Code No: 114AE

**R13**

**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-$\pi$ 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 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-$\pi$ 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 10sinwt at +3Vand -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 draw backs 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, $R_c$ = 1.5kΩ 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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