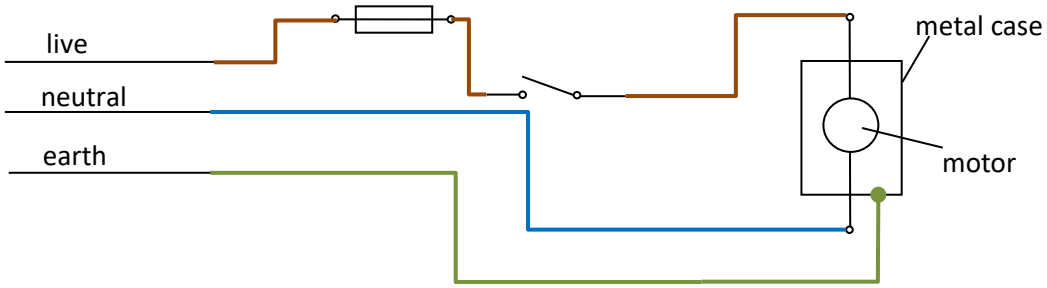
**2021 Sec 4 Physics Assignment 16**
**Practical Electricity- Answers**

**Note**: State **formulae** applied

- Use more s.f. (4 or 5) for intermediate values.
- Check final numerical answers to have **2 or 3 s.f.**!

1 (a)




(b) A fuse protects an electrical appliance from damage or a user from electric shock by preventing excessive current from flowing through it.

(c) When a current passing through a fuse is equal to or exceeds its rating (maximum allowed current), the fuse will melt and break the circuit.

(d)

(i) A suitable fuse rating here is 10 A.
(ii) When the computer works normally, a current of 6.1 A would cause the fuse of rating 6.0 A to blow and stop the current flowing in the circuit.
(iii) If there is an electrical fault and the current surge to a high value, say 25 A, an electrical fire can be started but the fuse does not blow.

(e) $P = VI$ ➔ $I = P/V = 600/240 = 2.5$ A, fuse rating = 3 A

2 A conductor allows **electricity** to pass through it. Water is a good conductor of electricity and our body is a good conductor of electricity. We should **not** touch **electrical appliances** with **wet hands** because **our** body is a good conductor of **electricity** and we may get electrocuted.

3(a) The expected operating potential difference is 240 V, and when the p.d. across the lamp is 240 V, it will consume 50 W of power and operate at normal brightness. 50 J of electrical energy is converted into heat and light energy every second.

(b)(i)

**Note**:

- Given rating of a lamp (P, V), values of P, V and current I may vary according to circuit arrangement, only R is fixed.
- Since e.m.f. is 240V, each lamp should have V < 240V, different P and same I (in series).

$P = V^2/R$ ➔ $R = V^2/P$ (using ratings for each lamp)

$R_1 = 1152\ \Omega$, $R_2 = 720\ \Omega$

$R_{effective} = R_1 + R_2$

e.m.f. = $I \times R_{effective}$

Current $I = I_1 = I_2 = 240 / R_{effective} = 0.128 \approx 0.13$ A (2sf)

(b)(ii) $P = I^2 \times R_{effective} = 30.8 \approx 31$ W (2sf)

OR $P = VI$ = e.m.f. x I

(b)(iii) Energy Used = P x t

= 0.0308 x 2 x 30 (2 hrs a day for 30 days)
= 1.848 kWh

Cost = no. kWh x unit cost
= 1.848 x 25

= 46 cents OR $0.46