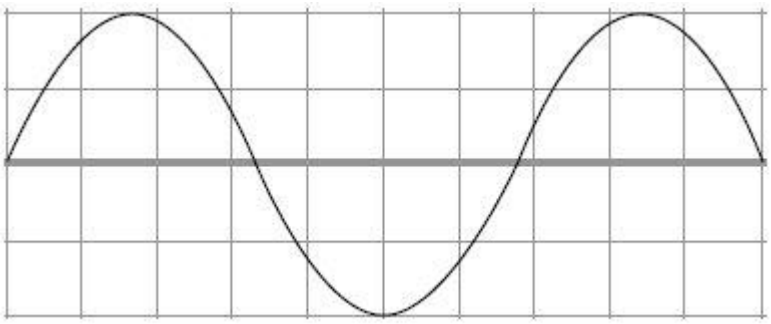
Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Q1.

The diagram below shows an ac waveform that is displayed on an oscilloscope screen.



The time base of the oscilloscope is set at 1.5 ms per division and the y-gain at 1.5 V per division.

(a) For the ac waveform shown,

(i) Calculate the frequency

_____

_____

_____

_____

answer _____ Hz

(3)

(ii) Calculate the peak voltage

_____

_____

_____

_____

answer _____ V

(2)

(iii) the rms voltage

_____

_____

_____

_____

answer _____ V

(2)

(b) State and explain the effect on the oscilloscope trace if the time base is switched off.

_____

_____

_____

_____

_____

_____

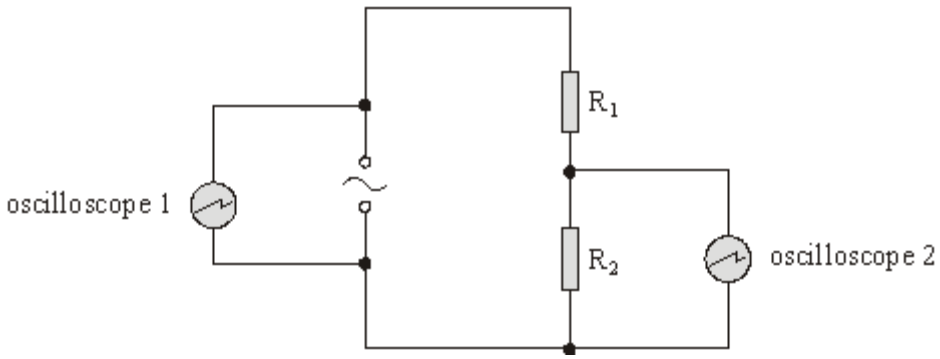
(2)

(Total 9 marks)

Q2.

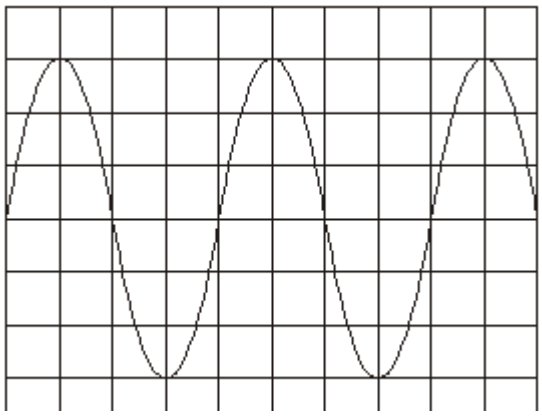
The circuit in **Figure 1** shows a sinusoidal ac source connected to two resistors, R_1 and R_2, which form a potential divider. Oscilloscope 1 is connected across the source and oscilloscope 2 is connected across R_2.

Figure 1



(a) **Figure 2** shows the trace obtained on the screen of oscilloscope 1. The time base of the oscilloscope is set at 10 m/s per division and the voltage sensitivity at 15 V per division.

Figure 2



For the ac source, calculate

(i) the frequency,

_____

_____

(ii) the rms voltage.

_____

_____

_____

(4)

(b) The resistors have the following values: R_1 = 450 Ω and R_2 = 90 Ω.
Calculate

(i) the rms current in the circuit,

_____

(ii) the rms voltage across R_2.

_____

(2)

(c) Oscilloscope 2 is used to check the calculated value of the voltage across R_2. The screen of oscilloscope 2 is identical to that of oscilloscope 1 and both are set to the same time base. Oscilloscope 2 has the following range for voltage sensitivity: 1 V per div., 5 V per div., 10 V per div. and 15 V per div.
State which voltage sensitivity would give the most suitable trace. Explain the reasons for your choice.

_____

_____

_____

_____

_____

(3)
(Total 9 marks)