Printed Pages: 02 **Sub Code: EEC401**
Paper Id: 131406 **Roll No.** | | | | | | | | | | |

BTECH
(SEM IV) THEORY EXAMINATION 2017-18
ELECTRONIC CIRCUITS

Time: 3 Hours ***Total Marks: 100***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10= 20

a) Define Power Supply Rejection Ratio (PSRR)?
b) What are the characteristics of an Ideal op-amps?
c) What is meant by drain-source saturation current?
d) How is threshold voltage of the MOSFET adjusted?
e) What is the significance of transistor biasing?
f) Define the Beta of a transistor? expression
g) Write the expression for voltage gain with negative and positive feedback?
h) What is the Barkhausen criterion for oscillation?
i) What are the basic topology of feedback?
j) Draw the small signal model of BJT?

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30

a) Explain the working of an op-amp inverting amplifier? Derive the expression for its voltage gain?
b) Draw and Explain the transfer characteristic of a MOSFET operation in enhancement mode?
c) For a fixed bias circuit using NPN transistor, the value of β is 80. If R_b=390KΩ, R_c= 1.5KΩ and V_{cc}=30V. find the coordinates of the Q-Point.
d) Discuss the different Differential amplifier configuration? Which is most commonly used and why?
e) What is an oscillator? How does it differ from an amplifier? What are the essential parts of an oscillator circuit?

SECTION C

3. Attempt any *one* part of the following: 10 x 1=10

a) Why op-amps are used generally in closed loop configuration? Explain?
b) Determine the voltage gain, input resistance, output resistance and bandwidth of the inverter. The IC op-amp connected in the circuit has the following parameter- $A=2x10^5$ R_i=2MΩ R_0=75Ω f_0=5Hz.

4. Attempt any *one* part of the following: 10 x 1=10

a) Explain Frequency response of a Common Source Amplifier?
b) Compare between (i) NMOS and PMOS (ii) JFET and MOSFET

5. Attempt any *one* part of the following: 10 x 1=10

a) Explain EBERS-MOLL Model of a transistor?

b) Explain how device capacitance plays dominant role in CE amplifier in high frequency region?

6. Attempt any *one* part of the following: 10 x 1=10

a) Discuss the circuit diagram of an active load in a differential amplifier?

b) Determine the output voltage of an op-amp for the input voltage of V_1=150μV, V_2=140μV. The amplifier has a differential gain of 4000 and the value of CMRR is (i) 100 and (ii) 10^5

7. Attempt any *one* part of the following: 10 x 1=10

a) Discuss the effect of negative feedback on voltage gain, stability, distortion, bandwidth, output and input impedance of an amplifier?

b) Draw and discuss indetail the circuit of an RC phase shift oscillator?