Practice Question Set For A-Level
Subject : Physics
Paper-3 Topic: Section A(Practical Skills Set-3)

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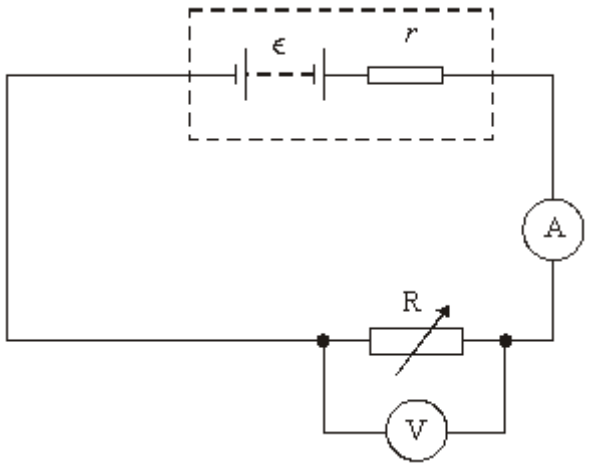
Name of the Student:_____
Max. Marks : 17 Marks **Time : 17 Minutes**

Q1.

A battery of emf $\in$ and internal resistance *r* is connected in series to a variable resistor R and an ammeter of negligible resistance. A voltmeter is connected across R, as shown in the figure below.



(a) (i) State what is meant by the emf of the battery.

_____

_____

(ii) The reading on the voltmeter is less than the emf. Explain why this is so.

_____

_____

(2)

(b) A student wishes to measure $\in$ and *r*. Using the circuit shown in the figure above the value of R is decreased in steps and at each step the readings *V* and *I* on the voltmeter and ammeter respectively are recorded. These are shown in the table.

reading on voltmeter/V	reading on ammeter/A
8.3	0.07
6.8	0.17
4.6	0.33
2.9	0.44

0.3	0.63

(i) Give an expression relating *V, I*, ϵ and *r.*

_____

(ii) Draw a graph of *V* (on the *y*-axis) against *I (*on the *x*-axis) on graph paper.

(Allow one sheet of graph paper)

(iii) Determine the values of ϵ and *r* from the graph, explaining your method.

ϵ: _____

_____

r: _____

_____

(8)

(Total 10 marks)

Q2.

(a) The table summarises the properties of five of the stars in the constellation of Cassiopeia.

name	absolute magnitude	apparent magnitude	spectral class
Achird	4.6	3.5	G
Chaph	1.9	2.3	F
Ruchbah	0.24	2.7	A
Segin	–2.4	3.4	B
Shedir	–0.9	2.2	K

Explaining your answer in each case, state which star

(i) is the hottest,

_____

_____

_____

(ii) is likely to appear orange in colour,

_____

_____

_____

(iii) appears the brightest from Earth,

_____

_____

_____

(iv) is less than 10 pc away from the Earth.

_____

_____

_____

(4)

(b) The constellation Cassiopeia contains another star with an apparent magnitude of 2.2, absolute magnitude of –4.6 and a surface temperature of 12 000 K. Calculate, for this star,

(i) its distance from the Earth,

_____

_____

_____

(ii) the peak wavelength in its black body radiation curve.

_____

_____

_____

(3)
(Total 7 marks)