Code No: RT22041 **R13** SET - 1

II B. Tech II Semester Supplementary Examinations, Dec - 2015
ELECTRONICS CIRCUIT ANALYSIS
(Com. to ECE, EIE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1. a) Explain why RC Phase shift oscillators are not used at high frequencies. (4M)
   b) Define percent tilt and derive an expression for it. (4M)
   c) Show that band width decreases with cascading. (4M)
   d) What is Heat sink and explain its advantages. (4M)
   e) Derive the expression for harmonic distortion. (3M)
   f) Define Q factor. (3M)

PART –B

2. a) Find the voltage gain, input and output resistances of a emitter follower at high frequencies. (8M)
   b) A common source amplifier uses a MOSFET with the following parameters g_m=1.5mA/V, r_d=40kohms, C_{gs}=3pF, C_{ds}=1pF, C_{gd}=3.2pF. The value of R_d=200Kohms. The amplifier operates at 30KHz. Find Voltage gain, input resistance, output resistance and input capacitance. (8M)

3. a) With a neat circuit diagram. Explain about Boo-Strap emitter follower amplifier? (8M)
   b) Draw the circuit of a differential amplifier using BJT and derive an expression for CMRR. (8M)

4. a) Draw the block diagrams of four types of negative feedback amplifier circuits and explain the advantages and disadvantages with necessary derivations. (8M)
   b) Two FET based amplifiers with gains of 30 dB are cascaded together. Find the overall gain. Also find bandwidth of the overall circuit, if individual lower and higher 3 dB frequencies are 20 Hz and 20 kHz respectively. (8M)

5. a) Derive the expression for frequency of oscillation of BJT RC phase-shift oscillator with necessary explanation. (8M)
   b) What is the equivalent circuit of a crystal? Derive the expressions for series and parallel resonances. A crystal oscillator has the following parameters: L=0.33H, C=0.065pF, C_m=1.0pF and R=5.5 k ohm. i) Find the series resonant frequency. ii) Find the Q of the crystal. (8M)

6. a) A signal $i_b=I_m$ coswt is applied to a power amplifier with second order nonlinearity between i_b and i_c. Derive the expression for i_C and also derive ditrtion factor. (8M)
   b) Explain the operation of a class A power amplifier with necessary diagram. (8M)

7. a) Explain the operation of a single tuned amplifier circuit and its frequency Response. (8M)
   b) Show that for an "n" stage synchronously tuned amplifier, maximum Bandwidth is achieved if the single stage gain is 4.34 dB. (8M)

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