RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

B.A./B.Sc. THIRD SEMESTER EXAMINATION, DECEMBER 2014

SECOND YEAR

Date : 19/12/2014 **ELECTRONICS (General)**

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

Answer **any five** questions :

1. a) What are the differences between Negative Feedback and Positive Feedback? [3]
   b) Mention the advantages of Negative Feedback. [3]
   c) The gain of an amplifier without feedback is 70 but with negative feedback it falls to 35. If due to ageing, the gain falls to 50, find the percentage reduction in the gain.
      i) Without negative feedback.
      ii) With feedback. [4]

2. a) A transistor working as class A amplifier has zero signal power dissipation of 12 watts. If output A.C. power is 6 watts, find
      i) Power rating of the transistor.
      ii) Collector efficiency of the transistor. [5]
   b) Describe the working principle of a class A transformer coupled power Amplifier in CE mode. [5]

3. a) What are the real characteristics of OP-AMP? [2]
   b) What is slew rate of OP-AMP? How is it related to the limitation of higher operating frequencies? [1+2]
   c) An OP-AMP has bandwidth of 1MHz and open loop gains A_0 = 100V/mv. Calculate the cut-off frequency of the OP-AMP. [5]

4. a) Derive the gain of an Inverting amplifier. Also mention the gain when the feedback resistor is disconnected or withdrawn from the circuit. [3+2]
   b) Derive and explain the application of OP-AMP as adder. [5]

5. a) What is Barkhausen Criteria for oscillation? [3]
   b) Explain the operation of Crystal oscillator mentioning the piezo electric effect. [5]
   c) What are the advantages of IC? [2]

6. a) In a Phase shift oscillator, each section has a resistor of 100K and a capacitor of $0 \cdot 05 \mu F$. Find
      i) operating frequency of the oscillator
      ii) the phase shift produced by each section of RC network. [6]
   b) Why RC oscillators cannot generate high frequency oscillations? [2]
   c) What is the difference between an oscillator and an multivibrator? [2]

7. Write short notes on **any two** of the following : [2×5]
   a) CMRR of OP-AMP
   b) Schmitt Trigger using OP-AMP
   c) Voltage & Power Amplifier
   d) Comparison of class A, B, AB and C transistor amplifiers.

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