

R13

Code No: 114AE

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B.Tech II Year II Semester Examinations, May-2015****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) Classify amplifiers. [2M]
- b) What are the general characteristics of negative feedback amplifiers? [3M]
- c) Discuss the effect of bypass capacitor on low frequency response [2M]
- d) Explain about Hybrid- π model. [3M]
- e) What are the other names for monostable multivibrator? [2M]
- f) State Clamping circuit theorem. [3M]
- g) Discuss the importance of heat sinks. [2M]
- h) When does low pass circuit act as an integrator? [3M]
- i) What do you mean by turn on time of a transistor? [2M]
- j) Distinguish between Avalanche breakdown and Zener breakdown [3M]

Part-B**(50 Marks)**

- 2.a) Draw the CC amplifier and derive the expression for A_i , R_i , A_v , Y_o .
- b) A CE amplifier is drawn by a voltage source of internal resistance $R_S = 800$ ohms and load impedance is a resistance $R_L = 1000$ ohms. The h-parameters are $h_{ie} = 1.0K$ ohms, $h_{re} = 2 \times 10^{-4}$, $h_{fe} = 50$ and $h_{oe} = 25 \mu A/V$. compute A_i , R_i , A_v , R_o and R_o using exact analysis. [5+5]

OR

- 3.a) Explain the principle of negative feedback in amplifiers. Show quantitatively the effect of negative feedback on (i) Gain (ii) Stability (iii) Noise (iv) Distortion.
- b) Discuss the effect of current-series negative feedback on input and output impedance. [5+5]

4. Derive all components in the Hybrid- π model in terms of h parameters in CE configuration. [10]

OR

- 5.a) Derive the expression for lower 3dB frequency of a CE amplifier due to C_e .
- b) For CE amplifier calculate the mid frequency voltage gain and lower 3db Frequency. The transistor has h-parameters of $h_{ie} = 10 K$ ohms, $h_{fe} = 400$. The circuit details are $R_S = 600$ ohms, $R_1 = 15K$, $R_2 = 2.2K$ and $C_E = 50 \mu F$. [5+5]

- 6.a) Derive the expressions for UTP and LTP of a Schmitt trigger.
b) Show that an Astable Multivibrator can be used as a voltage to frequency converter. [5+5]

OR

- 7.a) With help of a neat circuit diagram and waveforms explain the operation of a transistor clipper.
b) Design and draw a diode clipper circuit to clip the given input voltage of $10\sin\omega t$ at +3V and -5V level. Sketch the waveforms neatly. [5+5]

- 8.a) Describe the operation of Class B Push pull amplifier and show how even Harmonics are eliminated?
b) What are the drawbacks of transformer coupled power amplifier. [5+5]

OR

- 9.a) Derive the expression for the percentage tilt of the output of high pass circuit with large time constant excited by a symmetrical square wave with zero average value.
b) 1 kHz square wave output from an amplifier has rise time $t_r = 350$ ns and tilt=5%. Determine the upper and lower 3-db frequencies. [5+5]

- 10.a) Explain the operation of transistor switch in saturation.
b) For a common emitter amplifier, $V_{cc} = 15V$, $R_c = 1.5k\Omega$ and $I_B = 0.3$ mA.
i) Determine the value of $h_{FE(min)}$ for saturation to occur.
ii) If R_c is changed to 500Ω will the transistor be saturated. [5+5]

OR

- 11.a) Explain in detail about piece-wise linear diode characteristics.
b) Discuss in detail about breakdown voltages of a transistor. [5+5]

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