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Note : Remove "Table of Content" before including in CP Book
Each Course Plan shall be printed and made into a book with cover page
Blooms Level in all sections match with A.2, only if you plan to teach / learn at higher levels

18EC42 : ANALOG CIRCUITS

A. COURSE INFORMATION

1. Course Overview

Degree:	BE	Program:	EC
Year / Semester :	2018/3	Academic Year:	2018-2019
Course Title:	Analog Circuits	Course Code:	18EC42
Credit / L-T-P:	50-5-0	SEE Duration:	180 Minutes
Total Contact Hours:	55	SEE Marks:	60 Marks

CIA Marks:	30	Assignment	10
Course Plan Author:	Arun G	Sign	
Checked By:		Sign	

2. Course Content

Module	Module Content	Teaching Hours	Module Concepts	Blooms Level
1	BJT AC Analysis: BJT Transistor Modeling , The re transistor model, Common emitter fixed bias, Voltage divider bias, Emitter follower configuration. - Darlington connection DC bias; The Hybrid equivalent model, Approximate Hybrid Equivalent Circuit ,Fixed bias, Voltage divider, Emitter follower configuration; Complete Hybrid equivalent model, Hybrid π Model.	10	Transistor AC Analysis and Hybrid equivalent model	L2,L3
2	Field Effect Transistors: Construction and Characteristics of JFETs, Transfer Characteristics, Depletion type MOSFET, Enhancement type MOSFET. Field FET Amplifiers: JFET small signal model, Fixed bias configuration, Self bias configuration, Voltage divider configuration, Common Gate configuration.SourceFollowerConfiguration,Cascade configuration.	10	Characteristics of FET and small signal model analysis ofFET amplifiers	L2,L3
3	Logarithms, Decibels, Low frequency response BJT Amplifier with RL, Low frequency -FET Amplifier, Miller effect capacitance, High frequency response –BJT Amplifier, High frequency response-FET Amplifier, Multistage Frequency Effects.	10	Frequency response of BJT and FET	L2
4	Feedback and Oscillator Circuits: Feedback concepts, Feedback connection types, Practical feedback circuits, Oscillator operation, FET Phase shift oscillator, Wien bridgeoscillator, Tuned Oscillator circuit, Crystal oscillator, UJT construction, UJT Oscillator	10	Negative feedback ,positive feedback and barkusen's criteria	L2
5	Power Amplifiers: Definition and amplifier types, Series fed class A amplifier, Transformer coupled class A amplifier, Class B amplifier operation and circuits, Amplifier distortion, Class C and Class D amplifiers. Voltage Regulators:Discrete transistor voltage regulation -Series and Shunt Voltage regulators.	10	Efficiency of power amplifiers and voltage regulators	L3

3. Course Material

Module	Details	Available
1	Text books	
	Robert L. Boylestad and Louis Nashelsky , Pearson 11 Edition 2012	In Lib
	"Electronics devices and Circuit theory"	
2	Reference books	

i	Adel S. Sedra and Kenneth C.Smith 5th Edition , "Micro Electronic circuit Theory and Applications	In Lib
ii	Behzad Razavi, John Weily, "Fundamentals of Microelectronics"	
iii	J.Millman &C.C.Halkias-Integrated Electronics, 2nd Edition 2010	
3	Others (Web, Video, Simulation, Notes etc.)	
		Not Available

4. Course Prerequisites

SNo	Course Code	Course Name	Module / Topic / Description	Sem	Remarks	Blooms Level
1	17ELN15 /25	Basic Electronics	1/ Semiconductor devices and BJT/ Fundamentals of diode characteristics and transistor characteristics	1/2		L2
			2/ Transistor biasing/ Knoweldge of fixed,voltage biasing circuits	1/2		L2

Note: If prerequisites are not taught earlier, GAP in curriculum needs to be addressed. Include in Remarks and implement in B.5.

B. OBE PARAMETERS

1. Course Outcomes

#	COs	Teach. Hours	Concept	Instr Method	Assessment Method	Blooms' Level
17EC33.1	Understand the BJT re -model and biasing circuits with the help ofBJT modeling	5	Transistor AC Analysis	Lecture	Assignment	L2,L3
17EC33.2	Compute AC gain and Impedance for BJT using h parameters model	5	Transistor Hybrid model	Lecture	CIA	L3
17EC33.3	Understand the construction and characteristics of JFET's and MOSFET's	5	Configuration of FET amplifiers	Lecture	Slip test and assignment	L2
17EC33.4	Determine the performance characteristics of FET amplifier using small signal model	5	Characteristics of FET	Lecture	Assignments and CIA	L3
17EC33.5	Understand the low and high frequency responses of BJT and FET amplifiers.	3	Frequency response of BJT and FET Amplifiers	Lecture	CIA	L2
17EC33.6	Understand the characteristics of negative feedback amplifiers associated with transfer and stability gain	3	Negative feedback circits	Lecture	Slip test	L2
17EC33.7	Understand the positive feedback and Barkhausen's criteria applied to oscillators	7	Oscillator operation and types	Lecture	assignment	L2
17EC33.8	Evaluate the efficiency of class A, B,C,D power amplifiers with AC and DC parameters	6	Power amplifiers efficiency	Lecture	CIA	L3
17EC33.9	Understand the operation of series	4	Voltage	Lecture	Assignment	L2

	and shunt circuits using voltage regulation principle		Regulation			
-	**Total**	**50**				

Note: Identify a max of 2 Concepts per Module. Write 1 CO per concept.

2. Course Applications

SNo	Application Area	CO	Level
1	The re model is used to predict the performance of a device and in small signal analysis	CO1	L2,L3
2	Small signal AC response can be determined by h parameters model	CO2	L3
3	VLSI, Embedded systems are the areas of FET applications as in IC fabrication	CO3	L2
4	FET amplifiers are used in oscilloscopes, electronic voltmeters and other measuring and testing equipment because of their high input impedance.	CO4	L3
5	Frequency Response of an amplifier or filter shows how the gain of the output responds to input signals at different frequencies	CO5	L2
6	Many **amplifiers** and control systems use **negative feedback**. circuits	CO6	L2
7	all the clock generators for microprocessors are actually oscillators	CO7	L2
8	Speakers ,headphones and RF Transmitters are applications of power amplifiers	CO8	L3
9	Electronic voltage regulators are found in devices such as computer power supplies where they stabilize the DC voltages used by the processor and other elements. In automobile alternators and central power station generator plants, voltage regulators control the output of the plant. In an electric power distribution system, voltage regulators may be installed at a substation or along distribution lines so that all customers receive steady voltage independent of how much power is drawn from the line.	CO9	L2

Note: Write 1 or 2 applications per CO.

3. Articulation Matrix

(CO – PO MAPPING)

-	Course Outcomes	Program Outcomes												
#	COs	PO1	PO2	PO3	PO4	PO5	PO 6	PO7	PO 8	PO9	PO1 0	PO1 1	PO1 2	Level
17EC33.1	Understand the BJT re -model and biasing circuits with the help ofBJT modeling	2	2	-	3	-	-	-	-	-	-	-	-	L2,L3
17EC33.2	Compute AC gain and Impedance for BJT using h parameters model	2	2	-	3	-	-	-	-	-	-	-	-	L3
17EC33.3	Understand the construction and characteristics of JFET's and MOSFET's	3	3	3	2	-	-	-	-	-	-	-	-	L2
17EC33.4	Determine the performance characteristics of FET amplifier using small signal model	3	3	3	2	-	-	-	-	-	-	-	-	L3
17EC33.5	Understand the low and high frequency responses of BJT and FET amplifiers.	2	1	-	-	-	-	-	-	-	-	-	-	L2
17EC33.6	Understand the characteristics of negative feedback amplifiers associated with transfer and stability gain	3	2	2	2	-	-	-	-	-	-	-	-	L2
17EC33.7	Understand the positive feedback and Barkhausen's criteria applied to oscillators	3	2	3	-	-	-	-	-	-	-	-	-	L2
17EC33.8	Evaluate the efficiency of class	3	3	3	-	-	-	-	-	-	-	-	-	L3

	A, B,C,D power amplifiers with AC and DC parameters													
17EC33.9	Understand the operation of series and shunt circuits using voltage regulation principle	3	3	3	2	-	-	-	-	-	-	-	-	L2
Note: Mention the mapping strength as 1, 2, or 3														

4. Mapping Justification

Mapping		Justification	Mapping Level
CO	**PO**	**-**	**-**
CO1	PO1	Knowledge of re- model is used to predict the performance of a device in small signal analysis	
CO1	PO2	In small signal analysis BJT re model is used to predict device performance	
CO1	PO4	The data interpreted usign re model analysis is used in prediction of device performance.	
CO2	PO1	Determination of small signal AC response is done using H parameter model	
CO2	PO2	Determination of small signal AC response analysis requires H parameter model	
CO2	PO4	Data interpreted using small signal AC analysis is based in H parameter model.	
CO3	PO1	Knowledge of FET is required for IC design and fabrication	
CO3	PO2	Analysis of FET characteristics is used in VLSI and Embedded system design	
CO3	PO3	Knowledge used to design IC is used in many medical instruments, communication equipment's and automobile components	
CO3	PO4	Design of embedded systems and VLSI systems is based on FET parameters interpreted by its characteristics	
CO4	PO1	Knowledge of FET amplifiers is used in the design of oscilloscopes , electronic voltmeters and testing equipment's	
CO4	PO2	In design and analysis of oscilloscopes, voltmeters testing devices require FET characteristics	
CO4	PO3	Design of many electronic and testing meters for public health and safety	
CO4	PO4	Design of oscilloscopes and testing equipment require the knowledge of FET amplifiers	
CO5	PO1	Knowledge of FET and BJT frequency response is required to determine the behavior of different inputs.	
CO5	PO2	Analysis of output gain to different input frequencies can be done using response of FET amplifiers.	
CO6	PO1	Knowledge of negative feedback circuits is used to predict the behavior and stability of controllers.	
CO6	PO2	Analysis of amplifiers and controllers require knowledge of negative feedback	
CO6	PO3	Design of temperature, viscosity,Ph controlling devices that are useful for society can be done with the knowledge of negative feedback circuits.	
CO6	PO4	Analysis of negative feedback is useful in designing different controllers and amplifiers.	
CO7	PO1	Knowledge of oscillators which use positive feedback, is required in building timing circuits for processors and clock generators	
CO7	PO2	Design of clocking circuits , microprocessors and controllers use	

		oscillators.	
CO7	PO3	Designed processors and controllers are useful for societal and environmental considerations.	
CO8	PO1	Knowledge of power amplifiers is required to built speakers , headphones, RF Tx and Rx.	
CO8	PO2	Design and analysis of RF receivers, speakers, head phones require knowledge of power amplifiers.	
CO8	PO3	RF transceivers , headphones speakers are useful for society and public health.	
CO9	PO1	Knowledge of voltage regulators is needed to design power supplies for various electronic devices.	
CO9	PO2	Analysis and design of power station generators , electric power distribution systems require the knowledge of voltage regulators	
CO9	PO3	Electric power distributes , power station generators , dc supply voltages hence designed are useful for society and environmental considerations.	
CO9	PO4	Design of alternators , central power distributors , power station generators etc require the knowledge of voltage regulators.	

Note: Write justification for each CO-PO mapping.

5. Curricular Gap and Content

SNo	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1					
2					
3					
4					
5					

Note: Write Gap topics from A.4 and add others also.

6. Content Beyond Syllabus

SNo	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Note: Anything not covered above is included here.

C. COURSE ASSESSMENT

1. Course Coverage

Module #	Title	Teaching Hours	No. of question in Exam						CO	Levels
			CIA-1	CIA-2	CIA-3	Asg	Extra	SEE		

							Asg			
1	BJT AC Analysis	13	2	-	-	1	1	2	CO1, CO2	L2, L3
2	Field Effect Transistor	10	2	-	-	1	1	2	CO3, CO4	L2, L3
3	BJT and JFET Frequency Response	12	-	2	-	1	1	2	CO5	L2
4	Feedback and Oscillator circuits	10	-	2	-	1	1	2	CO6, Co7	L2
5	Power Amplifiers and Voltage regulators	10	-	-	4	1	1	2	CO8, CO9	L2, L3
-	**Total**	**55**	**4**	**4**	**4**	**5**	**5**	**10**	**-**	**-**

Note: Distinct assignment for each student. 1 Assignment per chapter per student. 1 seminar per test per student.

2. Continuous Internal Assessment (CIA)

Evaluation	Weightage in Marks	CO	Levels
CIA Exam – 1	30	CO1, CO2, CO3, CO4	L2, L3,L2, L3
CIA Exam – 2	30	CO5, CO6, CO7	L2
CIA Exam – 3	30	CO8, CO9	L2, L3
Assignment - 1	8	CO1, CO2, CO3, CO4	L2, L3,L2, L3
Assignment - 2	8	CO5, CO6, CO7	L2
Assignment - 3	8	CO8, CO9	L2, L3
Seminar - 1	2	CO1, CO2, CO3, CO4	L2, L3,L2, L3
Seminar - 2	2	CO5, CO6,CO7	L2
Seminar - 3	2	CO8, CO9	L2, L3
Other Activities – define – Slip test			
Final CIA Marks	**40**	**-**	**-**

Note : Blooms Level in last column shall match with A.2 above.

D1. TEACHING PLAN - 1

Module - 1

Title:	BJT AC ANALYSIS	Appr Time:	16 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Understand the BJT re -model and biasing circuits with the help of BJT modeling	CO1	L2,L3
2	Compute AC gain and Impedance for BJT using h parameters model	CO2	L3
b	***Course Schedule***	-	-
Class No	**Module Content Covered**	**CO**	**Level**
1	BJT Transistor Modeling	Co1	L2
2	The re transistor model	Co1	L2
3	Common emitter fixed bias	Co1	L2
4	Voltage divider bias,	Co1	L2
5	Emitter follower configuration -Darlington connection	Co1	L2
6	DC bias; The Hybrid equivalent model	Co2	L3
7	Approximate Hybrid Equivalent Circuit ,Fixed bias	Co2	L3
8	Voltage divider	Co2	L3

9	Emitter follower configuration	C02	L3
10	Complete Hybrid equivalent model	C02	L3
11	Complete Hybrid equivalent model	C02	L3
12	Hybrid π Model	C02	L3
13	Numericals and question paper solving		
c	**Application Areas**	**CO**	**Level**
1	The re model is used to predict the performance of a device and in small signal analysis	CO1	L3
2	Small signal AC response can be determined by h parameters model	CO2	L3
d	**Review Questions**	-	-
1	Obtain the r parameter model for CE configuration	CO1	L2
2	With the help of appropriate circuits analyze CE fixed bias configuration	CO1	L3
3	With the help of appropriate circuits analyze CE voltage divider bias configuration	CO2	L3
4	Obtain the Exact AC analysis for CE amplifier with unbypassed R_E	CO1	L3
5	Analyze the CE with collector feedback configuration with necessary circuits	CO1	L3
6	Obtain r- parameter model for CC configuration	CO1	L2
7	For the transistor connected in CE configuration determine A_v,A_I,R_i and R_o using the complete hybrid equivalent model.. Given R_L=R_S=1 kΩ	CO1	L3
8	For the emitter follower circuit shown calculate Z_i,Z_o,A_v and A_I	CO1	L3
9	Obtain the analysis of CE configuration using simplified Hybrid model	CO2	L2
10	Obtain the analysis of CC configuration using simplified Hybrid model	CO2	L2
11	Obtain the analysis of CB configuration using simplified Hybrid model	CO2	L2
12	A common base amplifier as shown in figure has the following components: R_s=600Ω,R_c=5.6K, R_E=5.6K, R_L =39 K. The transistor parameters are h_{ie}=1 K, h_{fe}=85 and h_{oe}=2μA/V . Calculate R_i,R_o,A_v,A_{vs}=Vo/Vs.	CO2	L3
e	**Experiences**	-	-
1		CO1	L2
2			
3			
4		CO3	L3
5			

Module – 2

Title:	Field Effect Transistor	Appr Time:	10 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Understand the construction and characteristics of JFET's and MOSFET's	CO3	L2
2	Determine the performance characteristics of FET amplifier using small signal model	CO4	L3
b	***Course Schedule***	-	-
Class No	**Module Content Covered**	**CO**	**Level**
14	Construction and Characteristics of JFETs	CO1	L2
15	Transfer Characteristics	CO1	L2
16	Depletion type MOSFET	CO1	L2
17	Enhancement type MOSFET	CO1	L2
18	Field FET Amplifiers	CO1	L2
19	JFET small signal model,	CO2	L3
20	Fixed bias configuration	C02	L3
21	Self bias configuration	CO2	L3

22	Voltage divider configuration	CO2	L3
23	Common Gate configuration	CO2	L3
24	Source Follower Configuration.	CO2	L3
25	Cascade configuration	CO2	L3
c	**Application Areas**	**CO**	**Level**
1	VLSI, Embedded systems are the areas of FET applications as in IC fabrication	CO3	L2
2	FET amplifiers are used in oscilloscopes, electronic voltmeters and other measuring and testing equipment because of their high input impedance.	CO4	L3
d	**Review Questions**	-	-
13	Give the classification of FETs and their applications areas	CO3	L1
14	Explain any one method of biasing a single stage JFET amplifier	CO4	L3
15	With the help of neat diagram explain the voltage divider biasing method for JFET	CO3	L2
16	With the help of neat diagram explain the self biasing method for JFET	CO4	L4
17	Why is FET called unipolar device? List the features of FET	CO4	L2
18	For the circuit shown , the FET has V_p=4V, I_{DSS}=4 mA, Calculate i) I_{DSQ} ii)V_{GSQ} iii) V_{DSQ}	CO3	L5
19	Write a short note on biasing of MOSFET.	CO3	L2
20	Draw and explain a small signal low frequency model for JFET		L3
21	Derive the expressions for Av, Ri and R_o for various JFET amplifier configurations.		
e	**Experiences**	-	-
1		CO1	L2
2			
3			
4		CO3	L3
5			

E1. CIA EXAM – 1

a. Model Question Paper - 1

Crs Code:	17EC33	Sem:	III	Marks:	30	Time:	75 minutes
Course:	Analog Circuits						

-	-	**Note: Answer any 2 questions, each carry equal marks.**	**Marks**	**CO**	**Level**
1	a	Obtain the r parameter model for CE configuration	15	CO1	L2
	b	With the help of appropriate circuits analyze CE voltage divider bias configuration		CO1	L2
2	a	Obtain the analysis of CB configuration using simplified Hybrid model	15	CO2	L2
	b	A common base amplifier as shown in figure has the following components: R_s=600Ω,R_c=5.6K, R_E=5.6K, R_L =39 K. The transistor parameters are h_{ie}=1 K, h_{fe}=85 and h_{oe}=2μA/V . Calculate R_i,R_o,A_v,A_{vs}=Vo/Vs.		CO2	L3
3	a	Explain any one method of biasing a single stage JFET amplifier	15	CO4	L1
	b	Draw and explain a small signal low frequency model for JFET		CO4	L2
4	a	A FET amplifier shown in figure has the following parameters I_{DSS}=2mA,V_p=-2.4V Determine i) V_{GS} ii) Q-point	15	CO3	L2
	b	Derive the expressions for Av, Ri and R_o for various JFET amplifier configurations.		CO4	L2

b. Assignment -1

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions							
Crs Code:		Sem:	III	Marks:	10	Time:	90 – 120 minutes
Course:	Analog Circuits						

Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.

SNo	USN	Assignment Description	Marks	CO	Level
1	1KT17EC001	Obtain the r parameter model for CE configuration	10	CO1	L2
2	1KT17EC002	With the help of appropriate circuits analyze CE fixed bias configuration	10	CO1	L3
3	1KT17EC003	With the help of appropriate circuits analyze CE voltage divider bias configuration	10	CO1	L3
4	1KT17EC004	Obtain the Exact AC analysis for CE amplifier with unbypassed R_E	10	CO1	L3
5	1KT17EC005	Analyze the CE with collector feedback configuration with necessary circuits	10	CO1	L3
6	1KT17EC006	Obtain r- parameter model for CC configuration	10	CO1	L2
7	1KT17EC007	For the transistor connected in CE configuration determine A_v,A_I,R_i and R_o using the complete hybrid equivalent model.. Given R_L=R_S=1 kΩ	10	CO2	L3
8	1KT17EC008	For the emitter follower circuit shown calculate Z_i,Z_o,A_v and A_I	10	CO2	L3
9	1KT17EC009	Obtain the analysis of CE configuration using simplified Hybrid model	10	CO2	L2
10	1KT17EC010	Obtain the analysis of CC configuration using simplified Hybrid model	10	CO2	L2
11	1KT17EC011	Obtain the analysis of CB configuration using simplified Hybrid model	10	CO2	L2
12	1KT17EC012	A common base amplifier as shown in figure has the following components: R_s=600Ω,R_c=5.6K, R_E=5.6K, R_L =39 K. The transistor parameters are h_{ie}=1 K, h_{fe}=85 and h_{oe}=2μA/V . Calculate R_i,R_o,A_v,A_{vs}=Vo/Vs.	10	CO2	L3
13	1KT17EC014	Give the classification of FETs and their applications areas	10	CO2	L3
14	1KT17EC015	Explain any one method of biasing a single stage JFET amplifier	10	CO2	L2
15	1KT17EC016	With the help of neat diagram explain the voltage divider biasing method for JFET	10	CO2	L2
16	1KT17EC017	With the help of neat diagram explain the self biasing method for JFET	10	CO2	L2
17	1KT17EC018	Why is FET called unipolar device? List the features of FET	10	CO2	L2
18	1KT17EC020	A FET amplifier shown in figure has the following parameters I_{DSS}=2mA,V_p=-2.4V Determine i) V_{GS} ii) Q-point	10	CO2	L3
19	1KT17EC0021	For the circuit shown , the FET has V_p=4V, I_{DSS}=4 mA, Calculate i) I_{DSQ} ii)V_{GSQ} iii) V_{DSQ}	10	CO2	L3
20	1KT17EC022	Write a short note on biasing of MOSFET.	10	CO2	L2
21	1KT17EC023	Draw and explain a small signal low frequency model for JFET	10	CO2	L3
22	1KT17EC024	Derive the expressions for Av, Ri and R_o for various JFET amplifier configurations.	10	CO1	L3
23	1KT17EC025	Give the classification of FETs and their applications areas	10	CO1	L2
24	1KT17EC026	Explain any one method of biasing a single stage JFET amplifier	10	CO1	L2
25	1KT17EC027	With the help of neat diagram explain the voltage divider biasing method for JFET	10	CO1	L2
26	1KT17EC028	With the help of neat diagram explain the self biasing method for JFET	10	CO1	L2
27	1KT17EC029	Why is FET called unipolar device? List the features of FET	10	CO1	L2

28	1KT17EC030	A FET amplifier shown in figure has the following parameters I_{DSS}=2mA,V_p=-2.4V Determine i) V_{GS} ii) Q-point	10	CO1	L3
29	1KT17EC031	For the circuit shown , the FET has V_p=4V, I_{DSS}=4 mA, Calculate i) I_{DSQ} ii)V_{GSQ} iii) V_{DSQ}	10	CO1	L3
30	1KT17EC032	Write a short note on biasing of MOSFET.	10	CO2	L2
31	1KT17EC033	Draw and explain a small signal low frequency model for JFET	10	CO2	L2
32	1KT17EC035	Derive the expressions for Av, Ri and R_o for various JFET amplifier configurations.	10	CO1	L3
33	1KT17EC036	Give the classification of FETs and their applications areas	10	CO1	L2
34	1KT17EC037	Explain any one method of biasing a single stage JFET amplifier	10	CO1	L2
35	1KT17EC038	With the help of neat diagram explain the voltage divider biasing method for JFET	10	CO1	L2
36	1KT17EC040	With the help of neat diagram explain the self biasing method for JFET	10	CO1	L2
37	1KT17EC041	Why is FET called unipolar device? List the features of FET	10	CO1	L2
38	1KT17EC042	A FET amplifier shown in figure has the following parameters I_{DSS}=2mA,V_p=-2.4V Determine i) V_{GS} ii) Q-point	10	CO1	L3
39	1KT17EC043	For the circuit shown , the FET has V_p=4V, I_{DSS}=4 mA, Calculate i) I_{DSQ} ii)V_{GSQ} iii) V_{DSQ}	10	CO1	L3
40	1KT17EC044	Write a short note on biasing of MOSFET.	10	CO2	L2
41	1KT17EC046	Draw and explain a small signal low frequency model for JFET	10	CO2	L2
42	1KT17EC047	Derive the expressions for Av, Ri and R_o for various JFET amplifier configurations.	10	CO1	L3

D2. TEACHING PLAN - 2

Module – 3

Title:	BJT and JFET Frequency Response	Appr Time:	16 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Understand the low and high frequency responses of BJT and FET amplifiers.	CO5	L2
b	***Course Schedule***		
Class No	**Module Content Covered**	**CO**	**Level**
1	Logarithms, Decibels	CO5	L2
2	Low frequency response BJT Amplifier with RL	CO5	L2
3	Low frequency -FET Amplifier	CO5	L2
4	Miller effect capacitance	CO5	L3
5	Miller effect capacitance	CO5	L3
6	High frequency response –BJT Amplifier	CO5	L2
7	High frequency response –BJT Amplifier	CO5	L2
8	High frequency response-FET Amplifier,	CO5	L2
9	Multistage Frequency Effects.	CO5	L3
10	Numericals and question paper discussion		L3
11			
12			
13			
14			
15			
16			

c	Application Areas	CO	Level
1	Frequency Response of an amplifier or filter shows how the gain of the output responds to input signals at different frequencies	CO5	L3
2			
d	**Review Questions**	-	-
1	What do you understand by frequency respose of the amplifier ? How is it plotted?	CO5	L2
2	What do you mean by bandwidth of an amplifier?	CO5	L2
3	Explain the usefulness of decibel unit	CO5	L2
4	Explain the significance of Octaves and decades.	CO5	L3
5	Give the expression for voltage gain of the amplifier below and above midband.	CO5	L2
6	What is the effect of coupling capacitors on the bandwidth of the amplifier?	CO5	L3
7	What is the effect of bypass capacitors on the bandwidth of the amplifier?	CO5	L3
8	What is the effect of internal transistor capacitances on the bandwidth of the amplifier?	CO5	L3
e	**Experiences**	-	-
1			
2			
3			
4			
5			

Module – 4

Title:	Feedback and Oscillator Circuits	Appr Time:	10 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Understand the characteristics of negative feedback amplifiers and associated with transfer and stability gain	CO6	L2
2	Understand the positive feedback and Barkhausen's criteria applied to oscillators	CO7	L2
b	***Course Schedule***		
Class No	**Module Content Covered**	**CO**	**Level**
1	Feedback concepts, Feedback connection types	CO6	L2
2	Feedback connection types contd..	Co6	L2
3	Practical feedback circuits	Co6	L2
4	Oscillator operation, FET Phase shift oscillator,	CO7	L2
5	Wien bridge oscillator,	CO7	L2
6	Tuned Oscillator circuit	CO7	L2
7	Crystal oscillator	CO7	L2
8	UJT construction,	CO7	L2
9	UJT Oscillator	CO7	L2
10	Numericals and question paper solving		L3
c	**Application Areas**	**CO**	**Level**
1	Many **amplifiers** and control systems use **negative feedback**. circuits	CO6	L3
2	all the clock generators for microprocessors are actually oscillators	CO7	L3
d	**Review Questions**	-	-
1	What is Barkhausen criterion for the feedback oscillators?	CO6	L2

2	Explain the classification of the feedback oscillators.	CO6	L2
3	Why the negative feedback is incorporated in the Wein Bridge oscillator circuit?	CO7	L2
4	Explain the concept of tuned collector oscillator	CO7	L2
5	How frequency stability can be improved in the oscillators?	CO7	L3
6	What is Piezoelectric effect ? Explain the working of crystal oscillator	CO7	L2
7	Explain the working of Pierce crystal oscillator	CO7	L2
8	Explain the working of Miller crystal oscillator.	CO7	L2
9	Where does the starting voltage for an oscillator come from?	CO7	L2
10	Discuss the conditions for sustaining oscillations in oscillators	CO7	L2
11			
e	**Experiences**	-	-
1		CO7	L2
2			
3			
4		CO8	L3
5			

E2. CIA EXAM – 2

a. Model Question Paper - 2

Crs Code:	CS501PC	Sem:	I	Marks:	30	Time:	75 minutes
Course:	Design and Analysis of Algorithms						

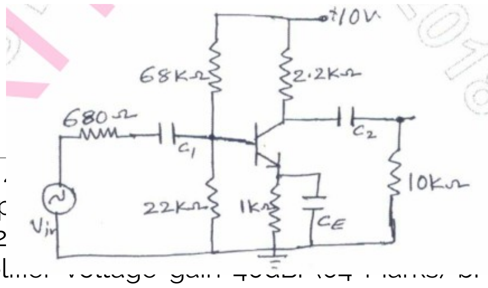
-	-	Note: Answer any 2 questions, each carry equal marks.	Marks	CO	Level
1	a	Explain the significance of Octaves and decades.	15	CO5	L2
	b	Describe Miller's effect and derive an equation for Miller input and output capacitances.		CO5	L3
2	a	The input power to a device is 10,000W at a voltage of 1000V. The output power is 500W and the output impedance is 20Q i) Find a power gain in decibels ii) Find the voltage gain in decibels iii) Find input impedance	15	CO5	L3
		Determine the high-cutoff frequencies of JFET amplifier for the following specification: CG = 0.01uF, Cc = 0.5g, Cs = 2p.F, Rsig= 10 KO, RG = 1mQ, RD = 4.71(52, Rs = IKO, RL = .2 IDSS = 8mA, Vp = -4V, rd = 0052, VDD = 20V, Cgd = 2 PF, Cgs = 4 PF, Cds = 0.5 PF, C, = 5 PF, o = 6 PF and Av=-3		CO5	L3
3	a	Mention the types of feedback connections. Draw their block diagrams indicating input and output signal.	15	CO6	L2
	b	What are the effects of negative feedback in an amplifier? Show how bandwidth of an amplifier increases with negative feedback		CO6	L3
4	a	With a neat circuit diagram, explain the working principle of FET phaseshift oscillator, with relevant equations.	15	CO7	L2
	b	With a neat circuit and waveforms, explain the working operation of UJT relaxation oscillator.		CO7	L2

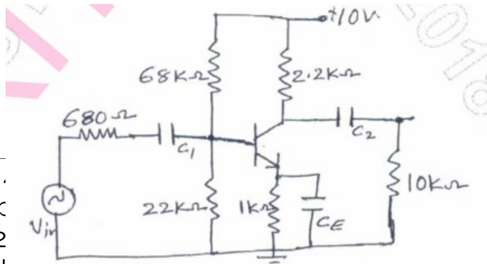
b. Assignment – 2

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions							
Crs Code:	17EC33	Sem:	III	Marks:	10	Time:	90 – 120 minutes
Course:	Design and Analysis of Algorithms						
Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.							

SNo	USN	Assignment Description	Marks	CO	Level
1	1KT17EC001	What do you understand by frequency respose of the amplifier ? How is it plotted?	10	Co6	L2
2	1KT17EC002	What do you mean by bandwidth of an amplifier?	10	Co6	L2

3	1KT17EC003	Explain the usefulness of decibel unit	10	C06	L2
4	1KT17EC004	Explain the significance of Octaves and decades.	10	C06	L2
5	1KT17EC005	Give the expression for voltage gain of the amplifier below and above midband.	10	C06	L2
6	1KT17EC006	What is the effect of coupling capacitors on the bandwidth of the amplifier?	10	C06	L2
7	1KT17EC007	Draw the small signal high frequency CE model for a transistor	10	C06	L2
8	1KT17EC008	The input power to a device is 10,000W at a voltage of 1000V. The output power is 500W and the output impedance is 20Q i) Find a power gain in decibels ii) Find the voltage gain in decibels iii) Find input impedance.	10	C06	L3
9	1KT17EC009	b. Describe Miller's effect and derive an equation for Miller input and output capacitance.	10	C06	L2
10	1KT17EC010	Discuss the effect of various capacitors on low-frequency response of BJT amplifier.	10	C06	L2
11	1KT17EC011	Derive the expression for low frequency response of BJT amplifier due to capacitors Cs and Cc.	10	C06	L3
12	1KT17EC012	Calculate fB, and fHo for amplifier circuit shown In Fig.Q5(b), for the base current IB = 14.791AA and Avolici - —102.58; 13 = 100; Cbe 201' ; Cbc = 4pF ; hie = 1100 ; Cwi = 6pF; Cwo = 8pF , CcE = 1pF. 	10	C06	L3
13	1KT17EC014	An amplifier rated ... aker. i) Calculate the inp ... ut if the power gain is 2 ... ated output if the ampl... (06 Marks) c.	10	C06	L3
14	1KT17EC015	Determine the high-cutoff frequencies of JFET amplifier for the following specification: CG = 0.01uF, Cc = 0.5g, Cs = 2p.F, Rsig= 10 KO, RG = 1mQ, RD = 4.71(52, Rs = IKO, RL = .2 IDSS = 8mA, Vp = —4V, rd = 0052, VDD = 20V, Cgd = 2 PF, Cgs = 4 PF, Cds = 0.5 PF, C, = 5 PF, o = 6 PF and Av = —3.	10	C06	L3
15	1KT17EC016	Explain the effect of multistage frequency of an amplifier	10	C06	L2
16	1KT17EC017	What is the effect of bypass capacitors on the bandwidth of the amplifier?	10	CO6	L3
17	1KT17EC018	What is the effect of internal transistor capacitances on the bandwidth of the amplifier?	10	C06	L3
18	1KT17EC020	Mention the types of feedback connections. Draw their block diagrams indicating input and output signal.	10	C07	L2
19	1KT17EC021	With a neat circuit diagram, explain the working principle of FET phase—shift oscillator, with relevant equations.	10	C07	L2
20	1KT17EC022	What are the effects of negative feedback in an amplifier? Show how bandwidth of an amplifier increases with negative feedback.	10	C07	L3
21	1KT17EC023	With a neat circuit and waveforms, explain the working operation of UJT relaxation oscillator	10	C07	L2
22	1KT17EC024	Determine the voltage gain, input and output impedance with feedback for voltage — series feedback having A = —100, R, = 10 KO and R0= 20 kfl for feedback factor (3 = -0.1)	10	C07	L3
23	1KT17EC025	What do you understand by frequency respose of the	10	CO6	L2

		amplifier ? How is it plotted?			
24	1KT17EC026	What do you mean by bandwidth of an amplifier?	10	CO6	L2
25	1KT17EC027	Explain the usefulness of decibel unit	10	CO6	L2
26	1KT17EC028	Explain the significance of Octaves and decades.	10	CO6	L2
27	1KT17EC029	Give the expression for voltage gain of the amplifier below and above midband.	10	CO6	L2
28	1KT17EC030	What is the effect of coupling capacitors on the bandwidth of the amplifier?	10	CO6	L2
29	1KT17EC031	Draw the small signal high frequency CE model for a transistor	10	CO6	L2
30	1KT17EC032	The input power to a device is 10,000W at a voltage of 1000V. The output power is 500W and the output impedance is 20Q i) Find a power gain in decibels ii) Find the voltage gain in decibels iii) Find input impedance.	10	CO6	L3
31	1KT17EC033	b. Describe Miller's effect and derive an equation for Miller input and output capacitance.	10	CO6	L2
32	1KT17EC035	Discuss the effect of various capacitors on low-frequency response of BJT amplifier.	10	CO6	L2
33	1KT17EC036	Derive the expression for low frequency response of BJT amplifier due to capacitors Cs and Cc.	10	CO6	L3
34	1KT17EC037	Calculate fB, and fHo for amplifier circuit shown In Fig.Q5(b), for the base current IB = 14.791AA and Avolici - —102.58; 13 = 100; Cbe 201' ; Cbc = 4pF ; hie = 1100 ; Cwi = 6pF; Cwo = 8pF , CcE = 1pF. 	10	CO6	L3
35	1KT17EC038	An amplifier rated … aker. i) Calculate the inp… ut if the power gain is 2… ated output if the ampl… (06 Marks) c.	10	CO6	L3
36	1KT17EC040	Determine the high-cutoff frequencies of JFET amplifier for the following specification: CG = 0.01uF, Cc = 0.5g, Cs = 2p.F, Rsig= 10 KO, RG = 1mQ, RD = 4.71(52, Rs = IKO, RL = .2 IDSS = 8mA, Vp = —4V, rd = 0052, VDD = 20V, Cgd = 2 PF, Cgs = 4 PF, Cds = 0.5 PF, C, = 5 PF, 0 = 6 PF and Av = —3.	10	CO6	L3
37	1KT17EC041	Explain the effect of multistage frequency of an amplifier	10	CO6	L2
38	1KT17EC042	What is the effect of bypass capacitors on the bandwidth of the amplifier?	10	CO6	L3
39	1KT17EC043	What is the effect of internal transistor capacitances on the bandwidth of the amplifier?	10	CO6	L3
40	1KT17EC044	Mention the types of feedback connections. Draw their block diagrams indicating input and output signal.	10	CO7	L2
41	1KT17EC046	With a neat circuit diagram, explain the working principle of FET phase—shift oscillator, with relevant equations.	10	CO7	L2
42	1KT17EC047	What are the effects of negative feedback in an amplifier? Show how bandwidth of an amplifier increases with negative feedback.	10	CO7	L3
43	1KT16EC001	With a neat circuit and waveforms, explain the working operation of UJT relaxation oscillator	10	CO7	L2
44	1KT16EC007	Determine the voltage gain, input and output impedance with feedback for voltage — series feedback having A = —100, R, =	10	CO7	L3

		10 KO and R0= 20 kfl for feedback factor (3 = -0.1)			

D3. TEACHING PLAN - 3

Module – 5

Title:	Power Amplifiers	Appr Time:	16 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Evaluate the efficiency of class A, B,C,D power amplifiers with AC and DC parameters	CO8	L3
2	Understand the operation of series and shunt circuits using voltage regulation principle	CO9	L2
b	***Course Schedule***		
Class No	**Module Content Covered**	**CO**	**Level**
1	Definition and amplifier types, Series fed class A amplifier	CO8	L2
2	Transformer coupled class A amplifier,	CO8	L2
3	Class B amplifier operation and circuits,	CO8	L2
4	Amplifier distortion,	CO8	L2
5	Class C and Class D amplifiers	CO8	L2
6	Class C and Class D amplifiers	CO8	L2
7	Voltage Regulators	CO9	L2
8	Discrete Series voltage regulators.	CO9	L3
9	Discrete Shunt Voltage regulators	CO9	L3
10	Numericals		L3
11	Numericals		L3
c	**Application Areas**	**CO**	**Level**
1	Speakers ,headphones and RF Transmitters are applications of power amplifiers	CO8	L2
2	Electronic voltage regulators are found in devices such as computer power supplies where they stabilize the DC voltages used by the processor and other elements. In automobile alternators and central power station generator plants, voltage regulators control the output of the plant. In an electric power distribution system, voltage regulators may be installed at a substation or along distribution lines so that all customers receive steady voltage independent of how much power is drawn from the line.	CO9	L3
d	**Review Questions**	-	-
1	Which amplifiers are called as power amplifiers	CO8	L2
2	Explain the general features of a power amplifier	CO8	L2
3	Draw and explain the block diagram of class D amplifier	CO8	L2
4	Explain the classification of power amplifiers based on class of operation	CO8	L2
5	Why efficiency of class D amplifiers is almost 100%? where are class D amplifiers used?	CO8	L2
6	When is the power dissipation maximum in class A amplifiers	CO8	L3
7	Give the expression for d.c. power input, a.c. power output and efficiency of a series fed directly coupled class A amplifier.	Co8	L2
8	Explain the advantages and disadvantages of directly coupled class A amplifiers	CO9	L2
9	Explain the advantages and disadvantages of transformer coupled class A amplifiers	CO9	L2
10	Explain the three point method of calculating the second harmonic	CO9	L2

	distorsion.		
11	`what is harmonic distorsion	CO9	L2
e	**Experiences**	-	-
1			
2			
3			
4			
5			

E3. CIA EXAM – 3

a. Model Question Paper - 3

Crs Code:	17EC33	Sem:	III	Marks:	30	Time:	75 minutes
Course:	Analog Circuits						

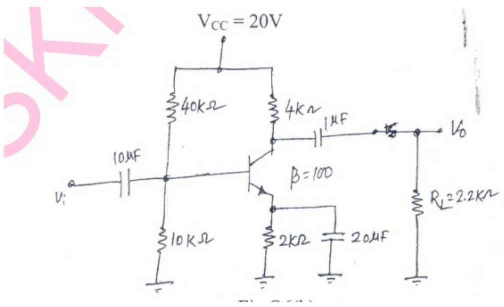
-	-	**Note: Answer any 2 questions, each carry equal marks.**	**Marks**	**CO**	**Level**
1	a	Explain series — fed class — A power amplifier. Show that its maximum conversion efficiency is 25%.	15	CO8	L3
	b	Explain with circuit diagram the operation of Class-B push-Pull amplifier using complementary—symmetry transistor pair. Also mention advantages and disadvantages of the circuit.		CO8	L2
2	a	An ideal class B push-pull power amplifier with input and output transformers has Vcc = 20V, N2 = 2N1 and RL = 20n. The transistors has hfc = 20. Let the input be sinusoidal. For the maximum output signal at VcE(p) = Vcc, determine : i) The output signal power ii) The collector dissipation in each transistor Conversion efficiency.	15	CO8	L3
	b	The following distortion readings are available for a power amplifier, D2 = 0.2, D3= 0.02, D4 = 0.06, with Il = 3.3A and Rc = 40. i) Calculate the total harmonic distortion ii) Determine the fundamental power component iii) Calculate the total power.			
3	a	Explain characteristics of a quartz crystal. With a neat diagram explain the crystal oscillator ,.in parallel resonant mode.	15	CO9	L2
	b	The following component values are given for the Wein-bridge oscillator of the circuit of Ri = R2 = 33k.0 Cl = C2 = 0.001g R3 = 47 ka R4 = 15ka i) Will this circuit oscillate? ii) Calculate the resonant frequency		CO9	L3
4	a	Explain the working of discrete series voltage regulator with diagram	15	CO9	L2
	b	Explain the working of discrete shunt voltage regulator with diagram		CO9	L2

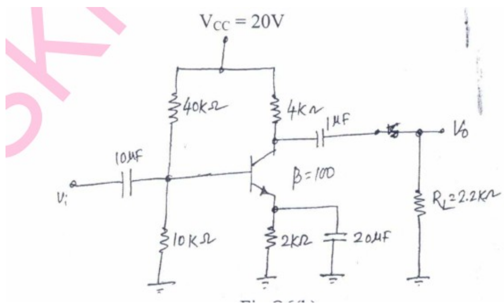
b. Assignment – 3

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions							
Crs Code:	17EC33	Sem:	III	Marks:	10	Time:	90 – 120 minutes
Course:	Design and Analysis of Algorithms						
Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.							

SNo	**USN**	**Assignment Description**	**Marks**	**CO**	**Level**
1	1KT17EC001	Which amplifiers are called as power amplifiers	10	CO8	L2
2	1KT17EC002	Explain the general features of a power amplifier	10	CO8	L2
3	1KT17EC003	Draw and explain the block diagram of class D amplifier	10	CO8	L2
4	1KT17EC004	Explain the classification of power amplifiers based on class of operation	10	CO8	L2
5	1KT17EC005	Why efficiency of class D amplifiers is almost 100%? where are class D amplifiers used?	10	CO8	L2
6	1KT17EC006	When is the power dissipation maximum in class A amplifiers	10	CO8	L3

7	1KT17EC007	Give the expression for d.c. power input, a.c. power output and efficiency of a series fed directly coupled class A amplifier.	10	CO8	L2
8	1KT17EC008	Explain the advantages and disadvantages of directly coupled class A amplifiers	10	CO9	L2
9	1KT17EC009	Explain the advantages and disadvantages of transformer coupled class A amplifiers	10	CO9	L2
10	1KT17EC010	Explain the three point method of calculating the second harmonic distorsion.	10	CO9	L2
11	1KT17EC011	`what is harmonic distorsion	10	CO9	L2
12	1KT17EC012	Explain series — fed class — A power amplifier. Show that its maximum conversion efficiency is 25%.	10	CO8	L3
13	1KT17EC014	Explain with circuit diagram the operation of Class-B push-Pull amplifier using complementary—symmetry transistor pair. Also mention advantages and disadvantages of the circuit.	10	CO8	L2
14	1KT17EC015	Compare the various classes of operation of power amplifiers a)Operating cycle b)position of Q point c) efficiency	10	CO8	L3
15	1KT17EC016	An ideal class B push-pull power amplifier with input and output transformers has Vcc = 20V, N2 = 2N1 and RL = 20n. The transistors has hfc = 20. Let the input be sinusoidal. For the maximum output signal at VcE(p) = Vcc, determine : i) The output signal power ii) The collector dissipation in each transistor Conversion efficiency.	10	CO8	L3
16	1KT17EC017	The following distortion readings are available for a power amplifier, D2 = 0.2, D3= 0.02, D4 = 0.06, with Il = 3.3A and Rc = 40. i) Calculate the total harmonic distortion ii) Determine the fundamental power component iii) Calculate the total power.	10	CO8	L3
17	1KT17EC018	 For the circuit shown ro = Gofl, C7,(cbe) = 36pF, Cu (cbc) = 4pF, CCe ti 1 pF, CWi = 6 pF, Cwo = 8pF i) determine fHiand fxo ii) find fp and fT.	10	CO8	L3
18	1KT17EC020	Explain characteristics of a quartz crystal. With a neat diagram explain the crystal oscillator ,,in parallel resonant mode.	10	CO9	L2
19	1KT17EC021	The following component values are given for the Wein-bridge oscillator of the circuit of Ri = R2 = 33k.0 Cl = C2 = 0.001g R3 = 47 ka R4 = 15ka i) Will this circuit oscillate? ii) Calculate the resonant frequency	10	CO9	L3
20	1KT17EC022	Explain the working of push pull class B amplifier with neat circuit diagram.	10	CO9	L2
21	1KT17EC023	Explain the working of discrete series voltage regulator with diagram	10	CO9	L2
22	1KT17EC024	Explain the working of discrete shunt voltage regulator with diagram	10	CO9	L2
23	1KT17EC025	Which amplifiers are called as power amplifiers	10	CO8	L2
24	1KT17EC026	Explain the general features of a power amplifier	10	CO8	L2
25	1KT17EC027	Draw and explain the block diagram of class D amplifier	10	CO8	L2
26	1KT17EC028	Explain the classification of power amplifiers based on class of operation	10	CO8	L2
27	1KT17EC029	Why efficiency of class D amplifiers is almost 100%? where are class D amplifiers used?	10	CO8	L2
28	1KT17EC030	When is the power dissipation maximum in class A amplifiers	10	CO8	L3

29	1KT17EC031	Give the expression for d.c. power input, a.c. power output and efficiency of a series fed directly coupled class A amplifier.	10	CO8	L2
30	1KT17EC032	Explain the advantages and disadvantages of directly coupled class A amplifiers	10	CO9	L2
31	1KT17EC033	Explain the advantages and disadvantages of transformer coupled class A amplifiers	10	CO9	L2
32	1KT17EC035	Explain the three point method of calculating the second harmonic distorsion.	10	CO9	L2
33	1KT17EC036	`what is harmonic distorsion	10	CO9	L2
34	1KT17EC037	Explain series — fed class — A power amplifier. Show that its maximum conversion efficiency is 25%.	10	CO8	L3
35	1KT17EC038	Explain with circuit diagram the operation of Class-B push-Pull amplifier using complementary—symmetry transistor pair. Also mention advantages and disadvantages of the circuit.	10	CO8	L2
36	1KT17EC040	Compare the various classes of operation of power amplifiers a)Operating cycle b)position of Q point c) efficiency	10	CO8	L3
37	1KT17EC041	An ideal class B push-pull power amplifier with input and output transformers has Vcc = 20V, N2 = 2N1 and RL = 20n. The transistors has hfc = 20. Let the input be sinusoidal. For the maximum output signal at VcE(p) = Vcc, determine : i) The output signal power ii) The collector dissipation in each transistor Conversion efficiency.	10	CO8	L3
38	1KT17EC042	The following distortion readings are available for a power amplifier, D2 = 0.2, D3= 0.02, D4 = 0.06, with Il = 3.3A and Rc = 40. i) Calculate the total harmonic distortion ii) Determine the fundamental power component iii) Calculate the total power.	10	CO8	L3
39	1KT17EC043	 For the circuit shown ro = Gofl, C7,(cbe) = 36pF, Cu (cbc) = 4pF, CCe ti 1 pF, CWi = 6 pF, Cwo = 8pF i) determine fHiand fxo ii) find fp and fT.	10	CO8	L3
40	1KT17EC044	Explain characteristics of a quartz crystal. With a neat diagram explain the crystal oscillator ,,in parallel resonant mode.	10	CO9	L2
41	1KT17EC046	The following component values are given for the Wein-bridge oscillator of the circuit of Ri = R2 = 33k.0 Cl = C2 = 0.001g R3 = 47 ka R4 = 15ka i) Will this circuit oscillate? ii) Calculate the resonant frequency	10	CO9	L3
42	1KT17EC047	Explain the working of push pull class B amplifier with neat circuit diagram.	10	CO9	L2
43	1KT16EC001	Explain the working of discrete series voltage regulator with diagram	10	CO9	L2
44	1KT16EC007	Explain the working of discrete shunt voltage regulator with diagram	10	CO9	L2

F. EXAM PREPARATION

1. University Model Question Paper

Course:						Month / Year	May /2018	
Crs Code:		Sem:		Marks:		Time:		
-	**Note**	Answer all FIVE full questions. All questions carry equal marks.				**Marks**	**CO**	**Level**
1	a	NEW SCHEME NOT AVAILABLE				16 /	CO1	

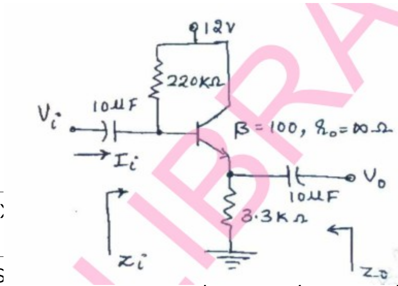
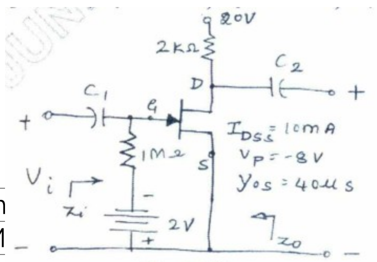
Dept EC
Prepared by
N Checked by Approved

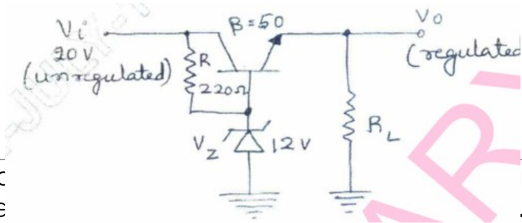
			20		
	b				
	c			CO2	
	d				
-	a		16 / 20	CO1	
	b			CO2	
	c				
	d				
2	a		16 / 20	C03	
	b				
	c			CO4	
	d				
-	a		16 / 20	CO3	
	b			CO4	
	c				
	d				
3	a		16 / 20	CO5	
	b				
	c			CO6	
	d				
-	a		16 / 20	CO5	
	b				
	c			CO6	
	d				
4	a		16 / 20	CO7	
	b				
	c			C08	
	d				
-	a		16 / 20	CO7	
	b			CO8	
	c				
	d				
5	a		16 / 20	CO9	
	b			CO10	
	c				
	d				
	a		16 / 20	CO9	
	b				

	c			CO10	
	d				

2. SEE Important Questions

Course:	Analog Circuits				Month / Year	May /2018
Crs Code:	17EC33	Sem:	III	Marks: 100	Time:	180 minutes

Module	Qno.	Important Question	Marks	CO	Year
	Note	Answer all FIVE full questions. All questions carry equal marks.	-	-	
1	1	Derive an expression for A„ Z, and Zo for CE—fixed bias using re-equivalent model.	8	CO1	2018
	2	Define h-paramete s and derive h-parameters model of CE-BJT	8	CO2	2018
	3	For the emitter-follower network of Fig.Q2(a). Determine • i) re ii) Z, iii) Zo iv)Av 	8	C01	2018
	4	With a neat circuit e: stor small-signal AC equivalent circuit	8	CO1	2018
	5	Define h parameters uivalent circuit of a transistor.	8	CO2	2010
2	1	Briefly explain the construction, operation and characteristics of n-channel D-type MOSFET.	8	C03	2018
	2	The fixed-bias configuration of Fig.Q3(b) has an operating point defined by .1 VGSQ = —2V and IDQ = 5.625mA , with DSS = 10mA and Vp = 8V. Determine : i)g_m ii) rd iv) Zo v) Av. 	8	CO3	2018
	3	Explain the small sign s)	6	CO3	2018
	4	Compare JFET and M	3	CO4	2018
	5	Draw the JFET common drain configuration circuit. Derive Z Zo and Av using small signal model.	7	CO4	2018
3	1	The input power to a device is 10,000W at a voltage of 1000V. The output power is 500W and the output impedance is 20Q i) Find a power gain in decibels ii) Find the voltage gain in decibels iii) Find input impedance.	6	CO5	2018
	2	Describe Miller's effect and derive an equation for Miller input and output capacitance.	6	CO5	2018
	3	Discuss the effect of various capacitors on low-frequency response of BJT amplifier	6	CO5	2018
	4	An amplifier rated 40W output is connected to a 10Q speaker. i) Calculate the input power required for full power output if the power gain is 250B. ii) Calculate the input voltage for rated output if the amplifier voltage gain 40dB. (04 Marks)	8	CO5	2018
	5	b. Determine the high-cutoff frequencies of JFET amplifier for the following specification:	8	CO4	2018

		CG = 0.01uF, Cc = 0.5g, Cs = 2p.F, Rsig= 10 KO, RG = 1mQ, RD = 4.71(52, Rs = IKO, RL = .2 IDSS = 8mA, Vp = —4V, rd = 0052, VDD = 20V, Cgd = 2 PF, Cgs = 4 PF, Cds = 0.5 PF, C, = 5 PF, o = 6 PF and Av=-3			
4	1	Mention the types of feedback connections. Draw their block diagrams indicating input and output signal.	8	CO6	2018
	2	With a neat circuit diagram, explain the working principle of FET phaseshift oscillator, with relevant equations	8	C07	2018
	3	What are the effects of negative feedback in an amplifier? Show how bandwidth of an amplifier increases with negative feedback.	6	C06	2018
	4	With a neat circuit and waveforms, explain the working operation of UJT relaxation oscillator	5	CO7	2018
	5	c. Determine the voltage gain, input and output impedance with feedback for voltage series feedback having A = -100, R, = 10 KO and R0= 20 kfl for feedback factor β=-0.1	5	CO6	2018
5	1	with a neat circuit diagram, explain the operation of a series —fed class A power amplifier and prove that η=25%	8	CO8	2018
	2	b. Calculate the output voltage and the zener current in the regulator circuit of Fig. with RL = 1KΩ 	8	CO9	2018
	3	Calculate the harmonic [illegible] nal with fundamental amplitude [illegible] .25, third harmonic amplitude of 0.1 V and fourth harmonic amplitude of 0.05V. Also find total harmonic distortion.	4	CO8	2018
	4	Explain the operation of a transformer coupled, push-pull class conversion efficiency.	8	CO8	2018
	5	Explain the fold —back current limiting circuit of voltage series . Determine the regulated voltage and currents of shunt regulation.	8	CO9	2018