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BME-025

B.Tech. MECHANICAL ENGINEERING (COMPUTER INTEGRATED MANUFACTURING)

Term-End Examination

00613

June, 2015

BME-025 : CONDITION MONITORING AND MAINTENANCE ENGINEERING

Time : 3 hours *Maximum Marks : 70*

Note : *Answer any **seven** questions. All questions carry equal marks. Use of calculator is allowed.*

1. (a) What is preventive maintenance ? Explain the different preventive maintenance tasks.

(b) What is reliability centered maintenance ? What are the important steps involved in implementing it in any plant ? *5+5=10*

2. (a) Briefly describe the concept of reliability, maintainability and availability.

(b) An electronic component in a CNC Lathe Machine has an exponential time to failure distribution with a failure rate of 0·08 per 1,000 hrs. What is the reliability of the component at 5,000 hrs ? Find the mean time to failure. *5+5=10*

3. A module of an automatic machine has 10 components in series. Each component has an exponential time to failure distribution with a constant failure rate of 0·05 per 4,000 hrs. What is the reliability of each component and the module after 2,000 hrs of operation ? What is the mean time to failure of the module ? *10*

4. (a) What is condition based maintenance ? Explain the condition monitoring procedure with the help of a flow diagram.

   (b) What are the objectives of total productive maintenance ? How does it differ from total preventive maintenance ? *5+5=10*

5. An automobile company is planning to replace its CNC machine whose cost price is ₹ 12,20,000. The scrap price of this CNC machine is only ₹ 20,000. The maintenance costs are estimated to be as follows. Determine when the company should get the CNC machine replaced. *10*

Year	Maintenance costs
1	22,000
2	50,000
3	80,000
4	1,20,000
5	1,80,000
6	2,50,000
7	3,20,000
8	4,00,000

6. (a) How do you improve the reliability of the equipment using the series and parallel connections ? Illustrate with an example.

(b) Find the reliability of the system with three components connected in

(i) Series, and

(ii) Parallel, each having reliability 0·8. *5+5=10*

7. (a) Differentiate between MTBF and MTTR.

(b) Define and explain the concept of Kaizen. Discuss any two examples of Kaizen in maintenance. *5+5=10*

8. (a) Distinguish between process FMEA and design FMEA. Discuss the merits and demirits of FMEA.

(b) What is codification ? What is its significance in spare parts management ? *5+5=10*

9. (a) What do you understand by the term 'maintenance planning' ? What are the different phases involved in maintenance planning ?

(b) When does an organisation opt for contractual maintenance ? Explain with examples. What are its merits and demerits ? *5+5=10*

10. Write short notes on any ***four*** of the following : $4 \times 2\frac{1}{2} = 10$

(a) Training Function

(b) Breakdown Maintenance (BM)

(c) FSND Analysis

(d) Eye Ball Analysis

(e) Zero Breakdown