Code No: RT21041   **R13**   SET - 1

II B. Tech I Semester Supplementary Examinations, Oct/Nov - 2017
ELECTRONIC DEVICES AND CIRCUITS
(Com. to ECE, EIE, ECC)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1.	a)	Explain the temperature dependence of V-I characteristics of P-N diode. (3M)
	b)	List the applications of Varactor diode? (2M)
	c)	Compare the rectifier and regulator. (2M)
	d)	Explain the Break down in transistor. (3M)
	e)	Draw and explain the hybrid model of a CB configuration. (3M)
	f)	Explain the terms Peak voltage and Valley current in UJT. (2M)
	g)	Why FET is called a voltage operative device? Explain. (2M)
	h)	List the advantages and disadvantages of fixed bias method. (2M)
	i)	Compare all the transistor amplifiers. (3M)

PART -B

2. a) Show that the Fermi energy level lies in the center of forbidden energy band for an intrinsic semiconductor. (10M)

   b) Find the concentration of holes and electrons in a p-type silicon at 300K assuming resistivity as 0.02Ω-cm. Assume $\mu_p = 475m^2$/V-sec, $n_i= 1.45 \times 10^{10}$/cm^3. (6M)

3. a) Explain the construction and working of varactor diode? (10M)

   b) The energy gap of Si is 1.1 ev. Its electron and hole mobilities at room temperatures are 0.15 and 0.06 m^2/V sec respectively. Evaluate its conductivity. (6M)

4. a) Derive the expression for Ripple factor for full wave rectifier with L-section filter. Explain the necessity of bleeder resistor (8M)

   b) A sinusoidal voltage whose V_m=24V is applied to half wave rectifier. The diode may be considered to be ideal and R_L=1.8KΩ is connected as load. Find out peak value of current, RMS value of current, DC value of current and ripple factor. (8M)

5. a) Explain the working principle of MOSFET in enhancement and depletion modes. (9M)

   b) The reverse saturation current of the Ge transistor is 2µA at room temperature of 25^0C and increases by a factor of 2 for each temperature increase of 10^0C. Find the reverse saturation current of the transistor at a temperature of 75^0C. (7M)

6. a) Compare h-parameters with Y-parameters and explain. (8M)

   b) Design a collector to base bias circuit for the specified conditions: V_{cc}=15V, V_{CE}=5V, I_{CE}=5mA, and β=100. (8M)

7. a) Compare CB and CC amplifiers (8M)

   b) Analyze CS-FET amplifier (8M)