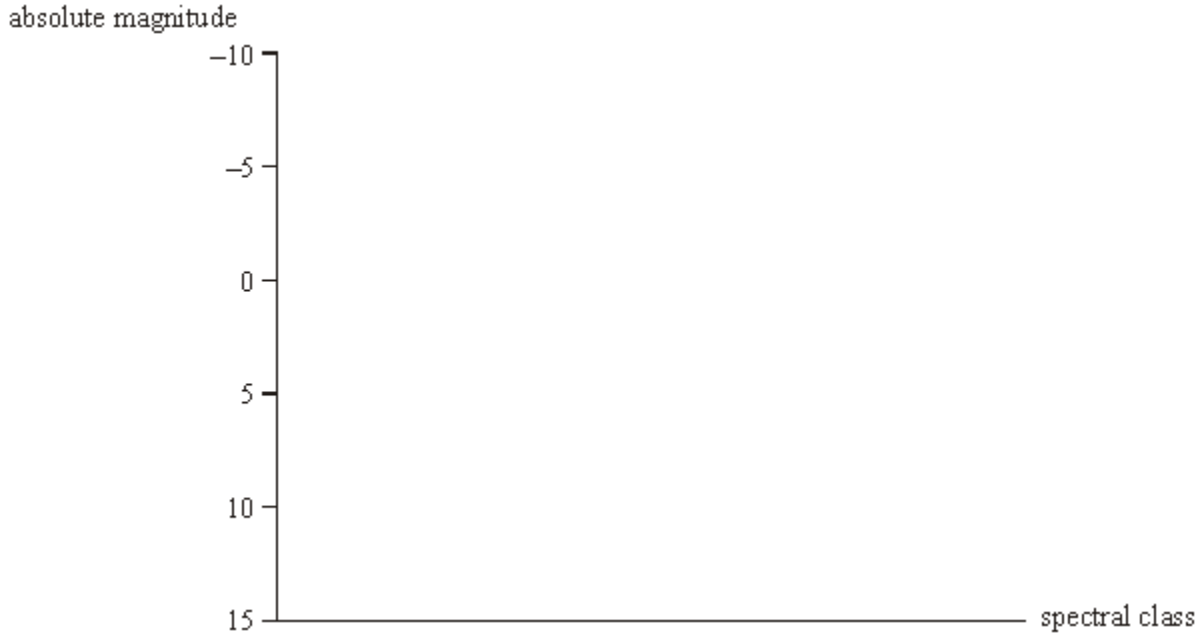
Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Q1.

(a) (i) On the axes below draw the Hertzsprung-Russell (H-R) diagram labelling the main sequence stars, dwarf stars and giant stars. Complete the horizontal axis by labelling the spectral classes.



(ii) On the H-R diagram, mark with an **X** the current position of the Sun and draw a line to represent the evolution of the Sun, from its formation to its eventual state as a white dwarf.

(4)

(b) Matar is a star in the same spectral class as the Sun.

(i) State **two** properties common to Matar and the Sun.

_____

_____

(ii) The distance to Matar is 330 light years. What is this distance in parsec?

_____

(iii) The apparent magnitude of Matar is 2.9. Calculate its absolute magnitude.

_____

_____

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(iv) Which is the larger star, Matar or the Sun? Explain your answer.

(6)
(Total 10 marks)

Q2.

An oscilloscope is connected to a sinusoidal ac source as shown in **Figure 1**.
The frequency and the voltage output of the ac source can be varied.

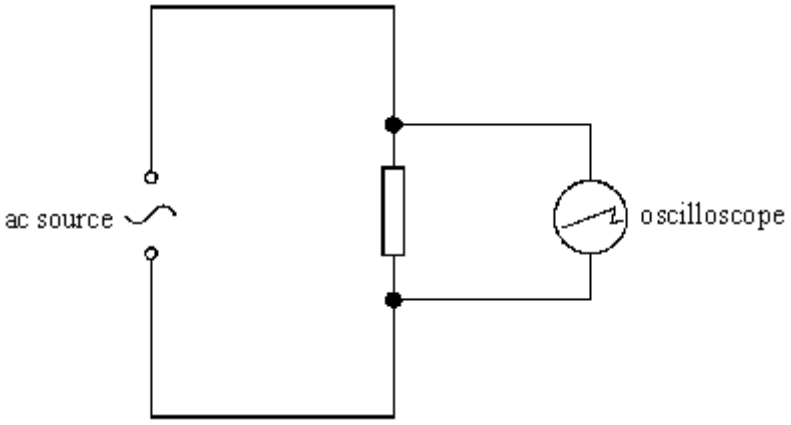


Figure 1

At a certain frequency the ac signal has an rms output of 7.1 V. **Figure 2** shows the trace obtained on the screen of the oscilloscope when one horizontal division corresponded to a time of 5.0 ms.

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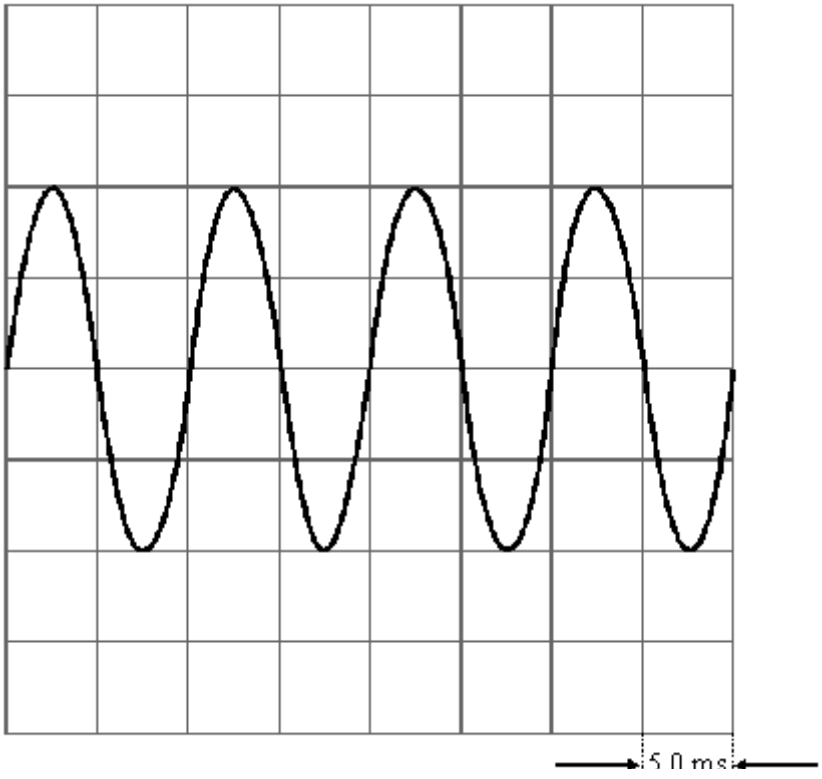


Figure 2

(a) Calculate, for the signal shown in **Figure 2**,

(i) the peak voltage,

_____

(ii) the frequency.

_____

_____

(3)

(b) The voltage output and frequency of the signal are now changed so that the peak voltage is 80 V and the frequency is 200 Hz.

State which **two** controls on the oscilloscope have to be altered so that **four** full cycles again appear on the screen but the peak to peak distance occupies the **full** screen.

Determine the values at which these two controls have to be set.

control 1: _____

value of the setting: _____

_____

_____

control 2: _____

value of setting: _____

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_____

_____

(5)

(Total 8 marks)

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