

**B.Tech. MECHANICAL ENGINEERING
(COMPUTER INTEGRATED
MANUFACTURING)**

Term-End Examination

June, 2019

**BME-025 : CONDITION MONITORING AND
MAINTENANCE ENGINEERING**

00582

Time : 3 hours

Maximum Marks : 70

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- Note :** (i) *Answer any seven questions.*
(ii) *Use of scientific calculator is permitted.*
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1. (a) Explain the term 'Maintenance Engineering'. Discuss the objectives of maintenance engineering. **2x5=10**
(b) What are the various functions of a maintenance department ? Explain each function in brief.

2. (a) Differentiate between Total Quality Management (TQM) and Total Productive Maintenance (TPM). **2x5=10**
(b) Briefly describe the concept of reliability, maintainability and availability.

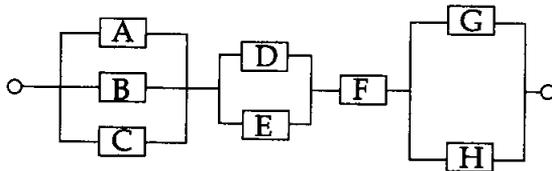
3. Explain 'Codification' ? What are the advantages of codification ? Discuss the significance of codification in the maintenance of spare parts. **10**

4. What do you understand about FMEA/ FMECA ? Explain the steps in carrying out design FMECA. Discuss the applications and merits of FMEA/FMECA. 10
5. (a) What are the various non-destructive tests employed by the maintenance department to detect failure in machines ? Describe any two tests. 5+5
 (b) Differentiate between MTBF and MTTR.
6. There are ten jobs to be processed through two machines M1 and M2 in the order M1→M2. The processing time required by each job (in minutes) is given in Table 1. Find the optimal sequence for the performance of these jobs in the minimum possible time. Also determine the idle time available on each machine. 10

Table 1

Jobs	Machine M1 (Hours)	Machine M2 (Hours)
A	2	7
B	5	3
C	1	4
D	6	7
E	2	8
F	3	9
G	5	10
H	1	2
I	6	1
J	8	5

7. (a) What do you understand by reliability ? 5+5
Why is it important to analyze the reliability of the manufacturing system ?
- (b) Find the system reliability of the following system :



Reliability of each unit is 0.45.

8. An item exhibiting a constant hazard rate has a reliability of 90 percent for an operating time of 500 hours. 2.5x4=10
- (a) What is the average failure rate of the item ?
- (b) What is MTBF ?
- (c) What is the reliability of the item for an operating time of 1000 hours ?
- (d) Corresponding to a reliability of 50%, what would be the operating time ?
9. Write short notes on the following : 2½x4=10
- (a) Redundancy in Reliability systems
- (b) A-B-C Analysis
- (c) Preventive Maintenance
- (d) Condition Based Maintenance
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