Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

End - Term Examinations – MAY/ JUNE 2025

Date: 03-06-2025 **Time:** 09:30 am – 12:30 pm

School: SOE	**Program:** B. Tech-MEC	
Course Code : MEC3015	**Course Name:** Reliability Engineering	
Semester: VI	**Max Marks**: 100	**Weightage**: 50%

CO - Levels	CO1	CO2	CO3	CO4	CO5
Marks	18	33	30	19	-

Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks. 10Q x 2M=20M

1.	Define Maintenance	2 Marks	L1	CO1
2.	What are the causes of poor Maintenance?	2 Marks	L1	CO1
3.	Define Total Productive Maintenance	2 Marks	L1	CO1
4.	Define Condition Based Maintenance	2 Marks	L1	CO1
5.	Define Failure Rate	2 Marks	L1	CO2
6.	List the various methods of estimating Reliability	2 Marks	L1	CO2
7.	Define Reliability	2 Marks	L1	CO2
8.	Define Mean Time Between Failure	2 Marks	L1	CO2
9.	Define Availability	2 Marks	L1	CO4
10.	Define Maintainability	2 Marks	L1	CO4

Part B

Answer the Questions. **Total Marks 80M**

<table>
<tr><td>11.</td><td>By implementing the Computers in Maintenance activities for an Industry what are the benefits of computerization in Maintenance?</td><td>10 Marks</td><td>L2</td><td>CO1</td></tr>
<tr><td colspan="5">Or</td></tr>
<tr><td>12.</td><td>By considering any Indian Industries what are the main reasons for the higher Maintenance Cost in Indian Industries?</td><td>10 Marks</td><td>L2</td><td>CO1</td></tr>
<tr><td>13.</td><td>How do you relate time-dependent failure rate of items which follows the shape of a bathtub?</td><td>10 Marks</td><td>L2</td><td>CO2</td></tr>
<tr><td colspan="5">Or</td></tr>
<tr><td>14.</td><td>Discuss the Scheduled Downtime & Un-Scheduled Downtime with examples</td><td>10 Marks</td><td>L2</td><td>CO2</td></tr>
<tr><td>15.</td><td>How the Reliability of systems are calculated which are connected in with an example?</td><td>10 Marks</td><td>L2</td><td>CO3</td></tr>
<tr><td colspan="5">Or</td></tr>
<tr><td>16.</td><td>How the Reliability of systems are calculated which are connected in with an example?</td><td>10 Marks</td><td>L2</td><td>CO3</td></tr>
<tr><td>17.</td><td>Consider a 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
<table><tr><td>Time</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>Number of Failures</td><td>176</td><td>156</td><td>137</td><td>121</td><td>110</td></tr></table>Calculate 1) Failure Density, 2) Failure Rate 3) Reliability & 4) Probability of Failure</td><td>15 Marks</td><td>L3</td><td>CO2</td></tr>
<tr><td colspan="5">Or</td></tr>
<tr><td>18.</td><td>Consider a series of tests conducted under certain stipulated conditions on 500 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.
<table><tr><td>Time</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>Number of Failures</td><td>140</td><td>115</td><td>93</td><td>84</td><td>68</td></tr></table></td><td>15 Marks</td><td>L3</td><td>CO2</td></tr>
</table>

	Calculate 1) Failure Density, 2) Failure Rate 3) Reliability & 4) Probability of Failure			

19.	**What are the types of availability depending on the time elements we take into consideration discuss in detail**	**15 Marks**	**L2**	**CO4**
	Or			
20.	**How the dependence of Availability on Reliability & Maintainability can be demonstrated by means of geometrical model.**	**15 Marks**	**L2**	**CO4**

21.	**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 / 0.95 **A**: 50 / 100 / 150 **B**: 60 / 90 / 120	**20 Marks**	**L3**	**CO3**
	Or					
22.	**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. 150/- with** **Sub Component** / **Cost of Reliability**: 0.8 / 0.9 / 0.95 **A**: 50 / 90 / 150 **B**: 70 / 90 / 120	**20 Marks**	**L2**	**CO3**