

**2005-PUNJAB TECHNICAL UNIVERSITY**  
**B.TECH VIII SEMESTER DEGREE EXAMINATION**  
**MAINTENANCE ENGINEERING**  
**(MECHANICAL ENGINEERING)**

TIME-3HOUR  
MARK-60

Note: Section A Is Compulsory. Attempt Any Four Questions From Section B And Any Two From Section C.

**SECTION A MARKS 2 EACH**

- 1.a) State two most important objectives of maintenance.
- (b) Identify the factors to be considered to determine the appropriate form of maintenance organization.
- (c) What are maintenance records?
- (d) Define availability of engineering systems.
- (e) Write expression for determining the reliability of a system when its elements are arranged in parallel.
- (f) Identify the objectives of maintenance cost control.
- (g) Identify the guidelines for determining the maintenance policy with respect to simple replaceable, complex replaceable and non-replaceable items.
- (h) Define Total Productive Maintenance.
- (i) Identify techniques of condition monitoring.
- (j) Identify important aspects of planned lubrication.

**SECTION B MARKS 5 EACH**

2. Identify and briefly discuss the various documents used for maintenance record keeping.
3. Define the following terms:
  - (a) Reliability of Engineering Systems
  - (b) Mean Time to Failure
  - (c) Mean Time between Failure
  - (d) Mean Time to Repair.
4. Identify and briefly discuss the factors influencing maintenance cost over life-cycles.
5. Distinguish between preventive and predictive maintenance. Discuss the development of preventive maintenance schedule.
6. Discuss briefly the maintenance requirements of process equipment. Explain briefly the safety aspects in maintenance of process equipment.

**SECTION C MARKS 10 EACH**

7. Identify and briefly discuss the various types of fault diagnosis and condition monitoring techniques. State the advantages obtained by condition monitoring.

8. Identify and briefly discuss the various costs associated with maintenance. Explain the economics of maintenance by plotting various maintenance costs against equipment availability.

9. Write notes on any two of the following:

(a) Maintenance Policy

(b) Computerized Maintenance Information system.

(c) Manpower Planning and Training for Maintenance

(d) Machine Failure Pattern.

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