



Regulation R18

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous, Accredited by NAAC with 'A' Grade)

Subject code: 2P3DC

B.Tech III Semester Regular/Supplementary Examinations, February 2021

ANALOG ELECTRONIC CIRCUIT ANALYSIS **(Electronics and Communication Engineering)**

Maximum Marks: 70

Date: 22.02.2021 Duration: 3 hours

Note: 1. This question paper contains two parts A and B.

2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.

3. Part B consists of 5 Units. Answer any one full question from each unit.

4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 Mention the effect of coupling capacitors on the bandwidth of the amplifier.
- 2 List the features of Darlington pair amplifier.
- 3 Write the general frequency considerations of an amplifier.
- 4 Why CE amplifier is generally preferable?
- 5 Draw the high frequency equivalent circuit of FETs
- 6 Draw the small signal model of a MOSFET considering second order effects.
- 7 What are the advantages and disadvantages of negative feedback.
- 8 What is Barkhausen Criteria.
What is a harmonic distortion? How even harmonics is eliminated using push- pull circuit?
- 9
- 10 Define Q-factor.

Part-B

Answer All the following questions.

(10M X 5=50Marks)

- 11.a Define h-parameter of a transistor in a small signal amplifier. What are the benefits of h-parameters? 5M
- 11.b Explain about different types of distortions that occur in amplifier circuits. 5M

OR

12. A darlington emitter follower circuit uses two identical transistor having the following h parameters $h_{ie}=1.1K$, $h_{re}=2.2 \times 10^{-4}$, $h_{fe}=50$, $h_{oe}=20\mu V/A$, $R_{E2}=3K\Omega$, $R_S=400\Omega$, $R_1=90K\Omega$, $R_2=10K\Omega$ Compute overall A_I & A_V , R_i , R_o & R_{ot} 10M
- 13.a Explain in detail with neat diagram frequency response of BJT amplifier. Discuss the significance of cut off frequencies and Bandwidth of the amplifier. 8M
- 13.b Write the expression of gain bandwidth product for voltage 2M

OR

14. Obtain an expression for CE short circuit current gain. 10M

15.a Explain the operation of common source FET amplifier with neat diagram. 5M
Derive the expression for voltage gain

15.b Draw the circuit for Cascode Amplifier. Explain its working, obtaining overall 5M
values of the circuit in terms of h-parameters.

OR

16.a A common source amplifier uses a MOSFET with the following parameters 8M
 $g_m=1.5\text{mA/V}$, $r_d=40\text{kohms}$, $C_{gs}=3\text{pF}$, $C_{ds}=1\text{pF}$, $C_{gd}=3.2\text{pF}$. The value of
 $R_d=200\text{Kohms}$. The amplifier operates at 30KHz . Find Voltage gain, input
resistance, output resistance and input capacitance

16.b Differentiate between cascode and folded cascode configurations. 2M

17. Explain different negative feedback topologies with neat diagrams 10M

OR

18. Draw the circuit diagram and derive the expression for frequency of oscillation 5M
and condition for sustained oscillations of 5M

i) Colpitts oscillator

ii) Hartley Oscillator

19 In a class B complementary power amplifier $V_{cc}=+15\text{V}$, $-V_{cc}=15\text{V}$ and $R_L=4\Omega$. 10M
Calculate

(i) Maximum a.c power which can be developed

(ii) Collector dissipation while developing maximum a.c power

(iii) Efficiency

(iv) Maximum power dissipation per transistor

OR

20 Draw the circuit for Single Tuned Amplifier. Explain its working. 10M