

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

B.A./B.SC. THIRD SEMESTER EXAMINATION, DECEMBER 2012

SECOND YEAR

ELECTRONICS (General)

Date : 20/12/2012

Time : 11 am – 1 pm

Paper : III

Full Marks : 50

Answer **any five** questions :

1. a) What do you mean by feedback in an amplifier? What is the basic difference between positive and negative feedback?
b) State the advantages of negative feedback.
c) An amplifier with a negative feedback provides an output voltage of 5V with an input voltage of 0.2V. On removal of feedback, it needs only 0.1V input to give the same output. Determine—
i) voltage gain without feedback
ii) voltage gain with feedback
iii) feedback ratio [(1+2)+3+4]
2. a) Sketch the circuit of summer using an OP-AMP to get $V_0 = -V_1 + 2V_2 - 3V_3$, where V_1 , V_2 and V_3 are the input voltages and V_0 is the output voltage.
b) A differential dc amplifier has a differential mode gain of 100 and a common mode gain 0.01. What is its CMRR in dB?
c) Why is a high value of CMRR of an OP AMP required? [5+3+2]
3. Define the following terms in the context of an operational Amplifier : [5×2]
Input offset Voltage, Slew Rate, Input offset Current, Virtual ground, CMRR
4. a) Mention different feedback topologies.
b) If A_f is the voltage gain of an amplifier with feedback, prove that $A_f = A/(1+\beta A)$, where A is the open-loop gain and β is the reverse transmission factor. [4+6]
5. a) A transformer-coupled class A power amplifier draws a current of 200mA from a collector supply of 10V, when no signal is applied to it. Determine—
i) the maximum output power
ii) the maximum collector efficiency, and
iii) the power rating of the transistor
If a 2Ω - load resistance is connected across the transformer secondary and the transformer turns ratio is 5:1, comment on the impedance matching.
b) Distinguish between voltage and power amplifiers. [(4+2)+4]
6. a) State the Barkhausen criterion. How does an oscillator work?
b) Explain the operation of a phase-shift oscillator with suitable diagram. At what frequencies does a phase-shift oscillator operate and why? [(1+3)+(4+2)]
7. Write short notes on any two of the following : [5×2]
a) Schmitt Trigger using OPAMP
b) Crystal Oscillator
c) Integrator using OP-AMP
d) Push-pull amplifier.

