4 **(a)** State two functions of capacitors connected in electrical circuits.

1. .....

.....

2. .....

.....

[2]

(b) Three capacitors are connected in parallel to a power supply as shown in Fig. 4.1.

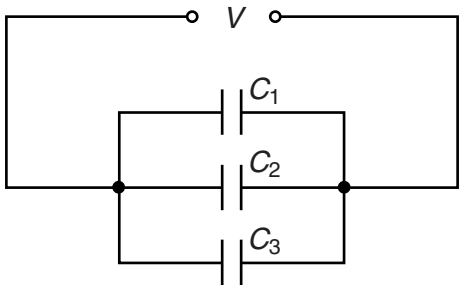

Fig. 4.1

The capacitors have capacitances C_1, C_2 and C_3. The power supply provides a potential difference V.

(i) Explain why the charge on the positive plate of each capacitor is different.

.....

.....

.....[1]

(ii) Use your answer in **(i)** to show that the combined capacitance C of the three capacitors is given by the expression

$$C = C_1 + C_2 + C_3.$$

[2]

(c) A student has available three capacitors, each of capacitance 12 μF.
Draw circuit diagrams, one in each case, to show how the student connects the three capacitors to provide a combined capacitance of

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(i) 8 μF,

[1]

(ii) 18 μF.

[1]