Code No: R1621041 **R16** SET - 1

II B. Tech I Semester Regular/Supplementary Examinations, October/November - 2018
ELECTRONIC DEVICES AND CIRCUITS
(Com to ECE, EIE and 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 **FOUR** Questions from **Part-B**

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PART –A

1. a) What is Hall Effect? (2M)
   b) Draw the symbols i)PN Diode ii)Zener Diode iii)Tunnel Diode (3M)
   c) Explain the necessity of bleeder resistor? (2M)
   d) Derive the relation between α and β. (3M)
   e) What is the need for biasing? (2M)
   f) List the benefits of h-parameters. (2M)

PART -B

2. a) Explain the term current density. Obtain the expression for current density 'J' in terms of dimensions of conductor, velocity carrier concentration of charge carrier. (10M)
   b) Calculate the resistivity of intrinsic germanium at 300 ^{0}K.Assume n_i=2.5X1013 per cm^3,μ_n=3800 cm^2/V-s and μ_p=1800 cm^2/V-s. (4M)

3. a) Explain forward and reverse bias in case of PN Junction. (8M)
   b) Derive expression for dynamic resistance of a diode. (6M)

4. a) Draw the circuit diagram of HWR and explain the operation with the help of waveforms. (8M)
   b) Derive the following expressions for HWR (6M)
   i)I_{dc} ii)I_{rms} iii) Ripple factor

5. a) Explain the input and output characteristics of a transistor in CB configuration. (10M)
   b) Explain the early effect and its consequences. (4M)

6. a) Give comparison of BJT and JFET. (6M)
   b) From the static characteristics how to obtain quiescent voltage and current using load line for JFET. (8M)

7. Draw the circuit of CE amplifiers and obtain its equivalent hybrid model and derive expression for A_I,R_I,A_V and R_0^1. (14M)

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Code No: R1621041 **R16** SET - 2

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(Com to ECE, EIE and 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 **FOUR** Questions from **Part-B**

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PART –A

1. a) Explain law of mass action. (2M)
   b) List the applications of Diode. (3M)
   c) Define ripple factor. (2M)
   d) What is early effect? (2M)
   e) What is thermal runaway (2M)
   f) State Miller's theorem. (3M)

PART -B

2. a) Derive expression for current density in terms of concentration of electrons, electron charge, mobility and electric field density (10M)
   b) Calculate the resistivity of intrinsic germanium at 300 ^{0}K.Assume n_i=2.5X1013 per cm^3,μ_n=3800 cm^2/V-s and μ_p=1800 cm^2/V-s. (4M)

3. Derive diode current equation, interms of applied voltage. (14M)

4. a) Draw the circuit diagram of FWR and explain the operation with the help of waveforms. (10M)
   b) In a FWR using an LC filter L=10 H,C=100µF and RL=500Ω.Calculate Idc, Vdc,Ripple factor for an input of Vi=30 sin(100 π t)V. (4M)

5. a) Explain constructional features of depletion MOSFET and explain its basic operation (10M)
   b) What is reverse saturation current (4M)

6. a) Draw the circuit of self bias circuit and explain how to determine the values of r1 and r2. (8M)
   b) Give comparison between E-MOSFET and D-MOSFET (6M)

7. a) Explain how FET can be used as an Amplifier (6M)
   b) Draw and explain a small signal low frequency model for FET (8M)

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Code No: R1621041 **R16** SET - 3

II B. Tech I Semester Regular/Supplementary Examinations, October/November - 2018
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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 **FOUR** Questions from **Part-B**

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PART –A

1.	a)	Define Peak Inverse Voltage	(3M)
	b)	Define Early effect?	(3M)
	c)	Name the transistor configuration which has high input impedance and low output impedance	(2M)
	d)	Define B -cut-off frequency of CE amplifier	(2M)
	e)	What is the need for biasing a transistor?	(2M)
	f)	Discuss the influence of coupling capacitor on the low frequency response	(2M)

PART -B

2.	a)	Derive the expression for Fermi level in P type and n type semiconductor	(7M)
	b)	Classify the materials with the help of neat energy band diagrams	(7M)
3.	a)	Derive the expression for transition capacitance of a diode	(7M)
	b)	Explain avalanche and zener breakdown mechanisms	(7M)
4.	a)	Derive the expression for ripple factor of fullwave rectifier with L-section filter. Explain the necessity of a bleeder resistor.	(7M)
	b)	Design a full wave rectifier with LC filter to provide an output voltage of 10v and a load current of 200 mA and ripple in limited to 2%.	(7M)
5.	a)	Draw the drain and transfer characteristics of depletion type MOSFET. Explain clearly about different operating regions	(7M)
	b)	Explain how transistor acts as an amplifier	(7M)
6.	a)	What do you mean by biasing? Derive the expression for stability factor of selfbias circuit	(7M)
	b)	Explain about thermal runaway and thermal resistance. Derive the condition for thermal stability	(7M)
7.	a)	List the advantages of FET over BJT.	(7M)
	b)	Draw hybrid model of transistor and explain each h-parameter of CE configuration?	(7M)

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Code No: R1621041 **R16** SET - 4

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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 **FOUR** Questions from **Part-B**

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PART –A

1. a) Derive drift and diffusion currents? (3M)
   b) Draw the V-I characteristic curve of a PN junction diode? (2M)
   c) What is ripple factor? Give its value for full wave rectifiers. (2M)
   d) Compare JFET and MOSFET? (3M)
   e) Define operating point? (2M)
   f) Draw small signal equivalent circuit of BJT. (2M)

PART –B

2. a) Define Hall effect and derive expression for Hall voltage and Hall coefficient. (7M)
   b) Explain the concept of Fermi level in extrinsic semiconductors (7M)

3. a) Derive the expressions for volt-ampere relation of PN diode. (7M)
   b) Write short notes on LED. (7M)

4. a) Explain the operation of bridge rectifier with neat diagrams? (7M)
   b) Compare various types of filters used in power supplies? (7M)

5. a) Explain in detail the working and operation of enhancement type MOSFET (7M)
   b) Explain in detail the working of JFET .Draw its drain and transfer characteristics (7M)

6. a) Derive and explain stability factors S, S’ and S’’? (7M)
   b) Explain diode bias compensation for V_{BE} and I_{CO}. (7M)

7. a) Derive current gain, voltage gain, input resistance and output resistance of simplified Common Collector amplifier? (7M)
   b) Draw the low frequency common source equivalent circuit of FET and derive its voltage gain? (7M)
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