Code No: 124AE

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, December - 2018
ELECTRONIC CIRCUITS
(Electrical and Electronics Engineering)

Time: 3 Hours   Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A
(25 Marks)

1.a) Compare CB,CE and CC amplifiers in terms of input and output impedances.   [2]
  b) What is the effect of negative feedback on Nonlinear distortion?   [3]
  c) State Miller's theorem.   [2]
  d) Define the parameters f_β, f_α and f_T.   [3]
  e) What are the applications of Multivibrators?   [2]
  f) What is the effect of diode characteristics on clamping voltage?   [3]
  g) Why heat sinks are required?   [2]
  h) What is mean by cross-over distortion?   [3]
  i) Why damper diodes are used at the output of the transistor switches?   [2]
  j) How the saturation parameters of transistor are vary with temperature?   [3]

PART-B
(50 Marks)

2.   Draw the circuit diagram and low frequency equivalent circuit of common collector amplifier and derive the equations for voltage gain, current gain, input resistance and output resistance.   [10]

OR

3.a) Prove that $A_{If} = A_I$ for voltage series feedback , with Rs=0.
  b) An amplifier with open-loop voltage gain A_v=1000±100 is available. It is necessary to have an amplifier whose voltage gain varies by no more than ±0.1 percent. Find the reverse transmission factor of the feedback network used and also find the gain with feedback?   [5+5]

4.   Prove that the CC short circuit current gain as a function of frequency is given by $A_{ic} = \dfrac{\alpha_{co}}{1+j\frac{f}{f_e}}$ where $\alpha_{co} = \dfrac{1}{1-\alpha_o}$ and $f_e = f_\alpha = f_\beta$.   [10]

OR

5.   A silicon transistor has h_{fe}= 100, and g_m =50mA/V at room temperature. If the values of hybrid π capacitances are C_e=100pf and C_c=3pF, find the values of f_β and f_T.   [10]

6.a) What is the main limitation of the collector coupled astable multivibrator to be used as a square wave generator?
   b) Explain the operation of a collector coupled transistor monostable multivibrator with the help of neat circuit diagram and waveforms. [5+5]

OR

7. Explain the working of various diode clipping circuits that operate with two independent clipping levels with neat circuit diagrams and waveforms. [10]

8.a) A transistor supplies 0.85W to a 4K load. The zero-signal dc collector current is 31mA, and the dc collector current with signal is 34mA. Determine the percent second-harmonic distortion.
   b) What is the maximum conversion efficiency of a class B push-pull amplifier? Prove it. [5+5]

OR

9.a) A signal $v(t) = Ve^{\frac{-t}{T}}$ is applied to a double differentiator. Find the output if $\tau = R_1C_1 = R_2C_2$. Plot the response and locate any minima.
   b) Consider a pulse waveform as input to the RC high pass filter. Obtain the expression for the negative jump in the response at t=tp. [5+5]

10. Explain how the diode is used as a switch and indicate the switching regions in diode V-I characteristics. [10]

OR

11. What are the different timing parameters of transistor switch? Define them and draw the switching response. [10]

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