

GUJARAT TECHNOLOGICAL UNIVERSITY

BE-6 SEMESTER – OLD PAPER – S22 TO W25 – QUESTION BANK

Subject Name & Code:

INDUSTRIAL SAFETY AND MAINTENANCE ENGINEERING (3161913)

Unit 1: Quality, Reliability and Maintainability (QRM)

Repeated Questions:

1. Define: (i) Quality, (ii) Reliability, (iii) Maintainability. (S23 - Q1a, 03 marks)
(Also in: W22 - Q1a, 03 marks)
2. Define Quality, Productivity and Reliability. (S22 - Q2a, 03 marks)
(Similar to above, includes Productivity)
3. Define maintainability, reliability and productivity. (S24 - Q3a, 03 marks)
(Also in: S25 - Q4a, 03 marks)
4. Explain how overall maintenance cost can be reduced. (S23 - Q1b, 04 marks)
(Also in: S22 - Q3b, 04 marks; W24 - Q1b, 04 marks; S25 - Q2b, 04 marks; S25 - Q1b, 04 marks)
5. What are the objectives of quality circle? (S23 - Q1a, 03 marks)
(Also in: S25 - Q4a, 03 marks)
6. What do you mean by quality? Explain the concept of quality circle. (W24 - Q1a, 03 marks)
(Also in: S22 - Q5a, 03 marks)

Other Important Questions:

1. How does FEMA help maintenance personnel? (W25 - Q1b, 04 marks)
 2. List and explain the characteristics of successful product development. (W25 - Q2 OR c, 07 marks)
(Also in: S25 - Q1c, 07 marks)
 3. What are objectives of Maintenance department? (S22 - Q1a, 03 marks)
 4. Explain different applications of Gantt and Bar Chart along with its limitations. (S24 - Q1a, 03 marks)
(Also in: S25 - Q3 OR a, 03 marks)
 5. Explain the different elements to be considered during design stage to improve the maintainability of the system. (W23 - Q1b, 04 marks)
 6. Write short note on: Quality Circle in maintenance. (S24 - Q1b, 04 marks)
 7. Justify the statement "safety comes first". (W25 - Q5a, 03 marks)
(Also in: S22 - Q4 OR a, 03 marks)
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Unit 2: Maintenance Jobs and Technologies

Repeated Questions:

1. What is wear? Explain various types of wear with neat sketches. (S23 - Q2 OR c, 07 marks)
(Also in: S24 - Q2 OR c, 07 marks)
2. State the types and reasons of wear in machines. (W22 - Q2a, 03 marks)
(Also in: S25 - Q5 OR a, 03 marks)
3. What are the causes of equipment breakdown? (W25 - Q3 OR a, 03 marks)
(Also in: W22 - Q3 OR a, 03 marks; S25 - Q1a, 03 marks)
4. Explain the reasons for the wear of machine component in details. (W23 - Q2c, 07 marks)
(Similar to above)
5. Explain the assembly of Ball and Roller bearing. (S24 - Q2c, 07 marks)
(Also in: S25 - Q3 OR c, 07 marks; W24 - Q3 OR c, 07 marks)
6. What is corrosion? List down different factors influencing corrosion. (S24 - Q2a, 03 marks)
(Also in: W22 - Q2b, 04 marks)
7. List down the different types of corrosion and state the important factor affecting the corrosion. (W23 - Q2a, 03 marks)

Other Important Questions:

1. Write a note on Assembly of Keyed Joints. (S23 - Q2a, 03 marks)
 2. Explain Reliability and Failure Rate using Bath Tub Curve. (S24 - Q2b, 04 marks)
 3. Explain the defect due to wear of equipments and its preventions. (S22 - Q3 OR c, 07 marks)
(Also in: W24 - Q2 OR c, 07 marks)
 4. Explain the effect of corrosion on the performance of machine. (W23 - Q2b, 04 marks)
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Unit 3: Defect List Generation and Defect/Failure Analysis

Repeated Questions:

1. What is fault tree analysis and root cause analysis? (W25 - Q2b, 04 marks)
(Also in: S25 - Q1b, 04 marks)
2. Prepare the fault tree analysis (FTA) for "no light in the room". (W25 - Q5b, 04 marks)
(Also in: S22 - Q3b, 04 marks; S25 - Q3b, 04 marks)
3. What is FMEA? How does FMEA help maintenance personnel? (W22 - Q3 OR c, 07 marks)
(Also in: S25 - Q5c, 07 marks; W24 - Q2c, 07 marks)
4. Classify different types of failure in detail. (S24 - Q3a, 03 marks)
(Also in: W24 - Q2a, 03 marks)
5. Write short note on Fault Tree Analysis. (S24 - Q3b, 04 marks)
(Also in: S25 - Q3 OR b, 04 marks)
6. State types of failure. Explain defect analysis and failure analysis. (W22 - Q3a, 03 marks)

Other Important Questions:

1. What is wear debris analysis? (W25 - Q3a, 03 marks)
 2. Explain Failure Modes and Effect Analysis in detail. Also list down advantages and disadvantages of the same. (S24 - Q3 OR c, 07 marks)
 3. Explain the FMEA (Failure Mode and Effect Analysis) techniques and state the advantages and limitation of it. (W23 - Q3 OR c, 07 marks)
 4. What is FTA (Fault tree analysis), Why it is carried out? Explain its procedure and various event symbol. (S23 - Q3 OR c, 07 marks)
 5. Draw the various gate symbols used in fault tree analysis (FTA) and state its meaning. (W23 - Q3a, 03 marks)
 6. Draw any three symbol for fault tree analysis (FTA). (S22 - Q3a, 03 marks)
 7. Enlist types of failures/defects. Discuss briefly (1) Equipment downstream analysis (2) Fault tree analysis (FTA). (S22 - Q3c, 07 marks)
 8. Explain Breakdown analysis template by taking an example of any company. (W24 - Q2b, 04 marks)
 9. What is fault tree analysis? Apply it for a car accident and suggest detail analysis. (W22 - Q3c, 07 marks)
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Unit 4: Maintenance Types/Systems

Repeated Questions:

1. Differentiate between planned maintenance and unplanned maintenance. (W22 - Q3 OR b, 04 marks)
(Also in: W23 - Q4a, 03 marks)
2. What is condition base maintenance system (CBMS)? (S23 - Q3 OR a, 03 marks)
(Also in: W22 - Q4a, 03 marks)
3. Explain short term and long term maintenance plan. (S23 - Q4b, 04 marks)
(Also in: W22 - Q4b, 04 marks; W24 - Q1b, 04 marks; S25 - Q4b, 04 marks)
4. Explain Leakage Monitoring and Vibration Monitoring. (W25 - Q4 OR c, 07 marks)
(Also in: W22 - Q4c, 07 marks)
5. Explain Vibration Monitoring for predictive maintenance in detail. (S24 - Q3c, 07 marks)
(Similar to above)
6. What is vibration monitoring? List out the causes of vibration in machine/plant. (S23 - Q3b, 04 marks)
7. Discuss with example predictive and preventive maintenance. (W25 - Q5c, 07 marks)
(Also in: S25 - Q2c, 07 marks)
8. Differentiate the breakdown maintenance and preventive maintenance. (S22 - Q1b, 04 marks)

Other Important Questions:

1. Define: Opportunistic Maintenance, Routine Maintenance, Preventive Maintenance, Predictive Maintenance. (W22 - Q3b, 04 marks)
(Also in: W24 - Q3a, 03 marks)
 2. Explain Breakdown Maintenance along with its advantages and disadvantages. (S24 - Q3 OR a, 03 marks)
 3. Write short note on Design Out Maintenance. (S24 - Q3 OR b, 04 marks)
(Also in: W24 - Q4a, 03 marks)
 4. List various types of maintenance carried out at refineries. Explain any two in detail. (S23 - Q3c, 07 marks)
(Also in: S25 - Q4c, 07 marks)
 5. State the advantages and limitations of condition base maintenance system. (W23 - Q4b, 04 marks)
 6. State the main objectives of preventive maintenance and explain the preventive maintenance in details. (W23 - Q4c, 07 marks)
(Also in: W24 - Q4c, 07 marks)
 7. Explain Equipment Downtime Analysis. (S23 - Q4 OR a, 03 marks)
(Also in: W24 - Q3 OR a, 03 marks)
 8. Differentiate between offline condition monitoring and online condition monitoring. (W23 - Q3 OR a, 03 marks)
 9. Explain Visual and Temperature Monitoring in detail. (W22 - Q4 OR c, 07 marks)
 10. What is Ferrography? (W24 - Q3b, 04 marks)
(Also in: W23 - Q3 OR b, 04 marks)
 11. Write a short note on "Ferrography". (S23 - Q3 OR b, 04 marks)
 12. Explain the principle of wear debris analysis and explain Ferrography method of wear debris analysis. (S22 - Q5c, 07 marks)
 13. What is Spectroscopy? (W25 - Q4a, 03 marks)
(Also in: W22 - Q4 OR a, 03 marks)
 14. What do you mean by condition monitoring? List out various methods of condition monitoring and explain any one. (S22 - Q5 OR c, 07 marks)
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Unit 5: Maintenance Planning and Scheduling

Repeated Questions:

1. Enlist the factors involved in effective planning of maintenance work. (W25 - Q4b, 04 marks)
(Also in: S22 - Q4a, 03 marks; S24 - Q4b, 04 marks; W22 - Q4 OR b, 04 marks; W24 - Q3c, 07 marks)
2. Explain different factors involved in effective planning of maintenance work. (S24 - Q4b, 04 marks)
(Same as above, different wording)
3. Brief note on CPM and PERT for scheduling work. (S23 - Q4a, 03 marks)
(Also in: S25 - Q5a, 03 marks)
4. Explain CPM with its advantages & limitations. (W24 - Q4 OR b, 04 marks)
5. Explain the Gantt chart and state its limitation. (W23 - Q3 OR b, 04 marks)
6. Define planning and scheduling. Differentiate planning and scheduling work in industry with suitable example. (S22 - Q4c, 07 marks)
7. Define following in terms of maintenance: (1) Planning and, (2) Scheduling. (W24 - Q4 OR a, 03 marks)

Other Important Questions:

1. What is planning in maintenance? Explain various factors involved in effective planning of maintenance work. (S23 - Q4c, 07 marks)
 2. Explain the planning procedure in industry. (S22 - Q4b, 04 marks)
 3. Write down advantages and limitations of PERT. (S24 - Q4a, 03 marks)
 4. Explain the following terms: 1) Major repair. 2) capital repair. (W23 - Q4b, 04 marks)
 5. Define the following terms: 1) Maintenance planning. 2) Maintenance scheduling. (W23 - Q4a, 03 marks)
 6. Explain the considerations for "design for maintainability" in details. (W24 - Q3 OR b, 04 marks)
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Unit 6: Safety Engineering

Repeated Questions:

1. Discuss causes of accidents in industrial plant. (W25 - Q2b, 04 marks)
(Also in: S23 - Q2b, 04 marks; W22 - Q1b, 04 marks; W25 - Q3b, 04 marks)
2. What is Hazard and Operability (HAZOP) Study? (W25 - Q3b, 04 marks)
(Also in: W22 - Q5a, 03 marks; S22 - Q2c, 07 marks; W24 - Q1c, 07 marks)
3. Explain HAZOP with its objectives, advantages and limitations. (S23 - Q1c, 07 marks)
(Also in: S25 - Q4c, 07 marks)
4. What is Job Safety Analysis (JSA)? Explain its objectives and procedure along with the limitations in detail. (S24 - Q4c, 07 marks)
(Also in: S25 - Q3c, 07 marks)
5. What is job safety analysis (JSA), Write down its objectives. (S23 - Q5 OR b, 04 marks)
(Also in: W24 - Q5 OR a, 03 marks)
6. Enlist the steps of Job Safety Analysis (JSA). (W22 - Q5b, 04 marks)
(Also in: S25 - Q5 OR c, 07 marks)
7. What are the causes of an accident? (S22 - Q5a, 03 marks)
(Also in: W24 - Q5a, 03 marks)
8. Explain different types of industrial accidents. Enlist the steps for accident prevention. (S23 - Q2 OR c, 07 marks)
(Also in: W22 - Q2c, 07 marks)
9. Explain a minor and major accidents in industries. (W25 - Q4a, 03 marks)
10. Enlist the steps of accident and dangerous occurrence reporting. (W25 - Q4b, 04 marks)
(Also in: W22 - Q5 OR b, 04 marks)
11. How safety survey is conducted in industries? (S23 - Q5b, 04 marks)
(Also in: S25 - Q5b, 04 marks)
12. Describe briefly about the safety training. (W25 - Q4c, 07 marks)
(Also in: W22 - Q2 OR c, 07 marks)
13. Explain the different type of safety training conducted in any organization. (W23 - Q5c, 07 marks)
(Also in: W24 - Q5c, 07 marks)
14. Write note on 'Safety training and publicity'. (S22 - Q5b, 04 marks)
15. Write down different types and categories of accidents. (S24 - Q4 OR b, 04 marks)

Other Important Questions:

1. How does management and government help in implementation of safety at any organization/industry? (W25 - Q1c, 07 marks)
 2. How industrial psychology is helpful in preventing accident in Industries? (W25 - Q3c, 07 marks)
 3. What are the objectives of Emergency Plan? Explain the Onsite and offsite Emergency. (S23 - Q5c, 07 marks)
 4. Explain Off-site Emergency Plan in brief. (S24 - Q5b, 04 marks)
(Also in: S25 - Q4b, 04 marks; W24 - Q4b, 04 marks)
 5. Explain different Safety Measures to prevent accidents and improve productivity. (S24 - Q1c, 07 marks)
 6. Enlist the different causes of industrial accident and explain any two causes in details. (W23 - Q5b, 07 marks)
 7. Differentiate between reportable type accident and non-reportable type accident. (W23 - Q5a, 03 marks)
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Unit 7: Safe Design and Operation of Plants

Repeated Questions:

1. Describe the procedure for ensuring safety in planning, building and operating plants. (W25 - Q2c, 07 marks)
(Also in: W22 - Q5c, 07 marks)
2. Which are the elements involved in procedure for ensuring safety in planning. (S23 - Q5a, 03 marks)
(Similar to above)
3. Explain different elements for Ensuring Safety in Planning in detail. (S24 - Q5c, 07 marks)
4. What are the safety rules need to be follow inside your college workshop? (S23 - Q5b, 04 marks)
(Also in: S25 - Q5b, 04 marks; W24 - Q5b, 04 marks)
5. What is Personal Protective Equipment (PPE)? Explain different PPEs used for industrial safety. (W25 - Q5 OR c, 07 marks)
(Also in: S25 - Q2 OR c, 07 marks; W22 - Q5 OR c, 07 marks)
6. Enlist the personal protective equipments with their functions. (S22 - Q2b, 04 marks)
(Also in: W24 - Q5 OR c, 07 marks)
7. Define: Inherent Safety Measures, Passive Safety Measures, Active Safety Measures. (W22 - Q5 OR a, 03 marks)

Other Important Questions:

1. Write a objectives of industrial legislation? (W25 - Q2a, 03 marks)
2. How to eliminate hazards? (W25 - Q5 OR a, 03 marks)
(Also in: S25 - Q2a, 03 marks)
3. State types of hazards and explain any three in detail with possible causes and remedial actions. (W25 - Q3c, 07 marks)
(Also in: W22 - Q1c, 07 marks)
4. Enlist the requirements of suitable PPE to protect the worker. (W23 - Q5 OR a, 03 marks)
5. Explain roll of management in industrial safety. (S22 - Q4 OR b, 04 marks)
6. Discuss briefly: (1) Safety Trials and (2) Industrial Hygiene (3) Alarm and Hazard Defense Plans. (S22 - Q4 OR c, 07 marks)
7. What are the objectives of good plant layout? (S23 - Q5 OR a, 03 marks)
(Also in: W23 - Q5 OR b, 04 marks; W24 - Q5 OR b, 04 marks)
8. Write short note on Factors Influencing the Plant Layout. (S24 - Page 2, Q3a, 03 marks)
9. Explain Safe Design Procedure in brief. (S24 - Page 2, Q3b, 04 marks)
10. What do you mean by safety? How Safety Engineering helps in improving productivity of an organization? - Discuss. (S22 - Q1c, 07 marks)
11. Why safety measures are required in industries. Explain safety measures in detail. (S23 - Q5 OR c, 07 marks)
12. What are the safety rules during maintenance? (S22 - Q5 OR b, 04 marks)
