Switchboards and Isolation Devices - Possible Questions

1 State one technical reason for earthing the neutral in the MEN system of supply.

2 MEN switchboards are not deemed to be safe unless they satisfy a number of criteria: One criterion is that
MEN switchboards need to be connected to an earth electrode. (N02)
Describe:

a) How this is achieved.

b) Where and how the connection at the switchboard should be made.

c) The means of identifying both the electrode and switchboard connections.

d) One other important MEN busbars related connection at the switchboard that is required in order for the board to comply.

3 Define the term main switchboard.

4 List two factors that must be considered when siting a switchboard.

5 A distribution switchboard does not have an earthing lead, nor can it be supplied from a linked-busbar switchboard. How then is an earth connection provided for the earth continuity busbar?

6 Give a reason why unwanted transient voltages may occur in standard MEN supply lines.

7 Define the term switchgear.

8 When installing switchboards, there are a number of specific physical requirements to ensure they are electrically safe. List FOUR of these.

9 Explain why steel gland plates that are used to support single core AC cable glands must have slots cut
between the gland holes.

10 List FOUR locations where switchboards must either not be located or require special construction
features.

11
a) Sketch and label a simple diagram to represent an MEN distribution system showing: (N01)

• A delta-star connected 11 kV/400 V supply transformer including output lines
• A single-phase consumer including main switch, and neutral and earth bar connections
• A three phase consumer including main switch, neutral and earth bar connections
• All earthing arrangements.

b) List two advantages of a three phase MEN system

c) Explain the meaning of the term electrically safe.

12 What type of switchboard must be used as the main switchboard in an electrical installation supplied from
a standard low voltage supply?

13 Sketch and label a diagram to show how a three phase, 400V distribution switchboard in an engineering workshop can be supplied from a RCD on a MEN main switchboard. (N00)

Provide the following in your diagram:
• MEN switchboard, including mains in, main earth, N and E bars, main switch, circuit protection (fuses) and an RCD (block only).
• Cable supplying the distribution switchboard, including the number of cores.
• Distribution switchboard, including N and E bars, main switch, subcircuit protection (fuses), and subcircuit wiring to a single phase and a three phase circuit.

14. The two figures on the following page represent a three-phase MEN switchboard and a three-phase distribution switchboard in a three-phase electrical installation The supply comes into the MEN switchboard and the three-phase distribution switchboard is supplied from the MEN switchboard. The distribution switchboard is protected by an RCBO. On the figures, draw and label the circuit diagram that shows:

• The supply to the MEN switchboard.
• The wiring between the MEN switchboard and the distribution switchboard.
• The distribution board protection on the MEN switchboard.
• The main switches on both boards.
• The earthing and neutral arrangements on both boards
• The neutral and earthing fittings on both boards (bars, link, electrode, tags).

There are other final subcircuits, MCBs, RCDs on both switchboards that do not need to be drawn.