

Practice Question Set For A-Level

Subject : Physics

Paper-3 Topic: Section A(Practical Skills)

Name of the Student: _____

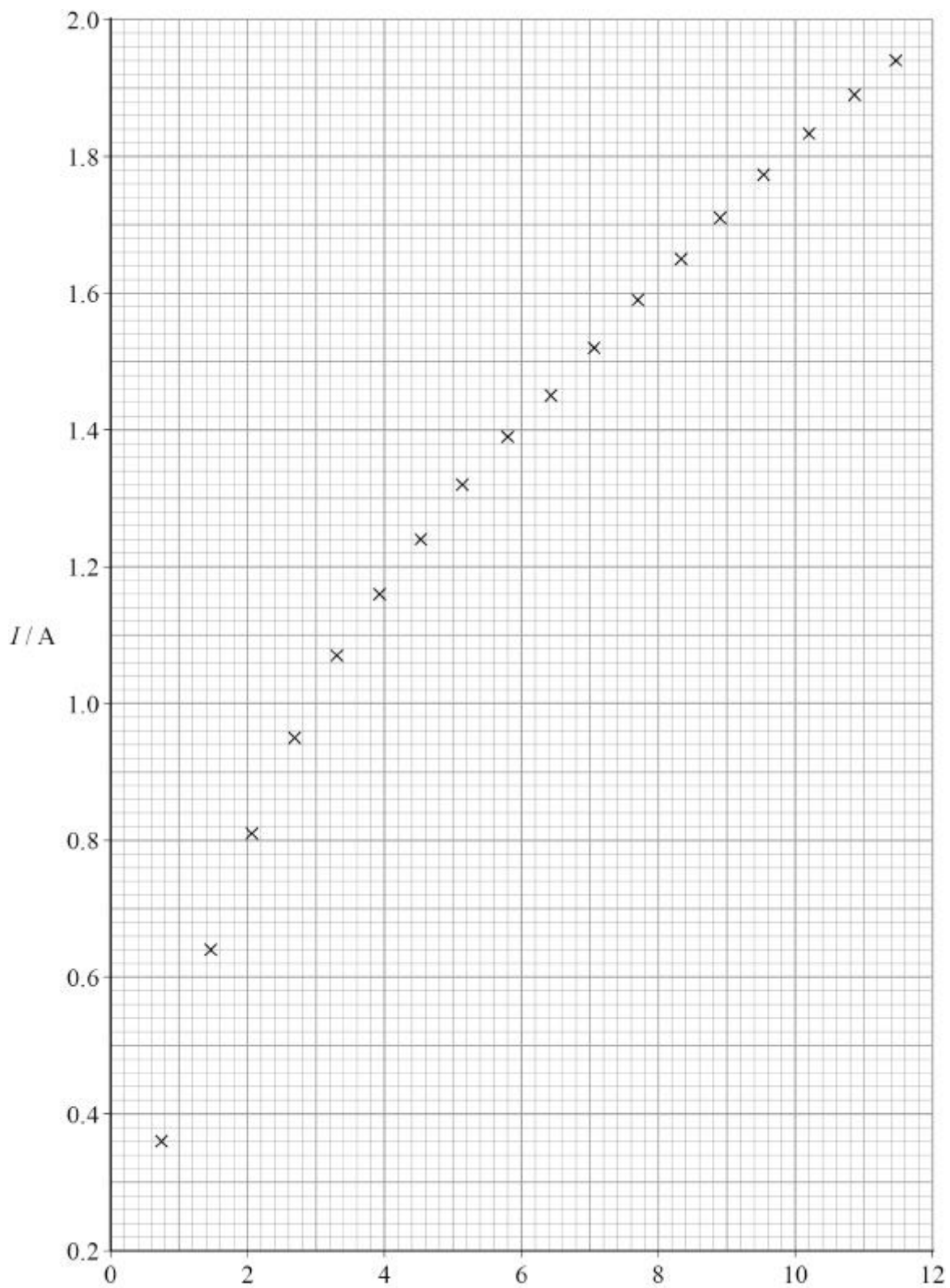
Max. Marks : 23 Marks

Time : 23 Minutes

Q1.

Figure 1 is a plot of current–voltage data for a filament lamp **L**.

Figure 1



The current I was measured as the voltage V across L was increased at a steady rate. These data were obtained using a current sensor and a voltage sensor connected to a data logger. The logger recorded data at a rate of 2.5 Hz.

- (a) Determine, in $V s^{-1}$, the rate of increase of V .

(4)

The table below shows some values of V that are plotted on **Figure 1** and corresponding results for I and for the power P dissipated in **L**.

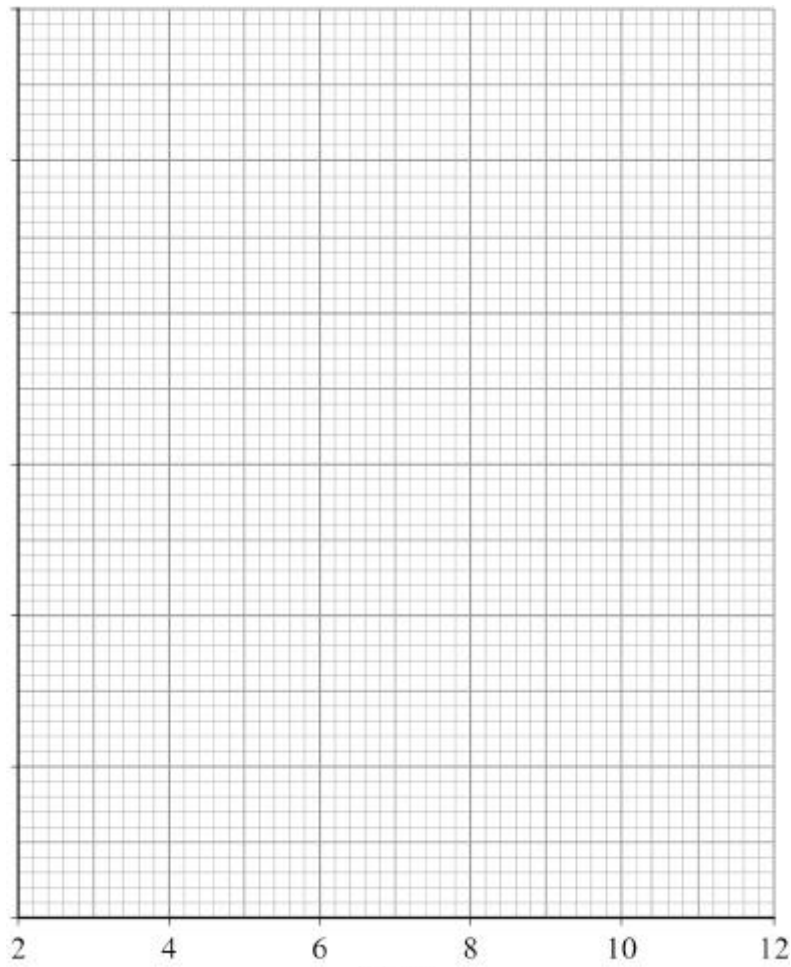
V/V	I/A	P/W
3.30	1.07	3.53
5.17	1.32	
7.69	1.59	12.2
9.58		
11.47	1.94	22.3

(d) Complete the table below above.

(3)

(e) Plot on **Figure 3** a graph of P against V .
You should use only the data in your completed table.

Figure 3



(3)

- (f) **L** is connected to a 12 V power supply of negligible internal resistance.
L then dissipates its rated power P_r .

A second lamp, identical to **L**, is now connected in series with **L**.

Determine the percentage of P_r that is dissipated in this circuit.

percentage = _____ %

(2)

(Total 16 marks)

Q2.

- (a) Draw a labelled diagram to define the parsec (pc).

The table below shows data for two stars: Rigel and the Sun.

Star	Surface temperature / K	Absolute magnitude	Mass / kg
Rigel	12 000	-7.84	3.6×10^{31}
Sun	5700	4.83	2.0×10^{30}

(b) State the spectral class of Rigel.

(1)

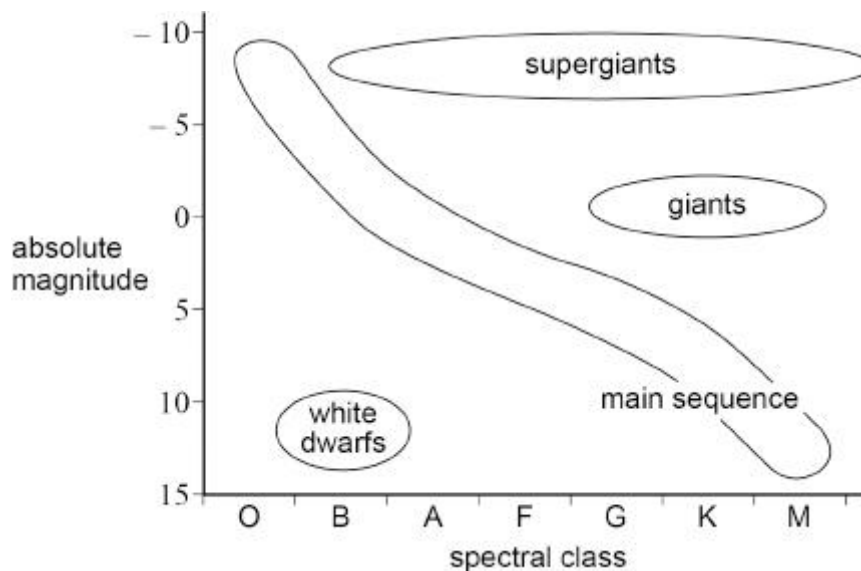
(c) The apparent magnitude of Rigel is 0.11

Calculate, in pc, the distance from Rigel to the Earth.

distance = _____ pc

(2)

(d) The figure below shows a Hertzsprung–Russell (HR) diagram.



Draw a line on the figure above to show the evolution of the Sun from formation to white dwarf.

(1)

(e) One stage in the evolution of Rigel includes the emission of a gamma ray burst.

Outline the circumstances during which a gamma ray burst will be emitted by Rigel.

(2)
(Total 7 marks)