

Sample paper ELECTRICAL INSTALLATION DESIGN

This sample paper serve only to illustrate the type and way questions may be asked in a test. These are questions taken from past years of the various three chapters 1, 2 and 3 including **the lab experiment on lighting controls**. For this cMST some of the questions had been converted to MCQs for the cMST however there are no sample MCQs here.

1. A proposed shopping centre applies for 2200kVA of electricity. State the voltage, frequency and number of wires that SP Services Ltd will provide.
What will be the maximum current that can be drawn at 2200kVA?
What is the power consumed at the factory when the power factor is 0.75?
2. Design the lighting control circuit to control three lamps simultaneously from three different locations, clearly labelled all wiring (live and neutral) as well as the switches.
Explain why the three lamps cannot be connected in series.
3. Determine the tripping time of the protective devices in the single line diagram of Figure Q3.
(i) When a current of 30A flows in a circuit protected by a 10A Type C MCB
(ii) When a live to neutral fault current of 150A occurs at Point A
How long will it takes for the 6A SP Type B MCB to operate when a current of 9A flows in Load C?

Please note only Time/Current curve of Type B MCBs is provided.

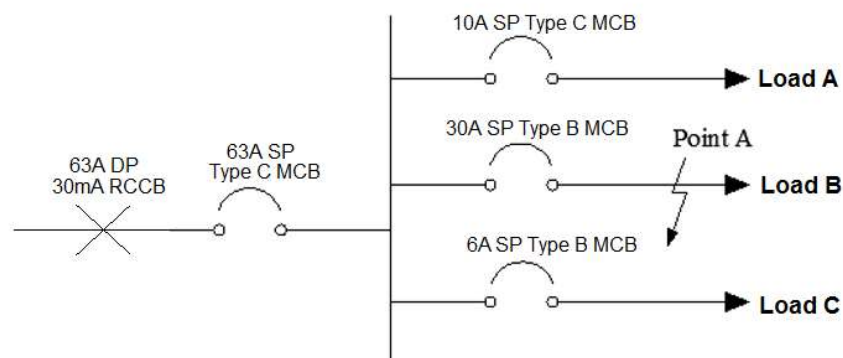


Figure Q3

4. A three-phase 400V 50 Hz supply feeds a three-phase 15kW delta-connected heater of unity power factor. Determine:
(i) the line current taken from the supply
(ii) the resistance of one of the three identical windings
(iii) the rated power of this heater if the windings are connected in star.

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5. Determine the size of a 6.7m long conduit with one 90° bend needed to accommodate the following circuits. (Use the cable factor method.)
- 2 numbers of single-phase circuit using 1.5 mm² single core PVC-insulated cables with 1.5mm² single core PVC insulated cables for the protective conductors.
 - 1 no. of three-phase 4-wire circuit using 2.5 mm² single-core PVC-insulated cables for phase and 1.5 mm² single core PVC-insulated stranded cable for the protective conductor.
- 6 Since March 2011, new colours are mandated for cables used for three phase electricity supply. State the previously mandated colours and the corresponding colours that are now used in place of these colours?
- 7 A semi-detached house taking supply at 400V/230V 3-phase has the following loads:
- 12 nos. of 2 x 32 W fluorescent light fittings
 - 15 nos. of 25W, 50V tungsten halogen lamps
 - **2 nos.** of 32A ring **circuits** connected to a total of 30 numbers of 13A switched socket outlets (Estimated demand of each circuit is 3.5kW.)
 - 1 no. of multi-split air-conditioning unit where the electrical load can be considered to be a 3-phase 400V motor rated 4.5 kW with efficiency of 0.88 and power factor of 0.86.
 - 1 no. 7.5 kW cooker connected to cooker control unit with 13A switched socket outlet
 - 3 nos. of instantaneous water heater each rated 3.0kW.

Draw a load list table as per sample below

(2 marks)

Description	Connected Load	D.F.	Current Demand

Assume the loads are distributed evenly over the three-phases and allowing 20% for future expansion, determine a suitable current rating for the main circuit breaker after applying the appropriate diversity factors. (Standard MCB ratings are 16A, 20A, 32A, 40A, 50A, 63A, 80A, 100A)