CMR Engineering College
Kandlakoya(V), Medchal Road, Hyderabad

Department of Electronics and Communication Engineering

COURSE FILE

Sub: Electronic Devices and Circuits **A.Y.2022-2023**
Year: II Year I Semester

Contents of Course file

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HOD **PRINCIPAL**

CMR ENGINEERING COLLEGE (AUTONOMOUS)

KANDLAKOYA (V), MEDCHAL ROAD, HYDERABAD-501401

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Vision of the Institute:

To be recognized as a premiere institution in offering value based and futuristic quality technical education to meet the technological needs of the society.

Mission of the Institute:

1. To impart value based quality technical education through innovative teaching and learning methods.
2. To continuously produce employable technical graduates with advanced technical skills to meet the current and future technological needs of the society.
3. To prepare the graduates for higher learning with emphasis on academic and industrial research.

VISION OF THE DEPARTMENT

To promote excellence in technical education and scientific research in electronics and communication engineering for the benefit of society.

MISSION OF THE DEPARTMENT

M1: To impart excellent technical education with state of art facilities inculcating values and lifelong learning attitude.

M2: To develop core competence in our students imbibing professional ethics and team spirit.

M3: To encourage research benefiting society through higher learning.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1: Establish themselves as successful professionals in their career and higher education in the field of Electronics & Communication Engineering and allied domains through rigorous quality education.

PEO 2: Develop Professionalism, Ethical values, Excellent Leadership qualities, Communication Skills and teamwork in their Professional front and adapt to current trends by engaging in lifelong learning

PEO 3: Apply the acquired knowledge & skills to develop novel technology and products for solving real life problems those are economically feasible and socially relevant

PEO 4: To prepare the graduates for developing administrative acumen, to adapt diversified and multidisciplinary platforms to compete globally

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Ability to apply concepts of Electronics & Communication Engineering to associated research areas of electronics, communication, signal processing, VLSI, embedded systems, IoT and allied technologies.

PSO2: Ability to design, analyze and simulate a variety of Electronics & Communication functional elements using hardware and software tools along with analytic skills.

Program Outcomes (POs) :

PO1:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2:Problem analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3:Design/Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6:The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7:Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8:Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10:Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11:Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12:Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

1. Mapping of course objectives, course out comes with PEOS and Pos

Course Name: Electronics Device and Circuits (C211)

Course	Course Outcomes (CO's)
At the end of the course student will be able to	
C211.1	Acquire the knowledge of electronic Devices.
C211.2	Understand the utilization of various electronic Devices.
C211.3	Acquire the knowledge of Special Purpose Devices and their Applications.
C211.4	Design and Analysis of Small Signal Amplifiers.
C211.5	Study The Biasing Methods of Electronic Devices.

Course Outcome (CO)-Program Outcome (PO) Matrix:

CO's/ PO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C211.1	2	1	1	-	-	-	-	-	-	-	-	-
C211.2	2	1	1	-	-	-	-	-	-	-	-	-
C211.3	2	1	1	-	-	-	-	-	-	-	-	-
C211.4	2	3	3	3	-	-	-	-	-	-	-	-
C211.5	2	3	3	2	-	-	-	-	-	-	-	2
AVG	2	3	2	2	-	-	-	-	-	-	-	2

Justification of correlation levels:

CO1,CO2,CO3,CO4&CO5 with PO1: CO1 & CO2 moderately correlates with PO1 as they deals with knowledge of engineering fundamentals.

CO1,CO2& CO3 with PO2: CO1,CO2& CO3 slightly correlates with PO2 as it applies knowledge of engineering fundamentals in design of MOS circuits.

CO4,CO5 with PO2:CO4 &CO5 substantial correlates with PO2 as it addresses principles of mathematics in building Small Signal Amplifier circuits.

CO1,CO2 & CO3 with PO3: CO1,CO2 & CO3slightly correlates with PO3 as they deals with development of Solutions.

CO4 & CO5 with PO3: CO4 & CO5 substantial correlates with PO3 as they deal with development of Solutions.

CO4 with PO4: CO4 substantial correlates with PO4 as we conduct the Investigation of Complex Problems.

CO5 with PO4: CO5 moderately correlates with PO4 as we conduct the Investigation of Complex Problems.

CO5 with PO12: CO5 moderately correlates with PO4 as we conduct the Investigation of Complex Problems.

Course Outcome (CO)-Program Specific Outcome (PSO) Matrix:

CO's/ PSO's	PSO1	PSO2
C211.1	2	2
C211.2	2	2
C211.3	2	2
C211.4	2	3
C211.5	2	3
AVG	2	2

Justification of correlation levels:

CO1, CO2, CO3, CO4 & CO5 with PSO1: CO1,CO2,CO3,CO4 &CO5 moderately correlates with PSO1 as it demonstrates fundamentals of Electronic Devices.

CO1,CO2, CO3, CO4 & CO5 with PSO2: CO1,CO2 &CO3 moderately correlates with PSO2 as it deals with analysis of Electronic Devices where as CO4 & CO5 substantially correlates with PSO2 as IT Deals with the design of Electronic Devices.

4. SYLLABUS COPY

Course Objectives:

- To introduce components such as diodes, BJTs and FETs.
- To know the applications of components.
- To know the switching characteristics of components
- To give understanding of various types of amplifier circuits

Course Outcomes: Upon completion of the Course, the students will be able to:

- Know the characteristics of various components.
- Understand the utilization of components.
- Understand the biasing techniques
- Design and analyze small signal amplifier circuits.

UNIT - I

Diode and Applications: Diode - Static and Dynamic resistances, Equivalent circuit, Load line analysis, Diffusion and Transition Capacitances, Diode Applications: Switch-Switching times.
Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Rectifiers with Capacitive and Inductive Filters, Clippers-Clipping at two independent levels, Clamper-Clamping Circuit Theorem, Clamping Operation, Types of Clampers.

UNIT - II

Bipolar Junction Transistor (BJT): Principle of Operation, Common Emitter, Common Base and Common Collector Configurations, Transistor as a switch, switching times, Transistor Biasing and Stabilization - Operating point, DC & AC load lines, Biasing - Fixed Bias, Self Bias, Bias Stability, Bias Compensation using Diodes.

UNIT - III

Junction Field Effect Transistor (FET): Construction, Principle of Operation, Pinch-Off Voltage, Volt- Ampere Characteristic, Comparison of BJT and FET, Biasing of FET, FET as Voltage Variable Resistor. **Special Purpose Devices:** Zener Diode **-** Characteristics, Voltage Regulator. Principle of Operation -SCR, Tunnel diode, UJT, Varactor Diode.

UNIT – IV

Analysis and Design of Small Signal Low Frequency BJT Amplifiers: Transistor Hybrid model, Determination of h-parameters from transistor characteristics, Typical values of h- parameters in CE, CB and CC configurations, Transistor amplifying action, Analysis of CE, CC, CB Amplifiers and CE Amplifier with emitter resistance, low frequency response of BJT Amplifiers, effect of coupling and bypass capacitors on CE Amplifier.

UNIT – V

FET Amplifiers: Small Signal Model**,** Analysis of JFET Amplifiers, Analysis of CS, CD, CG JFET Amplifiers. MOSFET Characteristics in Enhancement and Depletion mode, Basic Concepts of MOS Amplifiers.

TEXT BOOKS:

1. Electronic Devices and Circuits- Jacob Millman, McGraw Hill Education
2. Electronic Devices and Circuits theory– Robert L. Boylestead, Louis Nashelsky, 11th Edition, 2009, Pearson.

5. INDIVIDUAL TIME TABLE

FACULTY NAME: Dr.Suman Mishra

BRANCH: II/IV B.TECH ECE I-SEM **SECTION:** A **ROOM NO: B-416** **w.e.f: 10-10-2022**

DAY / TIME	9.10 A.M-10.10 A.M	10.10 A.M - 11.00 A.M	11.00 A.M - 11.50 A.M	11.50 A.M - 12.40 P.M	12.40 P.M - 01:20 P.M	01.20 P.M – 02.20 P.M	02.20 P.M – 03.10 P.M	03.10 P.M – 04.00 P.M
MON					LUNCH			
TUE			EDC					
WED		EDC						
THU			EDC					
FRI							EDC	
SAT						EDC		

FACULTY NAME: Mrs.G.KALPANA

BRANCH: II/IV B.TECH ECE I-SEM **SECTION:** B **ROOM NO: B-417** **w.e.f: 10-10-2022**

DAY / TIME	9.10 A.M-10.10 A.M	10.10 A.M - 11.00 A.M	11.00 A.M - 11.50 A.M	11.50 A.M - 12.40 P.M	12.40 P.M - 01:20 P.M	01.20 P.M – 02.20 P.M	02.20 P.M – 03.10 P.M	03.10 P.M – 04.00 P.M
MON		EDC LAB		EDC	LUNCH	EDC LAB		
TUE		EDC						
WED			EDC					
THU		EDC LAB				EDC	EDC LAB	
FRI								
SAT	EDC						SAC	

BRANCH: II/IV B.TECH ECE I-SEM **SECTION:** C **ROOM NO: B-418** **w.e.f: 10-10-2022**

DAY / TIME	9.10 A.M-10.10 A.M	10.10 A.M - 11.00 A.M	11.00 A.M - 11.50 A.M	11.50 A.M - 12.40 P.M	12.40 P.M - 01:20 P.M	01.20 P.M – 02.20 P.M	02.20 P.M – 03.10 P.M	03.10 P.M – 04.00 P.M
MON					LUNCH			
TUE			EDC					
WED		EDC						
THU			EDC					
FRI							EDC	
SAT						EDC		

BRANCH: II/IV B.TECH ECE I-SEM **SECTION:** D **ROOM NO: B-419** **w.e.f: 10-10-2022**

DAY / TIME	9.10 A.M-10.10 A.M	10.10 A.M - 11.00 A.M	11.00 A.M - 11.50 A.M	11.50 A.M - 12.40 P.M	12.40 P.M - 01:20 P.M	01.20 P.M – 02.20 P.M	02.20 P.M – 03.10 P.M	03.10 P.M – 04.00 P.M
MON		EDC LAB		EDC	LUNCH	EDC LAB		
TUE		EDC						
WED			EDC					
THU		EDC LAB				EDC	EDC LAB	
FRI								
SAT	EDC						SAC	

6.SESSION PLAN (attached) & Detailed Lecture Plan

Electronic Devices and Circuits (Lesson) Plan

Subject code	Name of the subject	Year/Branch	Name of the Faculty
53009	Electronic Devices and Circuits	II B.Tech I Sem ECE	G.KALPANA

S.NO	Topic (JNTU syllabus)	Sub-Topic	No. of Lecturers Required	Remarks
UNIT-I	Diode and Applications:	Diode - Static and Dynamic resistancesDiode .	01	
		Equivalent circuit, Load line analysis,	01	
		Diffusion and Transition Capacitances,	01	
		Applications: Switch-Switching times.	02	
		Rectifier - Half Wave Rectifier	02	
		Bridge Rectifier	01	

		Rectifiers with Capacitive and Inductive Filters	02	
		Clippers-Clipping at two independent levels,	02	
		Clamper-Clamping Circuit Theorem	01	
		Clamping Operation, Types of Clampers	02	L15
UNIT- II	**Bipolar Junction Transistor (BJT):**	Principle of Operation, Common Emitter	01	
		Common Base	02	
		Common Collector Configurations	01	
		Transistor as a switch, switching times	02	
		Transistor Biasing. Stabilization	01	
		Operating point, DC & AC load lines	02	
		Biasing - Fixed Bias, Self Bias, Bias Stability	02	
		Bias Compensation using Diodes	02	L13
UNIT-III	**Junction Field Effect Transistor (FET):**	Construction, Principle of Operation	01	
		Pinch-Off Voltage, Volt-Ampere Characteristic,	02	
		Comparison of BJT and FET, , Biasing of FET	02	
		Zener Diode - Characteristics,	02	
		FET as Voltage Variable Resistor.	01	
		Voltage Regulator. Principle of Operation	02	
		SCR, Tunnel diode	02	
		UJT, Varactor Diode	02	L14
UNIT-IV	**Analysis and Design of Small Signal**	Transistor Hybrid model, Determination of h-parameters from transistor characteristics,	02	
		Typical values of h- parameters in CE, CB and CC	02	

	Low Frequency BJT Amplifiers	configurations		
		Transistor amplifying action,	02	
		Analysis of CE, CC, CB Amplifiers	02	
		CE Amplifier with emitter resistance,	01	
		low frequency response of BJT Amplifiers,	02	
		effect of coupling and bypass capacitors on CE Amplifier.	02	
				L13
UNIT-V	**FET Amplifiers:**			
		Small Signal Model and,Analysis of JFET Amplifiers	02	
		Analysis of CS,	01	
		Analysis of CD,	02	
		Analysis of CG,	01	L10
		MOSFET Characteristics in Enhancement	01	
		MOSFET Characteristics in Depletion mode	02	
		Basic Concepts of MOS Amplifiers	01	
		TOTAL NO. OF CLASSES	**65**	

8. Session Execution Log:

Sl.no	Syllabus	Scheduled completed date	Completed date	Remarks
1	I-UNIT	**09/09/21**		

2	II-UNIT	**24/09/21**		
3	III-UNIT	**18/10/21**		
4	IV-UNIT	**05/11/21**		
5	V-UNIT	**22/11/21**		

9. ASSIGNMENT QUESTION

ASSAIGNMENT QUESTIONS -1
ELECTRONIC DEVICES AND CIRCUITS

SET-1:

1.Explain Forward and Reverse bias Characteristics of PN Junction Diode?

2.Explain Avalanche Breakdown Mechanism?

3.Explain about Fixed bias circuit

4.Explain about Thermal Runaway?

5.Explain about JFET?

SET-2:

1.State and prove Clamping Circuit Theorem

2.Explain about Pinch off voltage?

3.Explain the Principle of operation of BJT

4.Explain input and output Characteristics of Common Emitter Configuration?

5.Explain about JFET?

SET-3:

1.Exp[lain about full wave rectifier with Neat Circuit Diagram?

2.Explain input and output Characteristics of Common Emitter Configuration?

3.Explain construction of JFET?

4Explain Forward and Reverse bias Characteristics of PN Junction Diode?

5.Explain about Fixed bias circuit

EDC ASSAIGNMENT -2

SET 1

1. Draw the circuit diagram of SCR and explain its operation along with its characteristics…CO3

2. a) how FET acts as voltage variable resistor…CO4

B)An n channel JFET has I dss=10mA and VP=-2 v. Determine the drain source resistance for 1)Vgs=0v 2)Vgs=-0.5v

3. Draw and explain BJT small signal model…CO3

4. Compare the performance of BJT and FET?...CO3

5) Explain hybrid equivalent of common collector configuration ?...CO3

SET 2

1. Explain the working of MOSFET amplifiers…CO5

2. Why we call FET as voltage controlled device…CO4

3. Given Ie=2.5 mA, hfe=140,hoe=20us and hob=0.5 us. Determine the common emitter hybrid equivalent circuit…CO3

4. Explain the working of tunnel diode….CO3

5. Calculate the game and frequency response characteristics of mosfet amplifier…CO5

SET 3

1. Derive the expression of voltage gain and input resistance for common gate FET amplifier?...CO4

2. Compare depletion and enhancement mode MOSFET…CO5

3. Define pinch off voltage….CO4

4. Explain the operation of n channel JFET….CO4

5. Explain about the effect of coupling and bypass capacitor on CE amplifier….CO3

10. Sample assignment Script
(Attached Separately)

11. Unit Wise Subject Materials
(Attached Separately)

edc notes.zip

12. Power Point Presentations

EDC PPT.zip

13. Sample And Answer Scripts

14. Material Collected from Internet/Wed sites

23. Material Collected from Internet/Wed sites

16. Previous Question paper model

JNTU PREVIOUS QUESTION PAPERS

Code No: 09A30203
B. Tech. II Year I Semester Examinations, May/June-2013
Electronic Devices and Circuits
(Common to EEE, ECE, CSE, EIE, BME, IT, MCT, ETM, ECOMPE, ICE)
Time: 3 hours Max. Marks: 75
Answer any five questions
All questions carry equal marks

1.a) Draw the V-I characteristics of a diode with zero cut-in voltage and equivalent resistance of 100 □. Draw the load line if RL is also 100 □.
b) Draw the equivalent circuit of a diode circuit when a DC voltage to forward bias

the diode along with an ac signal is applied.
c) Differentiate between normal PN junction diode and a Zener diode. [15]
2.a) Derive expressions for ripple factor, regulation and rectification efficiency of a half wave rectifier.
b) Design an LC filter for a Full wave rectifier to give 9V output as DC voltage at 100 mA current. Assume ripple factor to be 2%.
c) input type and
□3.a) Based on the currents flowing through a
BJT illustrate the amplification process.
b) BJT in CE configuration and
□ c) Compare CB, CC, and CE configurations. [15]
4.a)What is need for biasing? List the deficiencies overcome in voltage divider bias method.
b) Define stability factors for a BJT with any biasing method. Suggest a method to effects on operating point of a BJT circuit.
5.a)Discuss effect of VGS on drain current of a JFET based on its structure.
b) Define: Pinch-off voltage, mutual conductance (gm), dynamic drain resistance (rd)
c) Explain the operation of a MOSFET in enhancement and depletion modes.[15]
6.a) What is the difference between approximate and accurate h-parameter models of a BJT in CE configuration? Discuss the conditions applicable for each model.
b) Draw the h-parameter equivalent circuit of a generalized BJT amplifier and derive expressions for Av, Ai, Ri and Ro. [15]
7.a) Draw the circuit diagram, equivalent circuit of a JFET small signal amplifier in CS configuration and derive expressions for Av, Ai, Ri and Ro. Make applicable assumptions and comments.
b) A 12 k load resistance is connected to the output of a
JFET CS amplifier. If RG,RS and CS are given as 1M , 1 k□ and 25 μF respectively and
□, rd of JFET are listed as 20 and 10 k respectively, find the output voltage for a sinusoidal input of peak 0.1 volts at 2 kHz frequency. [15]
8.a) Which type of diode capacitance is utilized in varactor diode operation. Explain its principle of operation.
b) Name the device exhibiting negative resistance region in its V-I characteristic.
With suitable diagram explain the operation of this device.
c) Discuss the constructional details of SCR and Schotky barrier diode. [15]

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I .B.TECH –SUPPLEMENTARY EXAMINATIONS JANUARY- 2010

ELECTRONIC DEVICES & CIRCUITS

(COMMON TO EEE, ECE, CSE, EIE, BME, IT, E.CON.E, CSS, ETM, ECC, ICE)
Time: 3hours Max.Marks:80
Answer any FIVE questions
All questions carry equal marks
- - -

1.a) With the help of necessary equations show the trajectory of an electron is cycloid when it is placed in perpendicular electric and magnetic fields.

b) Determine the velocity and kinetic energy of an electron accelerated through potential of3KV. [8+8]

2.a) Compare the characteristics of a p-n junction diode, Zener diode and Tunnel diode.

b) How do you determine whether a given semiconductor is p-type or n-type? Explain the principle with necessary equations. [8+8]

3.a) Describe the action of a full wave bridge rectifier with the aid of input-output wave forms.

b) What are the advantages of bridge rectifier over centre tapped Transformer?

c) In a Bridge rectifier, the transformer is connected to 220 V, 60 Hz mains and the turns ratio of the step down transformer is 11:1. Assuming the diode is ideal, find

i) I_d ii) Voltage across the load iii) PIV [6+4+6]

4.a) Compare CB, CE, CC configurations with respect to current gain, voltage gain, input resistance and output resistance.

b) Explain what is meant by early effect in the case of transistor and what are its consequences? [10+6]

5.a) Give symbol of UJT and mark required polarities for operation.

b) Give the equivalent circuit of UJT.

c) Explain how UJT can be used as a negative resistance device, with the help of static characteristics. [4+4+8]

6.a) Draw the circuit diagram of fixed bias circuit in CE configuration and obtain the expression for I_B. Why the circuit is not suitable if the β of the transistor is changed.

b) How to obtain bias stability in CE configuration circuit?

c) Briefly explain about thermal stability. [8+4+4]

7.a) Classify the amplifiers based as feedback topology and give their block diagram. How the input and output impendence are effected in each case?

b) Draw the circuit diagram of a current feed back circuit and derive Expressions for Voltage gain and output resistance, and input resistance. [8+8]

8.a) Derive the expression for frequency of oscillations in RC-phase shift oscillator using BJT.

b) A crystal has L=0.1H, C=0.01PF, R=10kΩ and C_M=1PF. Find the series resonance andQ-factor. [8+8]

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD SET-2

I .B.TECH –SUPPLEMENTARY EXAMINATIONS JANUARY- 2010

ELECTRONIC DEVICES & CIRCUITS

(COMMON TO EEE, ECE, CSE, EIE, BME, IT, E.CON.E, CSS, ETM, ECC, ICE)
Time: 3hours Max.Marks:80
Answer any FIVE questions
All questions carry equal marks
- - -

1.a) With the help of necessary equations show the trajectory of an electron is cycloid when it is placed in perpendicular electric and magnetic fields.

b) Determine the velocity and kinetic energy of an electron accelerated through potential of3KV. [8+8]

2.a) Compare the characteristics of a p-n junction diode, Zener diode and Tunnel diode.

b) How do you determine whether a given semiconductor is p-type or n-type? Explain the principle with necessary equations. [8+8]

3.a) Describe the action of a full wave bridge rectifier with the aid of input-output wave forms.

b) What are the advantages of bridge rectifier over centre tapped Transformer?

c) In a Bridge rectifier, the transformer is connected to 220 V, 60 Hz mains and the turns ratio of the step down transformer is 11:1. Assuming the diode is ideal, find

i) I_d ii) Voltage across the load iii) PIV [6+4+6]

4.a) Compare CB, CE, CC configurations with respect to current gain, voltage gain, input resistance and output resistance.

b) Explain what is meant by early effect in the case of transistor and what are its consequences? [10+6]

5.a) Give symbol of UJT and mark required polarities for operation.

b) Give the equivalent circuit of UJT.

c) Explain how UJT can be used as a negative resistance device, with the help of static characteristics. [4+4+8]

6.a) Draw the circuit diagram of fixed bias circuit in CE configuration and obtain the expression for I_B. Why the circuit is not suitable if theβ of the transistor is changed.

b) How to obtain bias stability in CE configuration circuit?

c) Briefly explain about thermal stability. [8+4+4]

7.a) Classify the amplifiers based as feedback topology and give their block diagram. How the input and output impendence are effected in each case?

b) Draw the circuit diagram of a current feed back circuit and derive Expressions for Voltage gain and output resistance, and input resistance. [8+8]

8.a) Derive the expression for frequency of oscillations in RC-phase shift oscillator using BJT.

b) A crystal has L=0.1H, C=0.01PF, R=10kΩ and C_M=1PF. Find the series resonance andQ-factor. [8+8]

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Code.No: 21128

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD **SET-3**

I .B.TECH –SUPPLEMENTARY EXAMINATIONS JANUARY- 2010

ELECTRONIC DEVICES & CIRCUITS

(COMMON TO EEE, ECE, CSE, EIE, BME, IT, E.CON.E, CSS, ETM, ECC, ICE)
Time: 3hours Max.Marks:80
Answer any FIVE questions
All questions carry equal marks
- - -

1.a) Give symbol of UJT and mark required polarities for operation.

b) Give the equivalent circuit of UJT.

c) Explain how UJT can be used as a negative resistance device, with the help of static characteristics. [4+4+8]

2.a) Draw the circuit diagram of fixed bias circuit in CE configuration and obtain the expression for I_B. Why the circuit is not suitable if theβ of the transistor is changed.

b) How to obtain bias stability in CE configuration circuit?

c) Briefly explain about thermal stability. [8+4+4]

3.a) Classify the amplifiers based as feedback topology and give their block diagram. How the input and output impendence are effected in each case?

b) Draw the circuit diagram of a current feed back circuit and derive Expressions for Voltage gain and output resistance, and input resistance. [8+8]

4.a) Derive the expression for frequency of oscillations in RC-phase shift oscillator using BJT.

b) A crystal has L=0.1H, C=0.01PF, R=10kΩ and C_M=1PF. Find the series resonance andQ-factor. [8+8]

5.a) With the help of necessary equations show the trajectory of an electron is cycloid when it is placed in perpendicular electric and magnetic fields.

b) Determine the velocity and kinetic energy of an electron accelerated through potential of3KV. [8+8]

6.a) Compare the characteristics of a p-n junction diode, Zener diode and Tunnel diode.

b) How do you determine whether a given semiconductor is p-type or n-type? Explain the principle with necessary equations. [8+8]

7.a) Describe the action of a full wave bridge rectifier with the aid of input-output wave forms.

b) What are the advantages of bridge rectifier over centre tapped Transformer?

c) In a Bridge rectifier, the transformer is connected to 220 V, 60 Hz mains and the turns ratio of the step down transformer is 11:1. Assuming the diode is ideal, find i) I_d ii) Voltage across the load iii) PIV [6+4+6]

8.a) Compare CB, CE, CC configurations with respect to current gain, voltage gain, input resistance and output resistance.

b) Explain what is meant by early effect in the case of transistor and what are its consequences? [10+6]

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I .B.TECH –SUPPLEMENTARY EXAMINATIONS JANUARY- 2010 SET-4

ELECTRONIC DEVICES & CIRCUITS

(COMMON TO EEE, ECE, CSE, EIE, BME, IT, E.CON.E, CSS, ETM, ECC, ICE)
Time: 3hours Max.Marks:80
Answer any FIVE questions
All questions carry equal marks
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1.a) Classify the amplifiers based as feedback topology and give their block diagram. How the input and output impendence are effected in each case?

b) Draw the circuit diagram of a current feed back circuit and derive Expressions for Voltage gain and output resistance, and input resistance. [8+8]

2.a) Derive the expression for frequency of oscillations in RC-phase shift oscillator using BJT.

b) A crystal has L=0.1H, C=0.01PF, R=10kΩ and C_M=1PF. Find the series resonance andQ-factor. [8+8]

3.a) With the help of necessary equations show the trajectory of an electron is cycloid when it is placed in perpendicular electric and magnetic fields.

b) Determine the velocity and kinetic energy of an electron accelerated through potential of3KV. [8+8]

4.a) Compare the characteristics of a p-n junction diode, Zener diode and Tunnel diode.

b) How do you determine whether a given semiconductor is p-type or n-type? Explain the principle with necessary equations. [8+8]

5.a) Describe the action of a full wave bridge rectifier with the aid of input-output wave forms.

b) What are the advantages of bridge rectifier over centre tapped Transformer?

c) In a Bridge rectifier, the transformer is connected to 220 V, 60 Hz mains and the turns ratio of the step down transformer is 11:1. Assuming the diode is ideal, find

i) I_d ii) Voltage across the load iii) PIV [6+4+6]

6.a) Compare CB, CE, CC configurations with respect to current gain, voltage gain, input resistance and output resistance.

b) Explain what is meant by early effect in the case of transistor and what are its consequences? [10+6]

7.a) Give symbol of UJT and mark required polarities for operation.

b) Give the equivalent circuit of UJT.

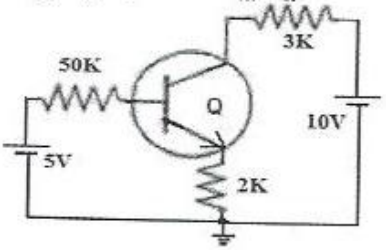

Figure:2

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17. REFERENCES:

SUGGESTED BOOKS

TEXT BOOKS:

1.Millman's Electronic Devices and Circuits – J. Millman, C.C.Halkias, and Satyabrata Jit, 2 Ed.,1998, TMH.
2.Electronic Devices and Circuits – Mohammad Rashid, Cengage Learing, 2013
3.Electronic Devices and Circuits – David A. Bell, 5 Ed, Oxford

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1. Integrated Electronics – J. Millman and Christos C. Halkias, 1991 Ed., 2008, TMH.
2.Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, 9 Ed., 2006, PEI/PHI.
3. Electronic Devices and Circuits – B. P. Singh, Rekha Singh, Pearson, 2Ed, 2013.
4. Electronic Devices and Circuits - K. Lal Kishore, 2 Ed., 2005, BSP.

5. Electronic Devices and Circuits – Anil K. Maini, Varsha Agarwal, 1 Ed., 2009, Wiley India Pvt. Ltd.
6. Electronic Devices and Circuits – S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, 2 Ed., 2008, TMH.

WEBSITES

1. http://www.engineersgarage.com/electronic-circuits
2. http://archive.org/details/ElectronicDevicesCircuits
3. http://www.gobookee.net/electronic-devices-and-circuits/
4. http://engineeringppt.blogspot.in/electronic-devices-and-circuits.html
5. http://www.ieeeghn.org/wiki/index.php/IEEE_Electron_Devices_Society_History
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10. http://techbits.co.in/forum/3rd-semester/electronic-devices-and-circuits-by- jacob
11. http://myengineeringebooks.blogspot.in/2013/03/electronic-devices-and-circuits
12. http://www.engineersarchive.com/2011/10/electronic-devices-and-circuits-by.html

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The Expert Details which have been mentioned below are only a few of the eminent ones known Internationally, Nationally and Locally. There are a few others known as well.

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