Code No: EC1502   **GEC-R14**

II B. Tech I Semester Supplementary Examinations, May 2016
SEMICONDUCTOR DEVICES AND CIRCUITS
(Electrical and Electronics Engineering)

Time: 3 Hours   **Max. Marks: 60**

Note: All Questions from **PART-A** are to be answered at one place.
Answer any **FOUR** questions from **PART-B**. All Questions carry equal Marks.

PART-A
6 × 2 = 12M

1. Define Static resistance, dynamic resistance of a PN diode.

2. Draw the diagram associated in converting AC input to pure DC output & explain the blocks.

3. The transistor has I_E = 10mA & α =0.98.Determine the value of I_B & I_C.

4. What is thermal runaway? What is the condition for thermal stability?

5. Compare JFET with MOSFET.

6. Justify the validity of approximate hybrid model applicable in low frequency region.

PART-B
4 × 12 = 48M

1. a) Explain V-I characteristics of a PN junction diode.   (6M)

    b) Explain the following   (6M)
       i) Open circuited PN junction.
       ii) Varactor Diode.

2. a) Derive the expression for the ripple factor in a full wave rectifier using induction filter.   (6M)

    b) A zener diode shunt regulator circuit is to be designed to maintain a constant load current of 400mA and voltage of 40V.The input voltage is 90 ± 5V. The zener diode voltage is 40V and its dynamic resistance is 2.5Ω.find the following quantities for the regulator: a) the series dropping resistance, b) zener power dissipation and c) load resistance. Assume the zener current to be 10% of load current.   (6M)

3. a) Explain the V-I characteristics of UJT and also define intrinsic stand-off ratio.   (6M)

    b) Explain the two types of break down Mechanisms in detail?   (6M)

4. a) A germanium transistor having $\beta=100$ and $V_{BE}=0.2V$ is used in a fixed bias amplifier circuit where $V_{CC}=16$ V, $R_C=5k\Omega$, $R_B = 790k\Omega$. Determine its operating point. (6M)

b) Draw a voltage divider bias circuit and derive an expression for its stability factor. (6M)

5. a) Explain the construction and operation of N channel JFET with neat diagrams . (6M)

b) A FET has a driven current of 4mA. If I_{DSS} = 8mA and $V_{GS (off)}$ = -6V. Find the values of V_{GS} & V_P. (6M)

6. a) Determine A_I , A_V , R_I and R_O for a common collector circuit. (6M)

b) Explain the common source FET amplifier using small signal model. (6M)

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