Reg. No. : [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

Question Paper Code : 50436

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

Third Semester

Electronics and Communication Engineering

EC6304 – ELECTRONIC CIRCUITS – I

(Regulations 2013)

Time : Three Hours   Maximum : 100 Marks

Answer ALL questions

PART – A   (10×2=20 Marks)

1. What is operating point ?

2. What is thermal runaway ?

3. What is bypass and coupling capacitor ?

4. List the need for boot strapping in amplifier.

5. What is BiMOS ?

6. A self biased P-channel JFET has a pinch off voltage of 5V and $I_{DSS} = 12$ mA. The supply voltage is 12 V. Determine the values of resistors R_D and R_S, so that $I_D = 5$ mA and $V_{DS} = 6$ V.

7. What is Miller effect ?

8. What is unity gain amplifier ?

9. Draw the symbols of PMOS and NMOS.

10. What is active loading ?

PART – B   (5×13=65 Marks)

11. a) With a neat diagram explain the voltage divider biasing and calculate the stability factor for BJT.

(OR)

b) With a neat diagram explain the source and drain resistance biasing of MOSFET.

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12. a) With a neat diagram explain the small signal analysis of common emitter amplifier and derive the necessary equations to calculate the voltage gain, input and output impedance.

(OR)

b) With a neat diagram explain the operation of differential amplifier and derive the necessary equations to calculate the CMRR.

13. a) With a neat diagram explain the small signal analysis of common source amplifier with a source resistance for MOSFET.

(OR)

b) With a neat diagram explain the source follower amplifier using MOSFET and derive the necessary equations to calculate the voltage gain, input and output resistance.

14. a) Explain the high frequency response of common emitter amplifier and derive the necessary equations to calculate the upper 3-dB frequency.

(OR)

b) Define f_α and f_β and f_τ. Also derive for f_α, f_β and f_τ with two source terminal and one sink terminal and derive for source and sink terminal currents as a function of reference current.

15. a) Explain the basic MOSFET current steering circuit.

(OR)

b) Explain and derive for AV for CG NMOS amplifier with following active loads
   i) Diode connected enhanced PMOS.
   ii) Depletion PMOS.

PART – C   **(1×15=15 Marks)**

16. a) Design a differential amplifier using CMOS and calculate the CMRR.

(OR)

b) What is cascade amplifier ? Explain with necessary equations and explain how to determine its bandwidth.

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