

## MODEL ANSWER

**Q.1 Attempt Any Three Of The Following.**

**9 Marks**

**a) Define the terms with example:**

**i) Routine maintenance**

**ii) Preventive maintenance**

**iii) Breakdown maintenance**

**Ans. Routine Maintenance:**

- It should be carried out daily if possible.
- The maintenance schedule is usually in the form of log sheets on which days, weeks, months of the year are tabulate.
- Routine maintenance is carried out without dismantling the equipment, but it must always be disconnected from supply before any repairs are undertaken.
- The routine maintenance work is carried out by the maintenance staff.
- Routine maintenance means checking/cleaning/repairing/replacement of machine/equipment.

**For Example (Activities)**

- It includes visual inspection, cleaning, minor repairs such as replacement of small parts and adjustment of equipment.
- Routine maintenance includes all work required in cleaning of electrical equipment from dust & dirt.
- Cleaning of the fitting, tank cover, bushing of power transformers.
- Cleaning the fixed & moving contacts of starters and replacement of burnt contacts.
- Routine maintenances of electric checking of control equipment and replacement of carbon brushes.
- Periodic visual inspection of various equipment's to locate initial condition leading to breakdown.
- Inspect plant under working condition and also when it as rest.
- Up keep of equipment and plant & repair defects at their initial stage.
- Checking of stationary parts.
- Checking of movable parts.
- Checking of working condition of equipment or machinery.

**Preventive Maintenance:**

Preventive maintenance is carried out to reduce the failure of equipment to minimum.

**For example:**

- Measurement of insulation resistance by megger,
- Cleaning of machine by suitable blower to blown out dust, dirt etc
- Checking of oil lubricated bearings.
- Overhaul control equipment
- It includes inspection of loose connection, ventilation, replacement of worn parts, change of oil, checking of insulation etc.

- Overhaul

**Corrective or Breakdown Maintenance :**

Corrective maintenance is carried out when an equipment fails or does not work satisfactory.

**For example: -**

1. In this type of maintenance, immediate steps are taken to repair the fault.
2. Rewinding is carried out if winding is burnt out or parts are replaced immediately.
3. At the same time, following checks are carried out so that further breakdown should be not taking place.
  - i) Tightness of stationary parts is checked.
  - ii) It is also checked that the moving parts are free to move and there is no damage to it.
  - iii) Reasons for the fault to take place, which can be eliminated.

Atmospheric condition and surroundings in which the machine has to work.

**b) State the Objectives of testing.**

- Ans.**
- I) To determine whether the performance of the machine is as per the designed data of not?
  - II) To check the variations in the actual values and designed values.
  - III) To find the reasons for the variations & to modify the manufacturing process accordingly.
  - IV) To determine quality of workmanship, quality of material used.
  - V) To test the new products work as per the revised design or not?
  - VI) Any weakness can be revealed & necessary steps taken to improve it.

**c) State different factors affecting preventive maintenance.**

- Ans.**
1. Type of machine & it's working condition.
  2. Working environment of industry.
  3. Load cycle
  4. Operating cycle of equipment or machine, or whether the machine is continuously working or otherwise.
  5. If the machine is continuously overload it needs early maintenance it will also need suitable times for preventive maintenance.
  6. If the machine fails, how much loss of money it will cause due to its down period.
  7. Large capacity machine or equipment are used in industry it require a sound policy for maintenance.
  8. Aging of machine

9. Cost of the maintenance.
10. Availability of trained & skilled technician.
11. Availability of spares & raw material.

**d) State the factors on which severity of shock depends.**

**Ans.** The effect of electrical shock on human bodies depends on following factors.

- i) Magnitude voltage of the system.
- ii) The period or duration for which the areas of contact with live part.
- iii) It is also depends on supply system i.e. A.C or D.C.
- iv) Body resistance (If wet resistance of body re
- v) Path of current through body.

**Q.2 Attempt Any Two Of The Following.**

**8 Marks**

**a) Define following terms**

- i) Safety      ii) Hazard      iii) Accident      iv) Responsibility**

**Ans.**

**i) Safety :-**

The meaning of the term safety is being safe, not being dangerous or in danger.

**ii) Hazard :-**

Hazard is a probable or possible cause of an accident.

**iii) Accident :-**

The event that happens unexpectedly & causes damage or injury is called as accident.

**iv) Responsibility:-**

The meaning of responsibility is being responsible or accountable for everything which are undergoes activities under the plant in charge.

**b) Explain the procedure for developing preventive maintenance schedule.**

- Ans.**
- i) Periodic visual inspection of various equipment's to locate initial condition leading to breakdown.
  - ii) Up keep of equipment and plant & r
  - iii) Checking of stationary parts.
  - iv) Checking of movable parts.
  - v) Checking of working condition of equipment or machinery.
  - vi) Checking of surrounding in which the machinery or equipment has to work i.e. atmospheric condition.

- vii) Checking of safety measures.
- viii) Checking of protective device.
- ix) Checking the list of consumable and non-consumable items to be used in the equipment's and machinery.
- x) Checking of stores and stored inventory.
- xi) Checking of tools, trackless, jacks and fixtures etc.
- xii) To attend major breakdown and repairs.

**c) What are the causes of electrical accident?**

**Ans.** Causes of electrical accidents are as follows:

1. If person touches the live wire or current carrying parts knowingly or unknowingly.
2. Due to short-circuit, severe leakage current, breaking of live conductor etc.
3. Due to loose contact, damage of insulation of wire.
4. Operation of switches with wet hands may results into accidents.

**Q.3 Attempt Any Two Of The Following.**

**8Marks**

**a) List out the Do's and Don'ts to achieve safety while working in substation.**

**Ans. 1) Do's:-**

- a. Place warning boards on main switch before starting the work.
- b. Before starting any work make sure that the controlling switches are opened & Locked.
- c. Always consider the circuit as alive.
- d. Test rubber gloves periodically.
- e. Keep your face away whenever an arc or flash occurs.
- f. Guard against arcs & high voltages.
- g. Place Rubber mats in front of electrical switch boards.
- h. See that all connections are securely made.

**2)Dont's:-**

- a. Do not close any switch without knowing the reason for its being opened.
- b. Do not touch with any electrical apparatus or conductors.
- c. Do not work in live circuits.
- d. Do not disconnected earthing connection.
- e. Do not tamper with the meter boards.
- f. Do not use metal case flash light around the energised apparatus.
- g. Do not place any part of the body in Circuit.
- h. Do not use metal case flash light aroundthe energised apparatus.
- i. Do not place any part of the body in Circuit
- j. Do not use wire with poor insulation.

**b) Distinguish between routine test and type test .**

**Ans**

<b>ROUTINE TEST</b>	<b>TYPE TEST</b>
1) Each & every piece of manufacture electrical equipment under goes these tests.	1) From a lot, one or two pieces are taken randomly & these tests are carried out on these samples.
2) This test is conducted not only on complete manufactured machine but on each an every part.	2) This test is conducted only on complete manufactured machine.
3) The performance of machine cannot be considered under this test.	3) The performance of machine can be considered under this test.
4) Ex. Measurement of DC resistance of Winding.	4) Ex. Direct load test on 3 phase induction Motor.

**C) Explain the procedure to be followed to rescuing a person who received an electric shock.**

**Ans. 1. Switching OFF the supply:**

When a person comes in contact with live conductor, switch off the main supply immediately if it is nearby or cut the wires with insulated pliers from the wiring circuit.

**2. Removing the person from the contact of current:-**

Push a person with dry sticks of wood or pull him by using hands wear by insulated hand gloves, or use cotton thick cloths or use dry newspaper folded of sufficient thickness.

### **3. Removing the person from fire:**

If a person's cloth catches fire, then wrap him in the blanket or coat & roll him on the ground to extinguish.

4. Call to doctor immediately.

5. Before coming doctor, if any burns or wound occurs on the body of the person use proper oil/ medicine (first aid).

6. If the person is not breathing, immediately start artificial respiration until the medical aid arrives.