

SUBJECT: ELECTRONIC DEVICES AND CIRCUITS (EC 241)

(NEW SCHEME)

19<sup>TH</sup> May, 2016

## Time: 3 Hours

Max. Marks: 100

- ✓ Answer ANY FIVE Questions.
- ✓ Missing data, if any, may be suitably assumed.
- 1A. Explain the working of an N channel JFET. Draw and explain its output VI characteristics & Transfer characteristics.
- 1B. Explain the input /output characteristics of a NPN transistor in CE configuration showing different region in the characteristics

(10+10=20 marks)

- 2A. For a zener network,  $R_S = 470\Omega$ ,  $V_Z = 10V$  and  $V_i = 22V$ . Find the minimum and maximum values of  $R_L$  so that zener diode remains in ON state, given that  $I_{ZK} = 2$  mA and  $P_{ZM} = 8$  W. Explain line and load regulation and sketch its Ideal characteristics. Also draw the circuit of the Zener Regulator.
- 2B. Explain the fixed-bias circuit and determine the expressions for the operating point. Perform the load line analysis for the same for variations in V<sub>CC</sub>, R<sub>B</sub> and R<sub>C</sub>.

(10+10=20 marks)

- 3A. Explain the working of full wave rectifier using center tap transformer with circuit diagram and waveforms. Derive the expression for ripple factor and efficiency.
- 3B. Explain the different resistances of a diode and derive its expression. Find the static and dynamic resistances of a germanium diode with 0.2 V forward bias applied, if reverse sat current is 1μA and temperature is 30°C.
- 3C. Derive the relation between I<sub>CEO</sub> & I<sub>CBO</sub>

(10+6+4=20 marks)

4A. Using Simplified CE Model Derive Expressions for A<sub>v</sub>, A<sub>i</sub>, R<sub>o</sub>, R<sub>o</sub><sup>'</sup> for a CB amplifier.

4B. Design a self bias circuit, given the following parameters:  $I_C=1$ mA,  $V_{CC}=12$ V,  $V_{CE}=V_{CC}/2$ ,  $V_B=3V$ , beta=80,  $V_{BE}=0.6$ V,  $R_2=3$ K

(10+10=20 marks)

- 5A. Derive the expression for A<sub>I</sub>, A<sub>V</sub>, A<sub>Vs</sub>, A<sub>Is</sub>, R<sub>i</sub>, and R<sub>o</sub> of a transistor amplifier using h parameters
- 5B. Explain in detail RC coupled Amplifier with circuit diagram, frequency response & waveforms.

(10+10=20 marks)

- 6A. Write short notes on Energy band diagram, Drift and diffusion currents.
- 6B. Draw the Hybrid-  $\pi$  model of BJT in CE configuration and derive expressions for any three conductance.

(10+10=20 marks)

- 7A. Derive the expression for the voltage gain of common-source amplifier with the help of FET low frequency model.
- 7B. Explain (a) CMRR (b) Emitter follower

(10+10=20 marks)

- 8A. Explain any two biasing circuits for FET. Also derive expressions for determining "Q" point for these circuits.
- 8B. Explain a two level clipper with appropriate voltage levels and a positive clamper circuit

(10+10=20 marks)

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