JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, December-2014
ELECTRONIC DEVICES AND CIRCUITS
(Common to EEE, ECE, CSE, EIE, BME, IT, MCT)

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)	Write the Difference between drift and diffusion current.	[2M]
b)	Explain about Photo diode.	[3M]
c)	What are PIV and TUF?	[2M]
d)	How Zener diode acts as a Voltage regulator.	[3M]
e)	Explain the early effect.	[2M]
f)	Why Common Collector Amplifier is called as emitter follower?	[3M]
g)	What are the salient features of Hybrid parameters?	[2M]
h)	Write the condition for thermal stability.	[3M]
i)	Define pinch-off voltage.	[2M]
j)	Why FET is called voltage variable resistor?	[3M]

Part- B
(50 Marks)

2.a) Write the volt-ampere equation for P-N junction diode. Draw and explain the V-I characteristics and discuss the effect of temperature on the characteristics.
b) Explain about Breakdown Mechanisms in Semiconductor Diodes.
c) Draw and explain the characteristics of Varactor Diode.

OR

3.a) Discuss about Zener Diode Characteristics.
b) Explain the Principle of Operation of Tunnel Diode.
c) Derive the Expression for Diode Equation.

4.a) Draw and explain the circuit diagram of full wave rectifier with L- section filter.
b) A bridge rectifier is used to supply d.c load of 20 A at 20 volts from 117 volts source. What is the rating of power transform?
c) Derive the expression for the regulation and efficiency of a half wave rectifier.

OR

5.a) Draw the circuit for a full-wave rectifier. And derive the expression for
   i) the DC current
   ii) the DC load voltage
   iii) the rms current.
b) Find the average value of the output voltage, peak diode current and PIV of the Half Wave Rectifier. Assume v_s is 12V (rms) Sinusoidal and $R_L=100\Omega$.
c) Define the following terms with necessary equations:
   i) Voltage gain
   ii) Power gain
   iii) Efficiency.

6.a) Explain how the BJT can be used as an amplifier and as a Switch.
   b) Explain the V-I characteristics in Common Emitter Configuration.
   c) Compare the transistor (BJT) amplifiers circuits in the three configurations with the help of h-parameters values.

OR

7.a) Draw and explain the output characteristics of BJT in common-base configuration.
   b) Draw and Explain the V-I characteristics of UJT.
   c) A transistor is operated at a forward current of $2\mu A$ and with the collector open circuited. Calculate the junction voltages V_C and V_E the collector to emitter voltage V_{CE} assuming $I_{CO} = 2\mu A$, $I_{EO} = 1.6\mu A$ and $\alpha_N = 0.98$.

8.a) What are the H-Parameters and write the h-parameters for transistor CE amplifier.
   b) Determine the base resistor R_b for fixed bias on collector to base bias and compare the stability factor S for both of them. Given $V_{CC} = 12V$, $R_L = 330\Omega$, $I_b = 0.3mA$, $\beta = 100$, $V_{CEQ} = 6V$.
   c) Compare different transistor biasing techniques.

OR

9.a) Define operating point and explain clearly the DC and AC load line.
   b) Derive the expression for the stability factor for self bias.
   c) Draw and explain the diode compensation technique in detail.

10.a) Explain Volt-ampere Characteristics of JFET.
   b) How FET act as a voltage controlled device and analyze low frequency CD amplifier.
   c) A FET has a driven current of 4mA if $I_{DSS} = 8mA$ and $V_{GS(off)} = -6V$. Find the value of V_{GS} and V_P.

OR

11.a) Deduce the condition for JFET biasing for zero drift current.
   b) Draw and explain the operation of Enhancement type MOSFET.
   c) Briefly discuss the source follower.

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