PHYSICS 1003/1902
Circuits Test SAMPLE

Time allowed : 30 minutes Open book

<table>
<thead>
<tr>
<th>Surname</th>
<th>First Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>SID</td>
<td>Team No. (e.g. 6ENV12)</td>
</tr>
</tbody>
</table>

Duration 30 minutes / Open book test / No need to show working, only the final answer is checked / All numerical answers must have appropriate units and appropriate significant figures.

Question 1
Suppose you have a 9.0 V DC voltage source and two 22 kΩ resistors.

(a) Draw a circuit where the two resistors are connected in series and the combination connected to the voltage source.

![Circuit Diagram](image)

(c) What is the current flowing out of the voltage source?

0.20 mA

Question 2
You are given the following circuit elements:

![Circuit Diagram](image)

Draw a circuit diagram, using some or all of these elements, in which the voltmeter measures a voltage of 3.0 V.

![Circuit Diagram](image)
Question 3

What is the resonance frequency (in Hz) of this circuit? 

5.0 kHz (1 mark)

Question 4

Sketch the waveform you might see on the screen of an oscilloscope if the signal into the oscilloscope is sinusoidal, with a frequency of 100 Hz and an amplitude of 5.0 V, and the settings on the oscilloscope are 5 V/div and 2 ms/div.

(2 marks)

Question 5

Which of the graphs (a) to (d) best represents the ratio \( \frac{v_2}{v_1} \) vs \( f \) in this circuit?

The graph which best represents the ratio \( \frac{v_2}{v_1} \) vs \( f \) is (d) (1 mark)