RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. SECOND SEMESTER EXAMINATION, MAY 2017

FIRST YEAR [BATCH 2016-19]

Date : 26/05/2017 **ELECTRONICS (General)**

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

Answer **any five** questions of the following: [5 X 10]

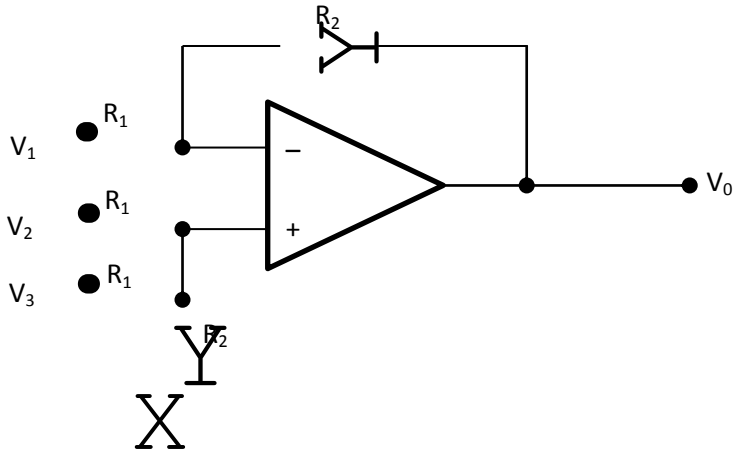
1. a) Define the following terms: Degenerative feedback and regenerative feedback. 2
   b) Give a comparative study of positive and negative feedback. 3
   c) Derive an expression between open-loop and close-loop voltage gain for a feedback amplifier. From that expression obtain the condition for which the amplifier will act as an oscillator. 3+2

2. a) How many feedback topologies are there? Mention names of those classes. 2
   b) Discuss any two feedback topologies with their schematic diagrams. 3+3
   c) What type of feedback is used in an OP-AMP adder circuit? Justify your answer. 2

3. a) "Negative feedback reduces the gain of an amplifier. Still this type feedback is widely used." Why? 3
   b) Compare ideal and practical properties of an OPAMP. 3
   c) Define and explain CMRR. Obtain its expression in terms of common-mode gain and difference signal gain. 4

4. Write short notes on **any two** of the following: 2 X 5
   a) Class AB amplifier.
   b) Offset null adjustment in OPAMP.
   c) Use of OP-AMP as differentiator and integrator.
   d) Hartley oscillator.

5. a) Design a non-inverting amplifier using OPAMP. How a unity gain buffer can be realised from the same. Define virtual ground. 3+2+1
   b) Obtain an expression for the output voltage for the following circuit: 4



6. a) What is meant by frequency stability of an oscillator? Why is the frequency stability of an oscillator high when piezoelectric crystal is used? 2+1

   b) Discuss working principle of phase-shift oscillator with the help of a schematic diagram. Obtain an expression for frequency of oscillation of the oscillator. 5+2

7. a) State the advantages of crystal oscillator. 2

   b) State the working principle of a Schmitt trigger. Obtain the hysteresis voltage for the circuit. 4+2

   c) An OPAMP inverting amplifier has an input resistor of 10KΩ and a feedback resistor of 50KΩ. If the input voltage is 1V, find the output voltage and the input current. 2

8. a) Design an astable multivibrator circuit using IC 555. Discuss its principle of operation. Obtain an expression for duty cycle of the multivibrator. 7

   b) Discuss how a square wave can be generated from the astable mutlivibrator. 3

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