C 37064 (Pages 2) Name.....

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FOURTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION
JUNE 2004

EC 2K 404–ELECTRONIC CIRCUITS

(New Scheme)

Time : Three Hours Maximum : 100 Marks

Answer **all** *the eight questions in I ; each question carries 5 marks.*
Answer **either** *(a)* **or** *(b) of questions II to V ; each question carries 15 marks.*

I. a) What is the compensation technique against V_{BE} variation ? Draw circuit diagram and explain.

b) Derive *hie* and *hfe* in terms of CB parameters.

c) How do you derive the equivalent circuit of JFET ? Define its three parameters.

d) How is enhancement NMOSFET feedback biased ? Explain with neat diagram.

e) What are the two types of feedback applied in electronic circuits ? What is the need for each of them ? What are their advantages ?

f) What is the disadvantage of Hartley and Colpitt oscillators ? How is that overcome ? Draw circuit to explain.

g) What is cross over distortion ? Why does it occur ? How can that be taken care of ? Explain with the waveforms.

h) Explain briefly how does inductive loading help in widening the operating frequency range of an amplifier.

(8 × 5 = 40 marks)

II. a) Draw a two–stage transformer coupled amplifier using BJTs and derive the expression for its overall gain. Explain its operation.

(9 + 6 = 15 marks)

Or

b) Draw the small signal high frequency hybrid "pi" equivalent circuit and explain how each component is arrived at. Derive their values in terms of low frequency parameters. Derive the short circuit current gain of common emitter amplifier at HF.

(6 + 4 + 5 = 15 marks)

III. a) Explain all the biasing arrangements of JFET and MOSFET in all the three configurations.

(15 marks)

Or

b) Draw the high frequency equivalent circuit of common gate JFET amplifier and explain how is it obtained. Derive the expression for voltage gain and the maximum frequency that can be handled by this circuit. Justify with the help of expression that this offers the widest bandwidth.

(6 + 4 + 5 = 15 marks)

Turn over

IV. a) Draw the circuit diagram of an amplifier which is given current series feedback and justify. Explain its operation. Derive all the four parameters in terms of open loop values.

(6 + 4 + 5 = 15 marks)

Or

b) Draw a RC phase shift oscillator using FET and explain its operation. Derive the expression for the frequency of oscillations. What is the condition on g_m to be satisfied to sustain the oscillations ?

(6 + 4 + 5 = 15 marks)

V. a) Prove that the efficiency of class B power amplifier is much higher than that of class A, using derivations. What is maximum power hyperbola ? Draw its graph and explain.

(8 + 7 = 15 marks)

Or

b) What is wideband amplifier ? What is its need ? Why not we get wide band from RC coupled amplifiers ? Explain the mismatch technique of widening bandwidth.

(2 + 3 + 5 + 5 = 15 marks)

[4 × 15 = 60 marks]