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**Question Paper Code : 27191**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Third Semester

Electronics and Communication Engineering

EC 6304 — ELECTRONIC CIRCUITS — I

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Why is the operating point selected at the Centre of the active region?
2. Define Stability factor.
3. How are amplifiers classified according to the transistor configuration?
4. State Miller's Theorem.
5. Compare the features of three MOSFET amplifier configurations.
6. How does a transistor width-to-length ratio affect the small signal voltage gain of a common source amplifier?
7. Give relation between rise time and bandwidth.
8. Draw the hybrid  $\pi$  equivalent circuit of BJTs.
9. Mention the different types of active loads.
10. Draw a NMOS current source.

PART B — (5 × 16 = 80 marks)

11. (a) Why biasing is necessary in BJT amplifier? Explain the concept of DC & AC load line with neat diagram. How will you select the operating point, explain it using CE amplifier characteristics? (16)

Or

- (b) Describe in detail the various types of bias compensation circuits with neat illustration. (16)

12. (a) Enumerate in detail and derive expression for voltage gain of CS and CD amplifier under small signal low frequency condition. (16)

Or

- (b) Explain in detail the transfer characteristics of differential amplifier. Explain the methods used to improve CMRR. (16)

13. (a) Draw a common Gate MOSFET amplifier and derive for  $A_{vs}$ ,  $A_{is}$  and  $R_o$  using small signal equivalent circuit. (16)

Or

- (b) Explain with circuit and equivalent circuit BIMOS Cascode amplifier. Also derive for  $G_M$  and  $R_o$  of the amplifier. (16)

14. (a) With neat sketch explain hybrid  $\pi$  CE transistor model. Derive the expression for various components in terms of 'h' parameters (16)

Or

- (b) Explain the high frequency analysis of JFET with necessary circuit diagram and gain bandwidth product. (16)

15. (a) Discuss the operation of MOS differential amplifier with active and derive for CMRR. (16)

Or

- (b) Explain in detail the operation of CMOS common source and source follower with neat diagram and derive for  $A_v$ . (16)