7 **(a)** Define the *resistance* of a resistor.

For Examiner's Use

.....

.....[1]

(b) In the circuit of Fig. 7.1, the battery has an e.m.f. of 3.00 V and an internal resistance *r*. R is a variable resistor. The resistance of the ammeter is negligible and the voltmeter has an infinite resistance.

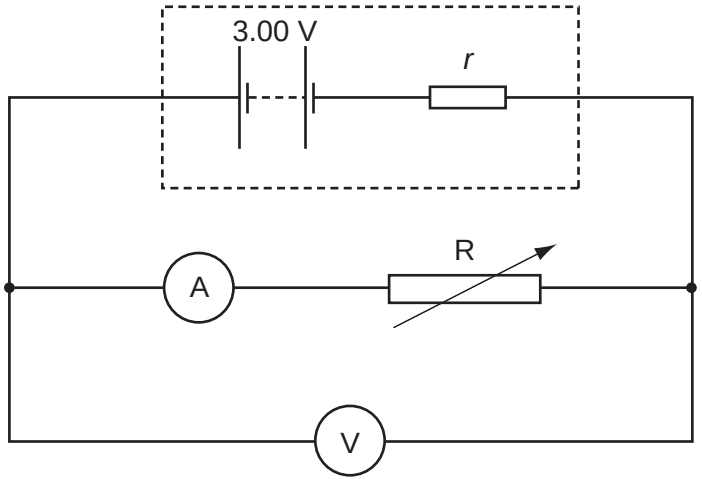

Fig. 7.1

The resistance of R is varied. Fig. 7.2 shows the variation of the power *P* dissipated in R with the potential difference *V* across R.

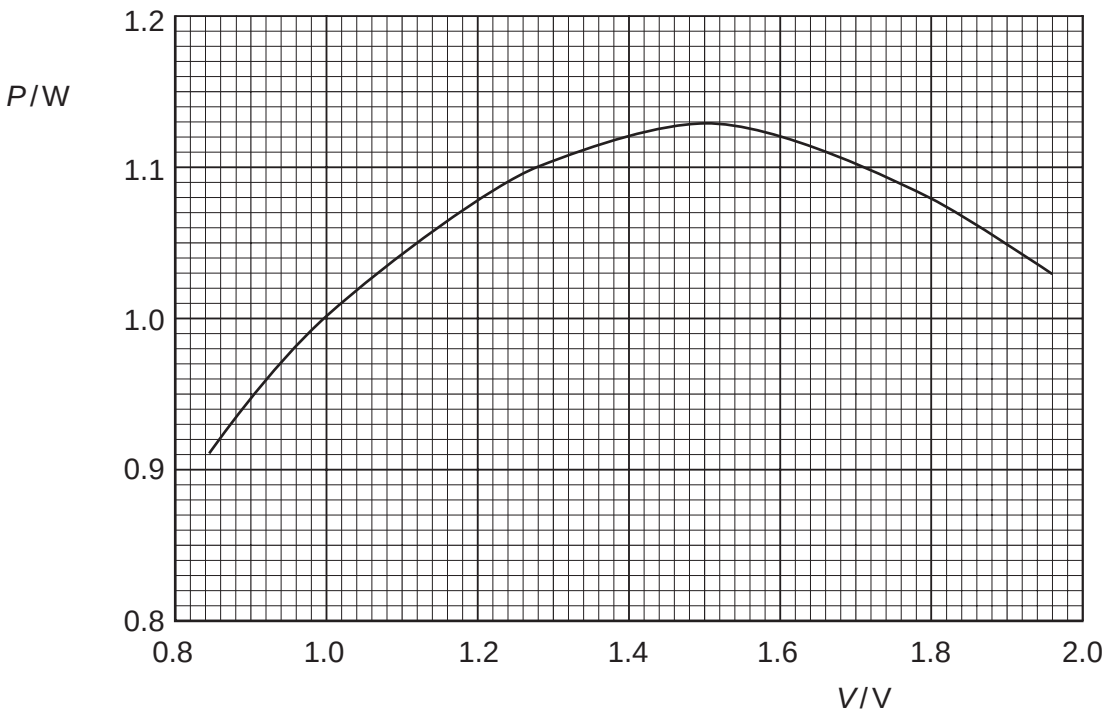

Fig. 7.2

For Examiner's Use

(i) Use Fig. 7.2 to determine

1. the maximum power dissipation in R,

maximum power = ... W

2. the potential difference across R when the maximum power is dissipated.

potential difference = ... V
[1]

(ii) Hence calculate the resistance of R when the maximum power is dissipated.

resistance = ... Ω [2]

(iii) Use your answers in **(i)** and **(ii)** to determine the internal resistance *r* of the battery.

r = ... Ω [3]

(c) By reference to Fig. 7.2, it can be seen that there are two values of potential difference *V* for which the power dissipation is 1.05 W.
State, with a reason, which value of *V* will result in less power being dissipated in the internal resistance.

.....

.....

.....

.....[3]