Time	1	2	3	4	5
Number of Failures	176	156	137	121	110

Calculate A) Failure Density, B) Failure Rate C) Reliability & D) Probability of Failure

(CO2) [Application]

13. The reliabilities and corresponding costs of two sub components *A* and *B* of a system are given in the following table. Find all possible system reliabilities and their costs. Give your comments to estimate the most optimal reliability for the system composed of two components *A* and *B* Find the combination of components such that (a) reliability should not be less than 85% (b) cost should not be more than Rs. 250/-

Sub Component	Cost of Reliability	
	0.8	0.9
A	100	150
b	90	120

(CO3) [Application]

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