

D 32982

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Name.....

Reg. No.....

THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION
DECEMBER 2012

AI 04 306—ELECTRONIC CIRCUITS
(2004 admissions)



Time : Three Hours

Maximum : 100 Marks

Answer all questions.

1. (a) (i) Write general characteristics of an ideal amplifier.
(ii) Define amplifier. Write their classification.
 - (b) Compare low frequency CS and CD amplifier.
 - (c) Write notes on hybrid- π capacitances.
 - (d) Briefly explain the principles of cascade, cascade amplifier.
 - (e) Sketch a CMOS inverter and explain its operation.
 - (f) Draw the high frequency model of MOSFET. Explain the effect of internal capacitances.
 - (g) Write the advantages and application of differential amplifier. Define A_c , A_d , CMRR.
 - (h) Compare MOS differential amplifier with BiCMOS amplifier.
- (8 × 5 = 40 marks)

2. (a) Draw the equivalent circuit of a transistor amplifier using h -parameters and derive expressions for A_v , A_i , R_i and R_o .
- (15 marks)

Or

- (b) (i) Draw the small signal low frequency equivalent circuit and derive A_V using CS amplifier. (8 marks)
 - (ii) Draw the circuit of Darlington emitter follower. Write its advantages and disadvantages. (7 marks)
3. (a) (i) Derive expression for short circuit current gain (A_{I_s}) as a function of frequency. (8 marks)
 - (ii) Derive f_{α} , f_{β} and f_T . (7 marks)

Or

- (b) (i) A CS amplifier uses a MOSFET having following parameters :
 $g_m = 1.5 \text{ mA/volt}$, $r_d = 40 \text{ k}\Omega$, $C_{gs} = 3 \text{ PF}$, $C_{ds} = 1 \text{ PF}$ and $C_{gd} = 3.2 \text{ PF}$.
The drain resistance $R_d = 2000 \text{ k}\Omega$ and amplifier operates at 30 kHz. Compute A_v , Input admittance input capacitance, output admittance. (8 marks)
- (ii) Explain the principles of transformer coupled amplifier. (7 marks)

Turn over

4. (a) Explain in detail the construction, working principle of enhancement type MOSFET. Draw V-I characteristics.

(15 marks)

Or

- (b) (i) Explain biasing in MOSFET amplifier. (7 marks)

- (ii) Explain in detail the construction, working principle of UJT. Explain how UJT act as an relaxation oscillator.

(8 marks)

5. (a) What is differential amplifier and explain small signal and large signal operation of differential amplifier.

(15 marks)

Or

- (b) Discuss about :

- (i) Non-ideal characteristics of differential amplifier. (7 marks)

- (ii) MOS differential amplifier. (8 marks)

[4 × 15 = 60 marks]