

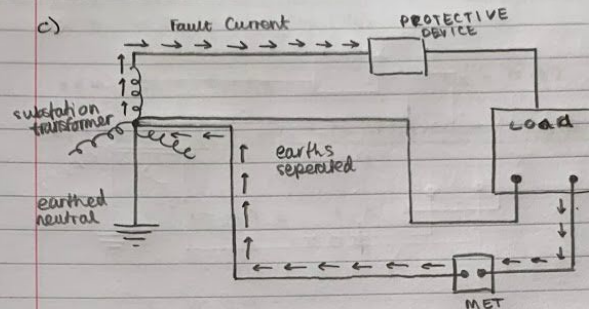
Lewis Humble HUM17837516 22/05/20 M4X00920

- ① a) An exposed conductive part is something that is exposed and made of a conductive material. This means that the part can be touched by people and has the ability to become even though it is not live under normal conditions. It would become live if a fault were to occur.

An example of this would be something made of a conductive material such as metal, for example, some ~~metals~~ buildings ~~works~~ are made of metal framework which could become live, also radiators and piping are other examples. An example is metal conduit.

~~4/1~~

b)



when there is a fault condition there is a fault current sent down, this current will go into the protective device which is protecting the load and this protective device will break the circuit so this fault current will not reach the load.

- d) One advantage of using a TN-C-S system ~~is~~ over a TT earth system is the cost is lower, Cost is low on TN-C-S system because you only need a two core cable. Another advantage is that step voltages are more of a problem in TT systems.

Lewis Humble HUM17837516 22/05/20 M4X00920

$$\textcircled{2} \frac{\text{Nominal voltage}}{\text{Earth fault loop impedance (Zs)}} = \frac{230}{Zs}$$

$$Zs = Ze + R_1 + R_2 \quad Ze = 0.32$$

$$R_1 + R_2 = \frac{(R_1 + R_2) \times \text{multiplier} \times \text{length}}{1000}$$

$$= \frac{10.49 \times 1.2 \times 23}{1000}$$

$$= 0.29$$

$$\therefore Zs = 0.32 + 0.29$$

$$= 0.61$$

$$\therefore \frac{\text{nominal voltage}}{\text{Earth fault loop impedance}} = \frac{230}{0.61} = 377.34 \text{ A}$$

b) From Regs book circuit will break at 0.1s.

Lewis Humble HUM17837516 22/05/20 M4x00920

③ a) $I_b = 37A$ $Z_e = 0.6$

$$S = \frac{\sqrt{I^2 \times t}}{k} = \sqrt{\quad}$$

$$\frac{\text{nominal voltage}}{\text{earth fault loop impedance (Zs)}} = \frac{230}{Z_s}$$

$$Z_s = Z_e + R_1 + R_2$$

$$R_1 + R_2 = \frac{(R_1 + R_2) \times \text{multiplier} \times \text{length}}{1000}$$

$$(R_1 + R_2) = ?$$

$$\begin{aligned} R_2 &= \frac{I_n}{C_a \times C_g + C_i + C_f + C_e} \\ &= \frac{40}{0.94 \times 0.7} \\ &= 60.84 \therefore 16 \text{ mm}^2 \end{aligned}$$

$$R_1 + R_2 = \frac{2.3 \times 1.2 \times 27}{1000} = 0.07$$

$$Z_s = 0.6 + 0.07 = 0.67$$

$$\therefore \frac{\text{nominal voltage}}{\text{earth fault loop impedance (Zs)}} = \frac{230}{0.67} = 340.98A$$

$$\begin{aligned} S &= \frac{\sqrt{I^2 \times t}}{k} = \frac{\sqrt{(340.98)^2 \times 0.2}}{115} \\ &= 1.33 \text{ mm}^2 \end{aligned}$$

$$\therefore \text{cable size} \geq 1.5 \text{ mm}^2 \text{ cpc } 1.5 \text{ mm}^2$$

Lewis Humble HVM17837516 22/05/20 M4X00920

④ a) $42 \times 19 = 798 \text{ m}$

$$N = \frac{E \times A}{F \times MF \times UF}$$

$$= \frac{300}{13500 \times 0.7 \times 0.8} \times 798$$

$$= 241.128 \therefore \text{number of lamps} = 32$$

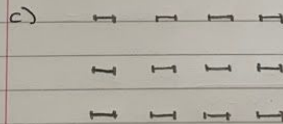
b) lux level

$$E = \frac{I}{d^2}$$

$$I = 10,000 \text{ cd}$$

$$d = 6 \text{ m}$$

$$E = \frac{10,000}{6^2} = 277.78 \text{ lux directly below}$$



I would arrange the luminaires spaced out in a regular pattern, this is only 12 however all 32 would be arranged the same way.

$$\begin{aligned} \textcircled{5} \text{ a) } I_n &= \sqrt{(I_a^2 + I_b^2 + I_c^2) - (I_a \times I_b) - (I_a \times I_c) - (I_b \times I_c)} \\ &= \sqrt{(115^2 + 145^2 + 200^2) - (115 \times 145) - (115 \times 200) - (145 \times 200)} \\ &= 74.67 \text{ A} \end{aligned}$$

b) If the loads were reactive then they would be out of phase.

c) make sure ~~all~~ everything is labelled clearly with labels showing what phase ~~each~~ each device is from.