Roll No.													

PRESIDENCY UNIVERSITY
BENGALURU
SCHOOL OF ENGINEERING
MAKEUP EXAMINATION – JAN 2023

Course Code: MEC 3015
Course Name: Reliability Engineering
Program : B. Tech - MECH

Date: 28-JAN-2023
Time: 09:30AM – 12:30PM
Max Marks: 100
Weightage: 50%

Instructions:

(i) Read the question properly and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and Non-programmable calculators are permitted.

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries TWO marks. (5Qx2M=10M)

1. Define Maintenance. (C.O.NO. 1)[Knowledge]
2. Define Breakdown Maintenance. (C.O.NO. 1)[Knowledge]
3. Define Reliability. (C.O.NO. 2)[Knowledge]
4. Define Availability. (C.O.NO. 4)[Knowledge]
5. Define Maintainability. (C.O.NO. 4)[Knowledge]

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries EIGHT marks. (5Qx8M=40M)

6. By considering any Industry how do you divide the Objectives of Maintenance in terms of Operational and Cost Objectives? (C.O.NO 1) [Comprehension]
7. How Scheduled Downtime is different from Unscheduled Downtime, justify your answer with example? (C.O.NO 2) [Comprehension]
8. How the Reliability of systems which are connected in Series are different from Parallel justify your answer with an example? (C.O.NO 3) [Comprehension]
9. What are all the factors which affects the Maintainability? (C.O.NO 4) [Comprehension]
10. What are all the factors which affects the Availability & Reliability? (C.O.NO 4) [Comprehension]

Part C [Problem Solving Questions]

Answer all the Questions. Each question carries TEN marks. (5Qx10M=50M)

11. Consider a series of tests conducted under certain stipulated conditions on 500 electronic components. The total duration of the tests is 7 hours. The number of components that fail during each hourly interval is noted. The results obtained are tabulated as shown in below table. (C.O.No.2) [Analysis]

Time	1	2	3	4	5	6	7
Number of Failures	140	115	104	96	93	84	68

Calculate a) Failure Density, b) Failure Rate & c) Reliability

12. Calculate the reliability of the following systems in which the probability of functioning of each component is given in the figure itself (C.O.NO 3) [Analysis]

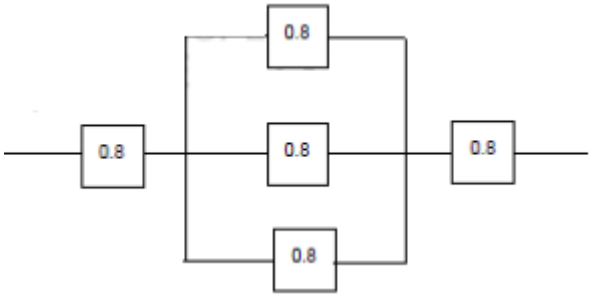

Figure (a)

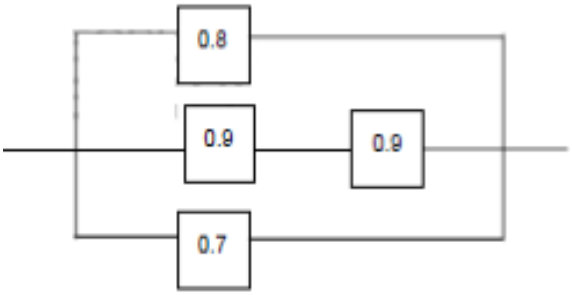

Figure (b)

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/- (C.O.NO 3) [Analysis]

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

14. What are the types of availability depending on the time elements we take into consideration discuss in detail. (C.O.NO 4) [Analysis]

15. How the dependence of Availability on Reliability & Maintainability can be demonstrated by means of geometrical model. (C.O.NO 4) [Analysis]