Code No: 133AB **R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, May/June - 2019
ANALOG ELECTRONICS
(Common to ECE, ETM)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) What are the types of distortion in amplifiers? [2]
b) Write the difference between cascade and cascode amplifiers? [3]
c) Define Gain Bandwidth Product. [2]
d) What are the elements in the hybrid π model? [3]
e) Distinguish between enhance mode and depletion mode of MOSFET. [2]
f) What is folded Cascode amplifier? [3]
g) What is meant by positive and negative feedback? [2]
h) What are the conditions for oscillation? [3]
i) Compare class A and class B amplifier. [2]
j) Define Q-Factor in tuned amplifiers. [3]

PART-B

(50 Marks)

2. Draw the h-parameter equivalent circuit for a typical common emitter amplifier and derive expression for A_i, A_V, R_i and R_O. [10]

OR

3.a) For any transistor amplifier, Prove that $R_i = (h_i/1-h_rA_v)$
b) Draw the circuit diagram of RC coupled amplifier. Explain the operation and its frequency response. [5+5]

4. Derive the expression for the CE short circuit gain A_i as a function of frequency using hybrid – π model. [10]

OR

5.a) In hybrid 'Pi' model of a transistor at high frequencies, show that the g_m is proportional to collector current.
b) Mention important characteristics of CE amplifier. [5+5]

6.a) With the help of a neat diagram explain the operation of an n-channel enhancement type MOSFET.
b) Explain how you set a Q point in a self- biased JFET. [5+5]

OR

7.a) Derive the relation between u and g_m of JFET amplifier.
b) A JFET has a drain current of 6mA. If I_{DSS} = 12mA and V_P = 4V find:
i) V_{GS}
ii) For an n-channel amplifier FET I_{DSS}=5.8 mA, V_P=-3V and V_{GS}=-2V find I_D and g_m. [5+5]

8.a) An amplifier has a midband gain of 125 and a bandwidth of 250KHz. If 4% negative feedback is introduced, find the new bandwidth and gain.

b) Derive an expression for frequency of oscillations of a RC phase shift oscillators. [5+5]

OR

9.a) What are the advantages and disadvantages of the introduction of negative feedback in amplifiers? Explain.

b) Draw and explain the operation of Colpitt's oscillator. [5+5]

10. Draw the circuit diagram of class B push pull amplifier and explain its operation. Also prove that its conversion efficiency is 78.5%. [10]

OR

11.a) Explain the principle of operation of class-AB power amplifier with a neat sketch.

b) Discuss in detail about frequency response of tuned amplifiers. [5+5]

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