



**2022 Sec 4 Physics Assignment Answers**  
**Assignment 13 Static Electricity**

**Total = 20**

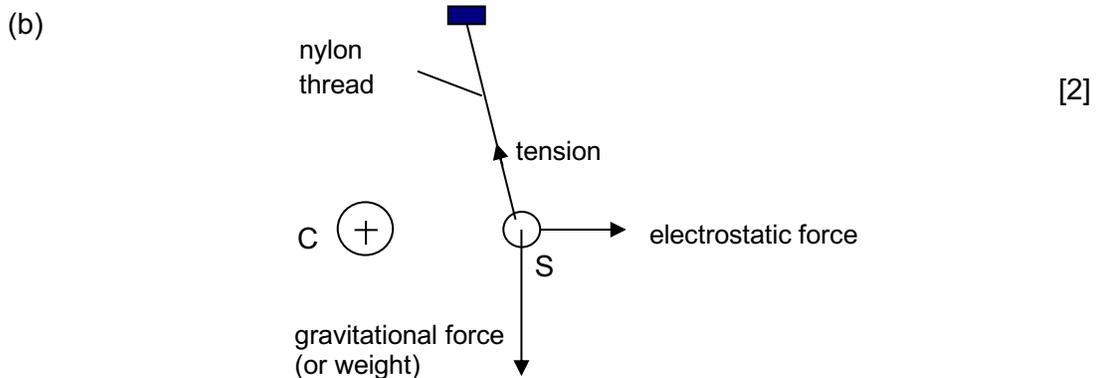
- 1 (a) Since unlike charges attract, some electrons in P and Q will move to the left end of P next to the perspex rod, so P has excess negative charge. [1]  
 This will also result in induced positive charges on the right end of Q. [1]
- (b) P becomes negatively charged / P has net negative charge [1]  
 Q becomes positively charged / Q has net positive charge [1]
- (c) No. [1]  
 There is no contact between the rod and the spheres throughout the whole process. [1]

- 2 (a) (i) The positively charged sphere C attracts electrons to the left side of sphere S and induces positive charges on the right side of S. [1]

Since the unlike charges of spheres C and S are closer than the like charges, the force of attraction is stronger than the force of repulsion. [1]  
 Hence, sphere S moves towards C due to the net attractive force on S.

- (ii) When S touches C, since unlike charges attract, some electrons from S will move onto C to neutralise some of the positive charges in C. [1]

This will cause sphere S to become positively charged and C will be less positive. Since like charges repel, S will be repelled from C. [1]



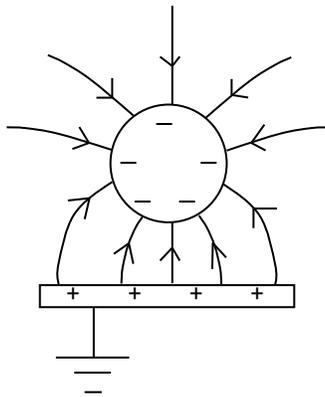
- (c) Thermal energy from the flame ionises the air particles around S to produce negative and positive ions. The negative ions will be attracted to S and slowly discharge the excess positive charges on S. [1]

When S is neutralised, it will fall closer to C due to the net force of the tension and the weight. [1]

The charged sphere C will induce charges on S again, causing S to be attracted to C again (as in part (a)(i)). [1]

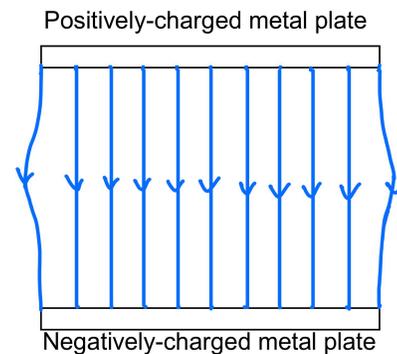
3 (a) [2]

- Shape of electric field patterns
- Arrow directions on electric field lines
- No crossing of electric field lines
- Sign of charges on objects

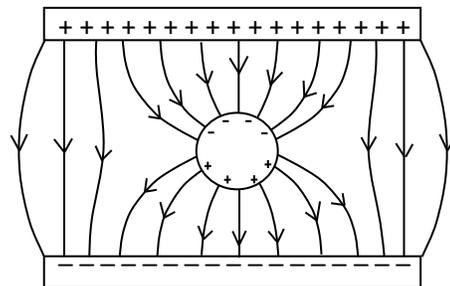


**Note:** The plate has induced positive charge.

(b) [1] electric field bet. 2 parallel plates



(c) [2]



**Note:** The sphere has induced positive charge (at the bottom) & induced negative charge (at the top), as electrons move to the top of the sphere.