RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. SECOND SEMESTER EXAMINATION, MAY 2018

FIRST YEAR [BATCH 2017-20]

Date : 29/05/2018 **ELECTRONICS (General)**

Time : 11 am – 1 pm **Paper :** II Full Marks : 50

Answer <u>any five</u> of the following questions : [5×10]

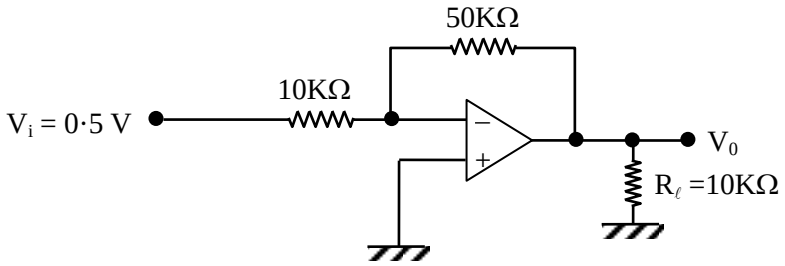
1. Answer **<u>any five</u>** of the following : [5×2]
   a) What do you mean by transistor biasing?
   b) Mention four advantages of negative feedback.
   c) What is oscillator? Give examples for Radio frequency (RF) and Audio frequency (AF) oscillators.
   d) Why is CMOS called 'complementary' MOS?
   e) State and explain Moore's law.
   f) Compare oscillators and multivibrators.

2. Write short notes on **<u>any two</u>** of the following : [2×5]
   a) Crystal oscillator
   b) TTL inverter
   c) Schmitt trigger
   d) Voltage and power amplifier

3. a) What do you mean by feedback in amplifier? What is the basic difference between positive and negative feedback? [3]
   b) Mention different feedback topologies or feedback circuit configurations with their schematic circuit diagrams. [4]
   c) Mention how positive feedback can be utilized for designing oscillators. [3]

4. a) What is Barkhousen criteria? [3]
   b) Discuss the working principle of Wien-bridge oscillator. [5]
   c) Compare Hartley and Colpitts oscillators. [2]

5. a) Design a non-inverting amplifier. Derive its voltage gain. [4]
   b)



   Calculate— i) Voltage gain
   ii) Load Current
   iii) Output Voltage [3×2]

6. a) Why power amplifiers are called large signal amplifiers? [1]
   b) What are the advantages of negative feedback in power amplifiers? [3]
   c) Explain the working principle of class-B Push-Pull power amplifier. [6]

7. a) Find the total harmonic distortion for an output signal having fundamental amplitude of 3·0V, the second harmonic amplitude of 1·5V, the third harmonic amplitude of 0·3V and the fourth harmonic amplitude of 0·03V. If the amplitude of the fundamental component of the output current is 2A,find the fundamental component of the output power and the total output power if $R = 10\Omega$. [5]

   b) State the working principle of a bistable multivibrator. [5]

8. a) Design a 2-input NAND gate with CMOS transistors. [3]

   b) Explain the working principle of voltage divider bias circuit with the help of its schematic diagram. Also obtain expressions of stability factors for the same. [4+3]

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