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Question Paper Code : 71446

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2015.

Third Semester

Electronics and Communication Engineering

EC 2205/EC 36/080290011 — ELECTRONIC CIRCUITS – I

(Common to Medical Electronics Engineering)

(Regulation 2008)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the factors to be considered to design a biasing circuit?
2. Define operating point.
3. Draw the h-parameter equivalent circuit for common emitter amplifier.
4. State Miller's theorem.
5. Discuss the effect of bypass capacitor on bandwidth of the amplifier.
6. If the mid band gain of an amplifier is 100 and the half power frequencies are $f_L = 40$ Hz and $f_H = 16$ KHz. Calculate the amplifier gain at 20 Hz and 20 KHz frequency.
7. Define conversion efficiency of power amplifier.
8. What is cross over distortion in class B power amplifier?
9. Define PIV.
10. What are the advantages of SMPS over linear regulators?

PART B — (5 × 16 = 80 marks)

11. (a) Define Stability factor. Calculate the operating point for the voltage divider biasing circuit shown in fig 1. Assume that the transistor is a silicon transistor with $\beta_{dc} = 100$, $R_1 = 9.1K\Omega$, $R_2 = 4.7 K\Omega$, $R_c=1K\Omega$, $R_E=560\Omega$, $V_{cc} = 10 V$. Find its Stability factor. (2+10+4)

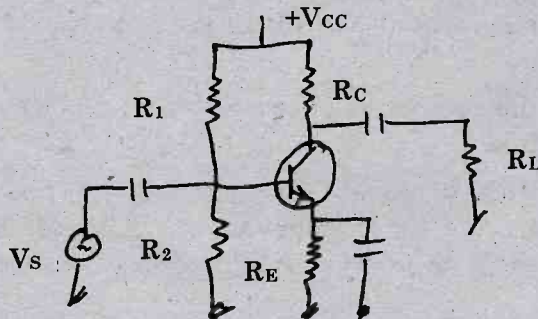


Fig. 1

Or

- (b) What is bias Compensation? Explain diode compensation

(i) for V_{BE}

(ii) for I_{co} .

(2+7+7)

12. (a) For the amplifier shown in fig 2, Calculate :

(i) The overall current gain(A is)

(4)

(ii) Overall voltage gain(A vs)

(4)

(iii) Overall input resistance R_i'

(4)

(iv) Overall output resistance R_o' .

(4)

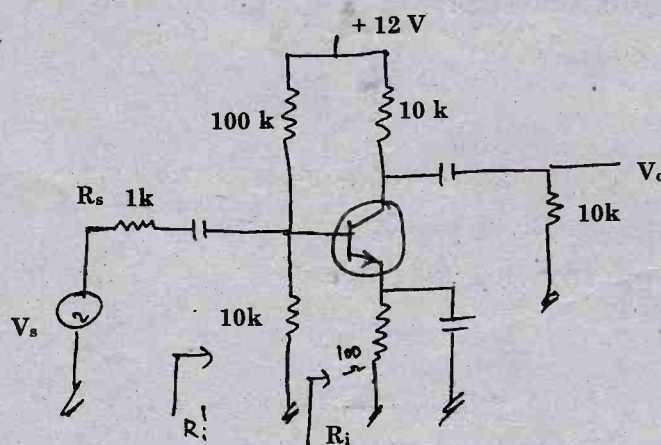


Fig. 2

Or

- (b) Explain the operation of emitter coupled difference amplifier with constant current load to improve stability. Briefly explain the transfer characteristics of a differential amplifier. (10+6)

13. (a) Show that the maximum efficiency of transfer coupled amplifier is 50%. Discuss the advantages and disadvantages of transfer coupled class A amplifier. (10+6)

Or

- (b) With a neat circuit diagram explain the working of class B push-pull power amplifier. What are its advantages and disadvantages? (10+6)
14. (a) (i) Derive the relation between rise time and upper 3 db frequency of an amplifier. (10)
- (ii) Four identical stages are cascaded. The lower and upper 3 dB frequencies of each stage are 40 Hz and 20 KHz respectively. Calculate the overall bandwidth of the cascaded amplifier. (6)

Or

- (b) Derive expression for upper and lower cutoff frequencies of a capacitively coupled multistage amplifier. (16)
15. (a) A half wave rectifier circuit is supplied from 230V, 50Hz supply with a stepdown ratio of 3:1 to resistive load of $10K\Omega$. The diode forward resistance is 75Ω while transformer secondary resistance is 10Ω . Calculate :
- (i) The maximum value of current (2)
- (ii) Average value of current (2)
- (iii) RMS value of current (2)
- (iv) d.c output voltage (2)
- (v) Rectification efficiency (4)
- (vi) Ripple factor. (4)

Or

- (b) With a neat circuit diagram. Explain the working of :
- (i) Buck switching regulator (8)
- (ii) Boost switching regulator. (8)