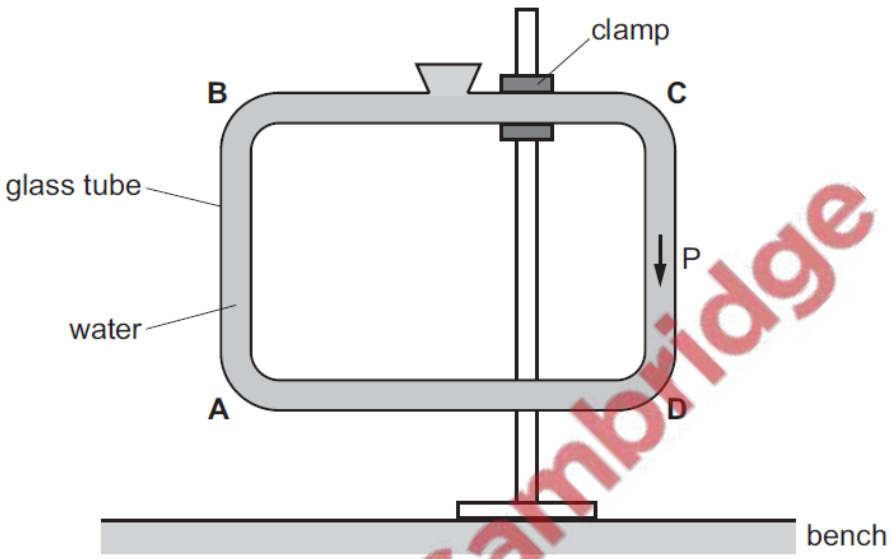
1. Nov/2020/Paper_12/No.17

The diagram shows a glass tube filled with water and suspended above a bench. The water is free to circulate around the tube.

At point P, there is a convection current moving in a downwards direction.

At which point is the tube heated to cause this convection current?



2. Nov/2020/Paper_22/No.3

Fig. 3.1 shows a hot water tank that contains two electric heaters X and Y.

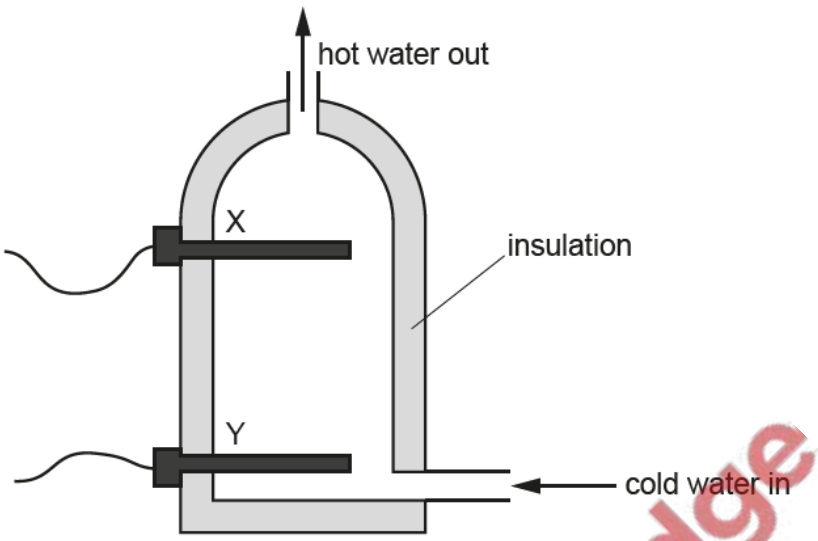


Fig. 3.1

Heater X is used during the daytime but heater Y is only used at night when electricity is cheaper.

(a) The tank is full of cold water and X is switched on.

The temperature of **all** the water above X increases very quickly but the temperature of the water below X increases much more slowly.

(i) Explain the process that causes the water above X to increase in temperature.

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(ii) Heater Y remains switched off. Explain why the temperature of the water below heater X increases much more slowly than the temperature of the water above heater X.

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(b) The hot water tank is covered in a thick layer of insulating material. The material is a plastic that contains a large number of small pockets of trapped air.

Explain why this material is a good insulator.

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..... [2]

3. June/2020/Paper_11/No.21

Which description of a dull black surface is correct?

A good emitter, good absorber and good reflector of radiation

B good emitter, poor absorber and poor reflector of radiation

C good emitter, good absorber and poor reflector of radiation

D poor emitter, poor absorber and poor reflector of radiation

4. June/2020/Paper_12/No.20

In which situation is there **no** transfer of energy?

A a car battery turning the starter motor

B a car moving along a horizontal road at constant speed

C a solar panel warming water

D a spacecraft orbiting the earth at constant height