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

II B. Tech I Semester Supplementary Examinations, June - 2015
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) What is meant by energy band? (3M)
   b) Describe Tunneling phenomenon? (4M)
   c) Define Ripple factor and Form factor. (4M)
   d) Describe the basic structure of the BJT. (4M)
   e) What is the effect of change in temperature on the stability of operating point? (4M)
   f) The output of common emitter amplifier is 180^0 out of phase with the input. Explain the reason. (3M)

PART –B

2. a) Explain the principle of Hall effect with diagram and write its applications (8M)
   b) What is law of junction? Explain (8M)

3. a) Explain the construction and working of Tunnel diode. (8M)
   b) Explain the construction and working of LCD. (8M)

4. a)What are different types of rectifiers? Compare them (6M)
   b) Determine the rating of a transformer to deliver 125 watts of dc power to a load for the following. (i) Half wave rectifier. (ii) Full wave rectifier (iii) Bridge rectifier (10M)

5. a) Draw the circuit diagram for finding the CC characteristics of a Transistor. (8M)
   b) Explain the working of a NPN transistor. (8M)

6. a) What is Biasing? Explain the need of it. List out different types of biasing methods. (6M)
   b) If the various parameters of a CE Amplifier which uses the self bias method are V_{CC}=12V, R_1=5KΩ, R_2=10KΩ, R_C=3KΩ, Re=1KΩ and β=50, find i) the coordinates of the operating point and ii) the Stability Factor, assuming the transistor to be of silicon. (10M)

7. a) Give the approximate H-parameter conversion formulae for CB and CE configuration in terms of CC. (10M)
   b) Compare A_V, A_I, R_i and R_o of CE, CB and CC configurations. (6M)
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Code No: RT21041 **R13** SET - 2

II B. Tech I Semester Supplementary Examinations, June - 2015
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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 **THREE** Questions from **Part-B**

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PART –A

1. a) Define Depletion region and explain how the pn junction formed? (4M)
   b) What are the applications of Varactor diode? (3M)
   c) Define Transformer utilization factor. (4M)
   d) What are the applications of MOSFET? (4M)
   e) What is meant by Amplification and in what region of the characteristics the transistor is operated as amplifier? (4M)
   f) What are half power frequencies? Why it is named so? (3M)

PART –B

2. a) Derive an expression for Continuity Equation. (8M)
   b) Derive an expression for Fermi level in an intrinsic semiconductor. (8M)

3. a) Explain the construction and working of Zener diode. (8M)
   b) Explain the construction and working of SCR. (8M)

4. a) Define Rectification efficiency and derive expression for it for the following
   (i) Half wave rectifier (ii) Full wave rectifier (iii) Bridge rectifier. (8M)
   b) Design Two-section LC filter to provide an output voltage 9V with a load current of 100 mA and the ripple is limited to 0.2%. (8M)

5. a) Draw and explain the CB characteristics of a transistor. (8M)
   b) Draw the Eber-moll model of a transistor. (8M)

6. a) What is the necessity of Biasing circuits? Derive the expression for stability factor of self bias circuit. (8M)
   b) In a Silicon transistor circuit with a fixed bias, V_{CC}=10V, R_C=4KΩ, R_B=7KΩ, β =100, V_{BE}=0.7V.Find the operating point and Stability factor. (8M)

7. Derive the Expressions for voltage gain, current gain, input impedance, output impedance of a CE amplifier, using exact and approximate model. (16M)

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Code No: RT21041 **R13** SET - 3

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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 **THREE** Questions from **Part-B**

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PART –A

1. a) What are conductors, insulators and semiconductors? (4M)
   b) What are the applications of laser diode? (3M)
   c) What are the advantages and disadvantages of full wave rectifier? (4M)
   d) What are the differences between BJT and JFET? (4M)
   e) Define thermal runaway. (3M)
   f) Define the stability factor and write the expression for it (4M)

PART –B

2. a) What is the Hall Effect? Derive the an Expression for Hall Coefficient? (8M)
   b) Explain the Diffusion and Drift currents for a semiconductor. (8M)

3. a) Explain in detail about the current components in a pn junction diode. (8M)
   b) Explain in detail the break down mechanisms in a diode. (8M)

4. a) With a neat sketch explain the working of bridge rectifier. (6M)
   b) Define Ripple factor and derive expression for it for the following (i) Half wave rectifier (ii) Full wave rectifier (iii) Bridge rectifier. (10M)

5. a) Compare CE, CB and CC configurations. (6M)
   b) Explain in detail the working of JFET and draw its drain and transfer characteristics. (10M)

6. In a Self bias circuit containing R_1=50KΩ, R_2=25KΩ, Re=1KΩ, R_C=3KΩ, β =90, V_{CC}=12V, V_{BE}=0.7V. Find the operating point, S, S', and S". (16M)

7. a) Analyze a Single stage transistor amplifier using h-parameters. (6M)
   b) Give the approximate H-parameter conversion formulae for CC and CB configuration in terms of CE. (10M)

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Code No: RT21041 **R13** 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 **THREE** Questions from **Part-B**

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PART –A

1. a) Define Energy gap. How it varies with temperature? (4M)
   b) What is Avalanche breakdown? (4M)
   c) Define peak inverse voltage. (3M)
   d) Define Amplification factor and transconductance. (4M)
   e) Define Stability factor. (3M)
   f) Draw H-parameter model of a CE transistor. (4M)

PART –B

2. a) Derive an expression for Fermi level in an extrinsic semiconductor. (10M)
   b) Explain about Energy Band Diagrams. (6M)

3. a) Explain the working of pn diode in forward and reverse bias conditions. (8M)
   b) Explain the construction and working of UJT. (8M)

4. a) Draw the block diagram of a power supply. Explain in detail about different elements in power supply. (8M)
   b) With a neat sketch explain the working of Half-wave rectifier. (8M)

5. a) Explain the working of a PNP transistor with a neat diagram (6M)
   b) Explain the construction and working of Enhancement MOSFET. (10M)

6. a) What is the need of Biasing and Stabilization? Explain (8M)
   b) Explain in detail about Thermal Runaway and Thermal Resistance. (8M)

7. a) Give the advantages of H-parameter analysis. (4M)
   b) The H-parameters of a Transistor used in a CE circuit are h_{ie}=1KΩ, h_{re}=0.001. h_{fe}=50, h_{oe}=100K. The load resistance for the transistor is 1KΩ in the collector circuit. Determine R_i, R_O, A_V, A_i in the amplifier stage (Assume Rs= 1KΩ). (12M)

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