

II B. Tech II Semester Supplementary Examinations, November - 2019
ELECTRONIC 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 **FOUR** Questions from **Part-B**

~~~~~

**PART -A**

1. a) Write short notes on Hybrid  $\pi$  capacitances. (3M)
- b) What is Boot-strap emitter follower? (3M)
- c) What is thermal runaway? (2M)
- d) What is Heat sink and explain its advantages. (2M)
- e) What are the different types of Tuned Amplifiers? (2M)
- f) What are the effects of cascading double tuned amplifiers? (2M)

**PART -B**

2. a) Discuss in detail about the Validity of hybrid-  $\pi$  model. Also give typical values of hybrid-  $\pi$  conductances and capacitances. (7M)
- b) A common source amplifier uses a MOSFET with the following parameters  $g_m=1.5\text{mA/V}$ ,  $r_d=40\text{kohms}$ ,  $C_{gs}=3\text{pF}$ ,  $C_{ds}=1\text{pF}$ ,  $C_{gd}=3.2\text{pF}$ . The value of  $R_d=200\text{Kohms}$ . The amplifier operates at  $30\text{KHz}$ . Find Voltage gain, input resistance, output resistance and input capacitance. (7M)
3. a) Draw the circuit for CASCODE Amplifier. Explain its working, obtain overall values of the circuit in terms of h-parameters. (7M)
- b) Derive the effect of cascading on bandwidth of multistage amplifiers. (7M)
4. a) Draw the block diagrams of four types of negative feedback amplifier circuits and explain the advantages and disadvantages with necessary derivations. (7M)
- b) Two FET based amplifiers with gains of 40 dB are cascaded together. Find the overall gain. Also find bandwidth of the overall circuit, if individual lower and higher 3 dB frequencies are 40 Hz and 40 kHz respectively. (7M)
5. a) Derive the expression for frequency of oscillation of BJT RC phase-shift oscillator with necessary explanation. (7M)
- b) What is the equivalent circuit of a crystal? Derive the expressions for series and parallel resonances. A crystal oscillator has the following parameters:  $L=0.33\text{H}$ ,  $C=0.065\text{pF}$ ,  $C_m=1.0\text{pF}$  and  $R=5.5\text{ k ohm}$ . i) Find the series resonant frequency. ii) Find the Q of the crystal. (7M)
6. a) Derive the efficiency of a class A power amplifier with necessary diagram. (10M)
- b) What are the drawbacks of transformer coupled power amplifiers? (4M)

7. a) Compare single tuned inductively coupled amplifier with capacitive coupled single tuned amplifier? Highlight their merits. (7M)
- b) What is a stagger tuned amplifier? Explain its advantages and disadvantages. (7M)

