Practice Question Set For A-Level
Subject : Physics
Paper-3 Topic: Section B (Section 13_ Electronics)

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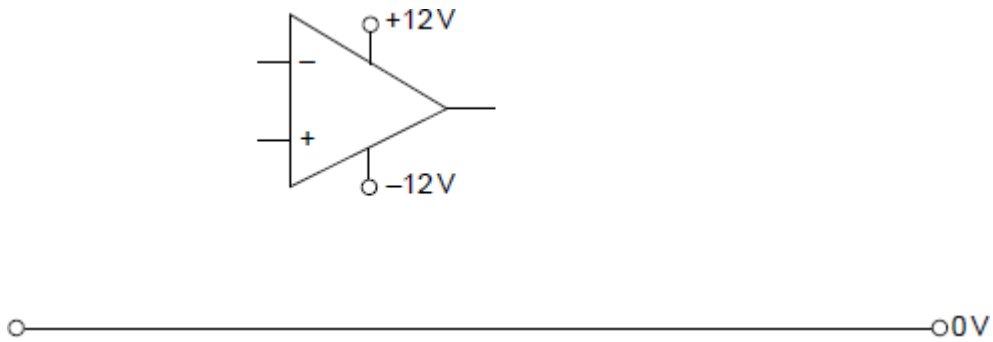
Name of the Student:_____
Max. Marks : 11 Marks **Time : 11 Minutes**

Q1.

A circuit is required to amplify the output voltage from a microphone by a factor of 100. The input resistance of the amplifier must be 4.7 kΩ to match the internal resistance of the microphone.

(a) In the space below, complete the circuit diagram of a suitable op-amp amplifier and give suitable resistor values to match the specification. The circuit can be inverting or non-inverting.



(4)

(b) The op-amp is powered by a ±12 V supply. Assuming an ideal op-amp is used, calculate the maximum amplitude of the input signal before the output becomes saturated.

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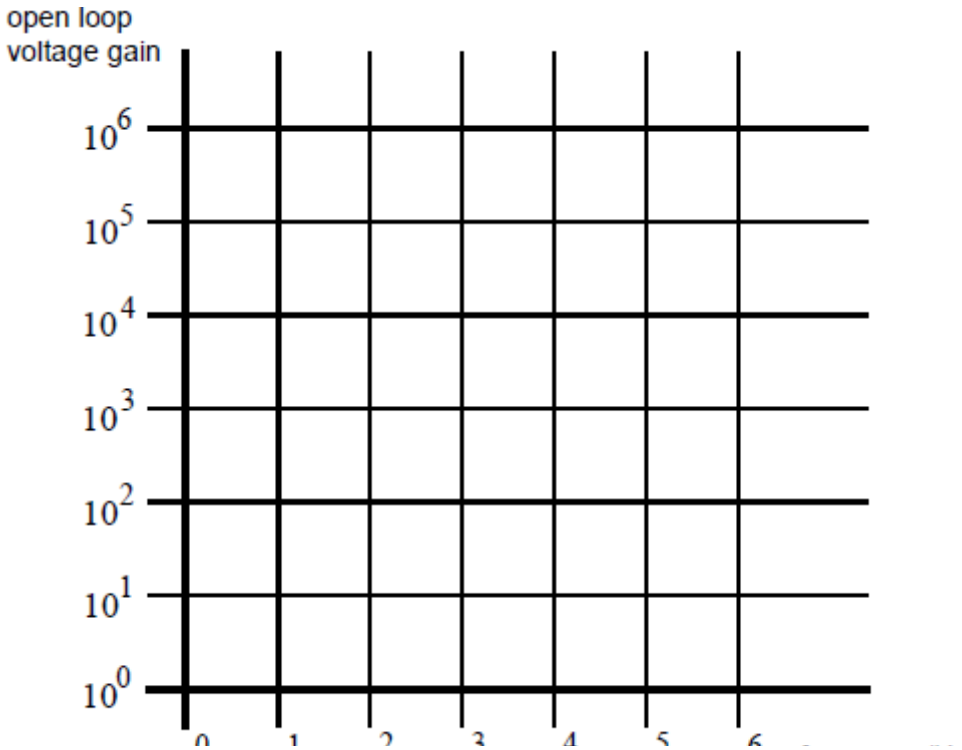
(2)

(c) The op-amp has a gain-bandwidth product of 1 MHz. Draw on the graph below how the open loop voltage gain of the op-amp varies with frequency.



(3)

(d) Calculate the frequency above which the voltage gain of the amplifier is less than 100.

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(2)

(Total 11 marks)