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| b. Assignment – 2 D3. TEACHING PLAN - 3 Module – 5 E2. CIA EXAM – 2. | الا Question Paper - 2 15 |
| D3. TEACHING PLAN - 3 Module - 5 F2. CIA FXAM - 2 | Inment – 2 |
| Module – 5 F2 CIA FXAM – 2 | 2HING PLAN - 3 |
| | 9 – 5 |
| | EXAM – 319 |
| a. Model Question Paper - 3 | 9 Puestion Paper - 3 |
| b. Assignment – 3 | jnment – 3 |
| F. EXAM PREPARATION | PREPARATION |
| 1. University Model Question Paper | rsity Model Question Paper |
| 2. SEE Important Questions | mportant Questions |

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 |

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| CIA Marks: | | 30 | | | Assignment | 10 |
| Course Plan Author: | | Arur | n G | | Sign | |
| Checked By: | | | | | Sign | |

2. Course Content

| Mod | Module Content | Teaching | Module | Blooms |
|-----|--|----------|--|--------|
| ule | | Hours | Concepts | 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 ,posi tive 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

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

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| i | Adel S | Kenneth C.Smith 5 th Edition , "Micro Electronic circuit | In Lib | | | | | |
| | Theor | | | | | | | |
| ii | Behza | d Razavi, Johr | Weily, "Fundamentals of Microelectronics" | | | | | |
| iii | J.Millman &C.C.Halkias-Integrated Electronics, 2 nd Edition 2010 | | | | | | | |
| 3 | Others | | | | | | | |
| | | | | Not Available | | | | |
| | | | | | | | | |

4. Course Prerequisites

| SNo | Course Code | Course Name | Module / Topic / Description | Sem | Remarks | Blooms Level |
|-----|----------------|-------------------|---|-----|---------|-----------------|
| 1 | 17ELN15 /25 | Basic Electronics | 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. | Concept | Instr | Assessmen | Blooms' |
|----------|---|--------|---|---------|--------------------------------|---------|
| | | Hours | | Method | t Method | 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 | Configuratio n of FET amplifiers | Lecture | Slip test and assignment | L2 |
| 17EC33.4 | Determine the performance characteristics of FET amplifier using small signal model | 5 | Characteristi cs of FET | Lecture | Assignment s 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 |

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| ć | and shunt o | circuits us | ing voltage | e | Regulation | | | | | | |
| r | egulation prin | ciple | | | | | | | | | |
| _ | | 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 analvsis | 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 | PO7 | PO | PO9 | PO1 | PO1 | PO1 | Level |
| | | | | | | | 6 | | 8 | | 0 | 1 | 2 | |
| 17EC33.1 | Understand the BJT re -model | 2 | 2 | - | 3 | - | - | - | - | - | - | - | - | L2,L3 |
| | and biasing circuits with the help | | | | | | | | | | | | | |
| | ofBJT modeling | | | | | | | | | | | | | |
| 17EC33.2 | Compute AC gain and | 2 | 2 | - | 3 | - | - | - | - | - | - | - | - | L3 |
| | Impedance for BJI using n | | | | | | | | | | | | | |
| | parameters model | | | | | | | | | | | | | |
| 1/EC33.3 | Understand the construction and | 3 | 3 | 3 | 2 | - | - | - | - | - | - | - | - | L2 |
| | | | | | | | | | | | | | | |
| 1750004 | MOSFEIS Determine the performance | 2 | - | 2 | 2 | | | | | | | | | |
| 1/EC33.4 | characteristics of EET amplifier | 5 | 3 | 3 | 2 | - | - | - | - | - | - | - | - | L3 |
| | using small signal model | | | | | | | | | | | | | |
| 17EC33.5 | Understand the low and high | 2 | 1 | _ | - | - | _ | _ | _ | _ | _ | _ | _ | 12 |
| 1/2033.3 | frequency responses of BJT and | - | - | | | | | | | | | | | |
| | FET amplifiers. | | | | | | | | | | | | | |
| 17EC33.6 | Understand the characteristics | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | - | L2 |
| | of negative feedback amplifiers | | | | | | | | | | | | | |
| | associated with transfer and | | | | | | | | | | | | | |
| | stability gain | | | | | | | | | | | | | |
| 17EC33.7 | Understand the positive | 3 | 2 | 3 | - | - | - | - | - | - | - | - | - | L2 |
| | feedback and Barkhausen's | | | | | | | | | | | | | |
| | criteria applied to oscillators | | | | | | | | | | | | | |
| 17EC33.8 | Evaluate the efficiency of class | 3 | 3 | 3 | - | - | - | - | - | - | - | - | - | L3 |

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| | A, B,C,D pov | wer amplifiers with | | | | | | | | | | | | | |
| | AC and DC pa | arameters | | | | | | | | | | | | | |
| 17EC33.9 | Understand series and s voltage regul | the operation of hunt circuits using lation principle | 3 | 3 | 3 | 2 | - | - | - | - | - | - | - | - | L2 |
| | | | | | | | | | | | | | | | |

Note: Mention the mapping strength as 1, 2, or 3

4. Mapping Justification

| Мар | ping | Justification | Mapping |
|----------|-----------|---|---------|
| | | | Level |
| | | - Knowledge of re-model is used to predict the performance of a | - |
| | POI | device in small signal analysis | |
| CO1 | PO2 | In small signal analysis B IT re model is used to predict device | |
| 001 | 1.02 | performance | |
| CO1 | PO4 | The data interpreted usion 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 | |
| | DO | parameter model. | |
| <u> </u> | PO1 | Knowledge of FET is required for IC design and fabrication | |
| CO3 | PO2 | Analysis of FET characteristics is used in VLSI and Embedded | |
| | DO0 | System design | |
| 03 | F03 | communication equipment's and automobile components | |
| <u> </u> | PO4 | Design of embedded systems and VLSI systems is based on EET | |
| 003 | 104 | 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 | |
| | DOa | Analysis of output gain to different input frequencies can be done | |
| 0.05 | P02 | Analysis of oulput gain to different input frequencies can be done | |
| C.06 | PO1 | Knowledge of negative feedback circuits is used to predict the | |
| | 101 | 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 | |
| | | Design of electring circuits for processors and clock generators | |
| | P02 | Design of clocking circuits , microprocessors and controllers use | |

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| | | 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 | | | | | |
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Note: Anything not covered above is included here.

C. COURSE ASSESSMENT

1. Course Coverage

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

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|---------|--|----|---|---|---|---|-----|----|-------------|--------|
| | | | | | | | Asg | | | |
| 1 | BJT AC Analysis | 13 | 2 | - | - | 1 | 1 | 2 | CO1, | 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, C07 | 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 | СО | 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 | 16 Hrs |
|----------|---|-------|--------|
| | | Time: | |
| 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 | C01 | L2 |
| 2 | The re transistor model | C01 | L2 |
| 3 | Common emitter fixed bias | C01 | L2 |
| 4 | Voltage divider bias, | C01 | L2 |
| 5 | Emitter follower configuration -Darlington connection | C01 | L2 |
| 6 | DC bias; The Hybrid equivalent model | C02 | L3 |
| 7 | Approximate Hybrid Equivalent Circuit ,Fixed bias | C02 | L3 |
| 8 | Voltage divider | C02 | L3 |

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| 9 | Emitter followe | er configuration | C02 | L3 |
| 10 | Complete Hybr | id equivalent model | C02 | L3 |
| 11 | Complete Hybr | C02 | L3 | |
| 12 | Hybrid π Model | C02 | L3 | |
| 13 | Numericals and | | | |
| | | | | |
| С | Application Are | eas | CO | Level |
| 1 | The re model is signal analysis | s used to predict the performance of a device and in small | CO1 | L3 |
| 2 | Small signal AC | Cresponse can be determined by h parameters model | CO2 | L3 |
| | | | | |
| d | Review Question | ons | - | - |
| 1 | Obtain the r par | rameter model for CE configuration | CO1 | L2 |
| 2 | With the help o | f appropriate circuits analyze CE fixed bias configuration | CO1 | L3 |
| 3 | With the help | of appropriate circuits analyze CE voltage divider bias | CO2 | L3 |
| | configuration | | | |
| 4 | Obtain the Exac | ct AC analysis for CE amplifier with unbypassed R $_{\scriptscriptstyle E}$ | CO1 | L3 |
| 5 | Analyze the C circuits | E with collector feedback configuration with necessary | CO1 | L3 |
| 6 | Obtain r- param | neter model for CC configuration | CO1 | L2 |
| 7 | For the transist using the comp | or connected in CE configuration determine A_v,A_l,R_l and R_o lete hybrid equivalent model Given $R_l = R_s = 1 k\Omega$ | CO1 | L3 |
| 8 | For the emitter | follower circuit shown calculate $Z_i Z_0 A_v$ and A_i | CO1 | L3 |
| 9 | Obtain the anal | ysis of CE configuration using simplified Hybrid model | CO2 | L2 |
| 10 | Obtain the anal | ysis of CC configuration using simplified Hybrid model | CO2 | L2 |
| 11 | Obtain the anal | ysis of CB configuration using simplified Hybrid model | CO2 | L2 |
| 12 | A common b | ase amplifier as shown in figure has the following | CO2 | L3 |
| | components: | $R_s=600\Omega, R_c=5.6K, R_E=5.6K, R_L = 39$ K. The transistor | | |
| | parameters are | h_{ie} =1 K, h_{fe} =85 and h_{oe} =2 μ A/V . Calculate R_i , R_o , A_v , A_{vs} =Vo/Vs. | | |
| е | Experiences | | - | _ |
| 1 | | | CO1 | L2 |
| 2 | | | | |
| 3 | | | | |
| 4 | | | CO3 | L3 |
| 5 | | | | |

Module – 2

| Title: | Field Effect Transistor | Appr | 10 Hrs | |
|----------|--|-------|--------|--|
| | | Time: | | |
| 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 | CO4 | L3 | |
| | signal model | | | |
| | | | | |
| b | Course Schedule | - | - | |
| Class No | Class No Module Content Covered | | | |
| 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 | |

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|----------------|--|-----|-------|
| 22 | Voltage divider configuration | CO2 | L3 |
| 23 | Common Gate configuration | CO2 | L3 |
| 24 | Source Follower Configuration. | CO2 | L3 |
| 25 | Cascade configuration | CO2 | L3 |
| | | | |
| С | Application Areas | СО | 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. | | |
| | | | |
| е | Experiences | - | - |
| 1 | | CO1 | L2 |
| 2 | | | |
| 3 | | | |
| 4 | | CO3 | L3 |
| 5 | | | |

E1. CIA EXAM – 1

a. Model Question Paper - 1

| Crs Code: | | 17EC33 | Sem: | | Marks: | 30 | Time: | 75 minute | s | |
|-----------|-----|---|--|---|-------------------------|---------------|------------|------------|-----|-------|
| Cour | se: | Analog Circ | uits | | · | | | | | |
| - | - | Note: Answ | /er any 2 qi | lestions, ead | ch carry equ | ual marks. | | Marks | CO | Level |
| 1 | а | Obtain the I | r parametei | model for C | E configura | tion | | 15 | CO1 | L2 |
| | b | With the h configuratio | With the help of appropriate circuits analyze CE voltage divider bia: configuration | | | | | | CO1 | L2 |
| 2 | а | Obtain the a | analysis of (| CB configura | tion usina s | implified Hvl | orid model | 15 | CO2 | L2 |
| | b | A common base amplifier as shown in figure has the following components: R_s =600 Ω , 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} =2 μ A/V. Calculate R_i , R_o , A_v , A_{vs} =Vo/Vs. | | | | | | tor ate | CO2 | L3 |
| 3 | а | Explain anv | one metho | d of biasing | a single sta | ge JEET amr | olifier | 15 | CO4 | 1 |
| | b | Draw and e | xplain a sm | all signal lov | v frequency | model for J | FET | | CO4 | L2 |
| | | | | | | | | | | |
| 4 | а | A FET ar I _{DSS} =2mA,V _P | nplifier sh =-2.4V Dete | own in fig rmine i) V _{gs} ii | ure has t i) Q-point | he followin | g paramet | ers 15 | CO3 | L2 |
| | b | Derive the configuration | expression ons. | ns for Av, F | Ri and R_{\circ} | for various | JFET ampli | fier | CO4 | L2 |

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

| Model Assignment Questions | | | | | | | | | | | |
|----------------------------|--|---------|--|---|---|--|---|------------------|---------|--------|--------|
| Crs C | ode: | | Sem: | | Marks: | 10 | Time: | 90 - | - 120 I | minute | S |
| Cours | se: | Analog | Circuits | | | | | | | | |
| Note | Each | student | to answer | 2-3 assigr | iments. Each a | assignmer | nt carries equal n | nark. | | | |
| SNo | l | USN | | A | Assignment D | escription | | M | larks | СО | Level |
| 1 | 1KT17 | 7EC001 | Obtain the | e r parame | eter model for | CE config | uration | | 10 | CO1 | L2 |
| 2 | 1KT17 | 7EC002 | With the configurat | help of a tion | ppropriate ci | rcuits ana | lyze CE fixed b | ias | 10 | CO1 | L3 |
| 3 | 1KT17 | 7EC003 | With the divider bia | help of as configui | appropriate (ration | circuits ar | nalyze CE volta | ge | 10 | CO1 | L3 |
| 4 | 1KT17 | 7EC004 | Obtain the R⊧ | e Exact AC | analysis for (| CE amplifie | er with unbypass | ed | 10 | CO1 | L3 |
| 5 | 1KT17 | 7EC005 | Analyze t | he CE wi | th collector | feedback | configuration w | rith | 10 | CO1 | L3 |
| 6 | 1KT17 | 7EC006 | Obtain r- i | parameter | model for CC | Configura | ition | - | 10 | CO1 | L2 |
| 7 | 1KT17 | 7EC007 | For the t | ransistor o | connected in | CE confic | uration determi | ne | 10 | CO2 | L3 |
| , | , | , | A _v ,Aı,Ri an Given R∟=I | d R₀ usinę R₅=1 kΩ | g the comple | te hybrid | equivalent mod | el | - | | |
| 8 | 1KT17 | 7EC008 | For the er | nitter follo | wer circuit sh | own calcu | late Z_i, Z_o, A_v and | A | 10 | CO2 | L3 |
| 9 | 1KT17 | 7EC009 | Obtain the model | e analysis | of CE configu | ration usin | g simplified Hyb | rid | 10 | CO2 | L2 |
| 10 | 1KT17 | 7EC010 | Obtain the model | e analysis (| of CC configu | ration usin | g simplified Hyb | rid | 10 | CO2 | L2 |
| 11 | 1KT17 | 7EC011 | Obtain the model | e analysis | of CB configu | ration usin | g simplified Hyb | rid | 10 | CO2 | L2 |
| 12 | 1KT17 | 7EC012 | A commo compone paramete Ri,Ro,Av,Av, | n base am nts: R _s =600 rs are h _{ie} _s =Vo/Vs. | nplifier as shov DQ,Rc=5.6K, R _E =1 K, h _{fe} =85 | wn in figur =5.6K, R _L = and h _{oe} =2 | e has the followi 39 K. The transis 2µA/V . Calcula | ng tor ate | 10 | CO2 | L3 |
| 13 | 1KT17 | 7EC014 | Give the c | lassificatio | on of FETs and | d their app | lications areas | | 10 | CO2 | L3 |
| 14 | 1KT17 | 7EC015 | Explain a amplifier | ny one r | nethod of bi | iasing a s | single stage JF | ET | 10 | CO2 | L2 |
| 15 | 1KT17 | 7EC016 | With the biasing m | help of r ethod for . | neat diagram JFET | explain t | he voltage divid | der | 10 | CO2 | L2 |
| 16 | 1KT17 | 7EC017 | With the I for JFET | nelp of nea | at diagram ex | plain the s | elf biasing meth | od | 10 | CO2 | L2 |
| 17 | 1KT17 | 7EC018 | Why is FE | T called u | nipolar device | e? List the | features of FET | | 10 | CO2 | L2 |
| 18 | 1KT17 | 7EC020 | A FET am I _{DSS} =2mA,\ | plifier sho /p=-2.4V De | wn in figure h etermine i) V _G | nas the fol sii) Q-point | lowing paramete | ərs | 10 | CO2 | L3 |
| 19 | 1KT17 | 7EC0021 | For the ci i) I _{DSQ} ii)V _{GS} | rcuit show a iii) V _{DSO} | n , the FET ha | as V _p =4V, I _l | oss=4 mA, Calcula | ate | 10 | CO2 | L3 |
| 20 | 1KT17 | 7EC022 | Write a sh | ort note o | n biasing of M | 10SFET. | | | 10 | CO2 | L2 |
| 21 | 1KT17 | 7EC023 | Draw and JFET | l explain | a small signa | al low fre | quency model | for | 10 | CO2 | L3 |
| 22 | 1KT17EC024 Derive the expressions for Av, Ri and R _o for various JFE amplifier configurations | | | ET | 10 | CO1 | L3 | | | | |
| 23 | 1KT17 | 7EC025 | Give the c | lassificatio | on of FETs and | d their app | lications areas | | 10 | CO1 | L2 |
| 24 | 1KT17 | 7EC026 | Explain a amplifier | ny one r | method of bi | iasing a s | single stage JF | ET | 10 | CO1 | L2 |
| 25 | 1KT17 | 7EC027 | With the biasina m | help of r ethod for . | neat diagram JFET | explain t | he voltage divid | der | 10 | CO1 | L2 |
| 26 | 1KT17 | 7EC028 | With the I for JFET | nelp of nea | at diagram ex | plain the s | elf biasing meth | od | 10 | CO1 | L2 |
| 27 | 1KT17 | 7EC029 | Why is FE | T called u | nipolar device | e? List the | features of FET | | 10 | CO1 | L2 |

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|----------|---|---|----|-----|----|--|--|
| 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_{\circ} 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 $I_{\text{DSS}}\text{=}2\text{mA}, V_{\text{p}}\text{=-}2.4\text{V}$ Determine i) $V_{\text{GS}}\text{ii}$ 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_{\circ} 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 | | | |
| | | | |

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| Copyrigint ©201, | Application Areas | CO | Level |
|------------------|---|-----|-------|
| 1 | Frequency Response of an amplifier or filter shows how the gain of the | C05 | |
| | output responds to input signals at different frequencies | | 0 |
| 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 |
| | | | |
| е | 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: | | |
| 1 | Understand the characteristics of negative feedback amplifiers and | CO6 | L2 |
| 2 | associated with transfer and stability gain | CO7 | 2 |
| | oscillators | , | |
| h | Course Schodule | | |
| Class M | Module Content Covered | 0 | |
| 1 | Feedback concents. Feedback connection types | | |
| 2 | Feedback connection types contd | | |
| 2 | | | |
| 3 | Practical reedback circuits | C00 | L2 |
| 4 | Uscillator operation, FET Phase shift oscillator, | | L2 |
| 5 | Wien bridge oscillator, | | L2 |
| 6 | | | L2 |
| 7 | Crystal oscillator | | L2 |
| 8 | UJI construction, | <u>CO7</u> | L2 |
| 9 | UJI Oscillator | CO7 | L2 |
| 10 | Numericals and question paper solving | | L3 |
| | | | |
| С | 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 |

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|-----------------|--|-----|----|
| 2 | Explain the classification of the feedback oscillators. | CO6 | L2 |
| 3 | Why the negative feedback is incorporated in the Wein Bridge oscillator | CO7 | L2 |
| | circuit? | | |
| 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 | | | |
| | | | |
| е | Experiences | - | - |
| 1 | | CO7 | L2 |
| 2 | | | |
| 3 | | | |
| 4 | | CO8 | L3 |
| 5 | | | |

E2. CIA EXAM – 2

a. Model Question Paper - 2

| Crs C | Code: | CS501PC | Sem: | 1 | Marks: | 30 | Time: 7 | ime: 75 minutes | | |
|-------|-------|---|----------------|---------------|---------------|---------------|-----------------|-----------------|-------|----|
| Cour | se: | Design and | Analysis of | Algorithms | | | | | | |
| - | - | Note: Answer any 2 questions, each carry equal marks. | | | | | Marks | СО | Level | |
| 1 | а | Explain the | significance | of Octaves | and decade | es. | | 15 | CO5 | L2 |
| | b | Describe M | iller's effect | and derive | an equation | for Miller in | put and outpu | ıt | CO5 | L3 |
| | | capacitance | es. | | | | | | | |
| 2 | а | The input p | ower to a de | evice is 10,0 | ooW at a vo | ltage of 100 | oV. The outpu | ut 15 | CO5 | L3 |
| | | power is 50 | oW and the | e output imp | pedance is 2 | 20Q i) Find a | a power gain i | n | | |
| | | decibels ii) I | Find the vol | tage gain in | decibels iii) | Find input ir | npedance | | | |
| | | Determine I | the high-cut | toff frequen | cies of JFET | amplifier fo | or the followin | g | CO5 | L3 |
| | | specificatio | n: | | | | | | | |
| | | CG = 0.01uF | -, Cc = 0.5g, | Cs = 2p.F, Rs | sig= 10 KO, 1 | RG = 1mQ, F | RD = 4.71(52, F | S | | |
| | | = IKO, RL = . | 2 IDSS = 8r | nA, Vp = -4' | V, rd = 005 | 2, VDD = 20 | oV, Cgd = 2 Pl | -, | | |
| | | Cgs = 4 PF, | Cds = 0.5 P | F, C, = 5 PF, | 0 = 6 PF an | d Av=-3 | | | | |
| 3 | а | Mention the | e types of f | eedback cc | onnections. I | Draw their k | olock diagram | s 15 | CO6 | L2 |
| | | indicating in | put and out | tput signal. | | | | | | |
| | b | What are t | he effects o | of negative | feedback ir | n an amplifi | er? Show hov | × | CO6 | L3 |
| | | bandwidth | of an amplif | ier increases | s with negat | ive feedbac | k | | | |
| 4 | а | With a ne | at circuit o | diagram, ex | plain the v | working pri | nciple of FE | T 15 | CO7 | L2 |
| | | phaseshift o | oscillator, wi | th relevant e | equations. | | | | | |
| | b | With a neat | circuit and | waveforms | , explain the | e working op | peration of UJ | Т | CO7 | L2 |
| | | relaxation o | scillator. | | | | | | | |

b. Assignment – 2

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

| | Model Assignment Questions | | | | | | | | | |
|-------|---|----------------|--|------------|-------------|---------|-------|----------|--------|-------|
| Crs C | ode: 17EC33 | Sem: | III M | 1arks: | 10 | Time: | | 90 - 120 | minute | S |
| Cours | se: Design | and Analysis o | of Algorithms | | | | | | | |
| Note: | Note: Each student to answer 2-3 assignments. Each assignment carries equal mark. | | | | | | | | | |
| SNo | USN | | Assignn | nent D | Description | | | Marks | СО | Level |
| 1 | 1KT17EC001 | What do yo | ou understan | id by | frequency | respose | of th | ne 10 | C06 | L2 |
| | | amplifier ? Ho | ow is it plotted | <u>/</u> ? | | | | | | |
| | | | What do you mean by bandwidth of an amplifier? | | | | | | | |

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|---------|----------------------------|--|----|-----|----|
| 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 |
| | | 68K28 52.2K2 | | | |
| 13 | 1KT17EC014 | An amplifier rated . i) Calculate the inp the power gain is 2 output if the ampl | 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, 0 = 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 FFT 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 |

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|----------|---------------------------|--|----|----------|-----|
| | | amplifier ? How is it plotted? | | <u> </u> | |
| 24 | 1KT1/EC026 | What do you mean by bandwidth of an amplifier? | 10 | C06 | L2 |
| 25 | 1KT1/EC02/ | Explain the usefulness of decidel unit | 10 | C06 | L2 |
| 20 | 1KT1/EC028 | Explain the significance of Octaves and decades. | 10 | C06 | L2 |
| 27 | 1KT17EC029 | Give the expression for voltage gain of the amplifier below | 10 | 006 | L2 |
| 28 | 1KT17EC000 | What is the effect of coupling capacitors on the handwidth of | 10 | C06 | 10 |
| 20 | INTI/EC030 | the amplifier? | 10 | 000 | LZ |
| 20 | 1KT17EC021 | Draw the small signal high frequency CE model for a | 10 | C06 | 12 |
| 29 | | transistor | 10 | 000 | LZ |
| 30 | 1KT17FC032 | The input power to a device is 10 000W at a voltage of 1000V | 10 | CO6 | 13 |
| | | The output power is 500W and the output impedance is 20Q i) | 10 | 000 | -5 |
| | | Find a power gain in decibels ii) Find the voltage gain in | | | |
| | | decibels iii) Find input impedance. | | | |
| 31 | 1KT17EC033 | b. Describe Miller's effect and derive an equation for Miller | 10 | CO6 | L2 |
| | , | input and output capacitance. | | | |
| 32 | 1KT17EC035 | Discuss the effect of various capacitors on low-frequency | 10 | CO6 | L2 |
| | | response of BJT amplifier. | | | |
| 33 | 1KT17EC036 | Derive the expression for low frequency response of BJT | 10 | CO6 | L3 |
| | | amplifier due to capacitors Cs and Cc. | | | |
| 34 | 1KT17EC037 | Calculate fB, and fHo for amplifier circuit shown In Fig.Q5(b), | 10 | CO6 | L3 |
| | | for the base current IB = 14.791AA and Avolici | | | |
| | | 100; Cbe 201' ; Cbc = 4pF ; hie = 1100 ; Cwi = 6pF; Cwo = 8pF , | | | |
| | | CcE = 1pF. | | | |
| | | | | | |
| | | tion O | | | |
| | | cours Easter 7 | | | |
| | | 68 KJLS SZIZAN | | | |
| | | 680 2 C2 | | | |
| | 41/T47EC000 | | | C06 | |
| 35 | INTI/EC030 | i) Calculate the inr (2) appressing 10km sker. | 10 | 000 | L3 |
| | | the power rain is 2 | | | |
| | | output if the ampl | | | |
| | | Marks) c. | | | |
| 36 | 1KT17FC040 | Determine the high-cutoff frequencies of JEET amplifier for | 10 | CO6 | 3 |
| | | the following specification: | 20 | | -5 |
| | | 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 . | | | |
| 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 | 10 | CO6 | L3 |
| | | the amplifier? | | | |
| 39 | 1KT17EC043 | What is the effect of internal transistor capacitances on the | 10 | CO6 | L3 |
| | | bandwidth of the amplifier? | | | |
| 40 | 1KT17EC044 | Mention the types of feedback connections. Draw their block | 10 | CO7 | L2 |
| | | diagrams indicating input and output signal. | | | |
| 41 | 1K117EC046 | With a neat circuit diagram, explain the working principle of | 10 | CO7 | L2 |
| | | FEI phase—shift oscillator, with relevant equations. | | | |
| 42 | 1K117EC047 | what are the effects of negative feedback in an amplifier? | 10 | 007 | L3 |
| | | Show now pandwidth of an amplifier increases with negative | | | |
| 40 | | ILEUNACK. | | <u> </u> | 1.0 |
| 43 | | with a near circuit and waveforms, explain the Working | 10 | | L2 |
| 1 4 | 1KT16EC007 | Determine the voltage gain input and output impodance with | 10 | CO7 | 10 |
| 44 | | feedback for voltage - series feedback baving A 100 D | 10 | | ∟് |
| L | 1 | Γ = | | | l |

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| 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 |
| | | | |
| С | 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 |
| | | | |
| a | Review Questions | - | - |
| 1 | Explain the general features of a new or amplifier | 0 | |
| 2 | Explain the general realures of a power amplifier | 0 | |
| 3 | Explain the classification of power amplifiers based on class of operation | <u> </u> | |
| 4 5 | Why efficiency of class D amplifiers is almost 100%? where are class D | | |
| 5 | amplifiers used? | | |
| 6 | When is the power dissipation maximum in class A amplifiers | | L3 |
| 7 | of a series fed directly coupled class A amplifier. | 08 | 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 |

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| | distorsion. | | | | | |
| 11 | `what is harmonic distorsion COg | | | | L2 | |
| | | | | | | |
| е | Experiences | | | - | - | |
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |

E3. CIA EXAM – 3

a. Model Question Paper - 3

| Crs Code: | | 17EC33 | Sem: | | Marks: | 30 | Time: 75 | minute | S | |
|-----------|-----|--|-------------------------------|------------------------------|--------------------------------|---------------|------------------|--------|-----|-------|
| Cour | se: | Analog Circuits | | | | | | | | |
| - | - | Note: Ans | wer any 2 | questions, | each carry e | qual marks. | | Marks | СО | Level |
| 1 | а | Explain se conversio | eries — feo n efficiency | 1 class — A y is 25%. | opower ampl | ifier. Show t | hat its maximum | 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. | | | | | | | | L2 |
| 2 | а | 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 follov 0.2, D3= 0 harmonic Calculate | - | | | | | | | |
| 3 | а | Explain ch crystal os | naracteristi cillator ,.in | cs of a quai parallel res | rtz crystal. Wi onant mode. | th a neat dia | gram explain the | 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 | а | Explain th | e working | of discrete | series voltage | e regulator w | vith diagram | 15 | CO9 | L2 |
| | b | Explain the working of discrete shunt voltage regulator with diagram | | | | | | | | L2 |

b. Assignment – 3

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

| | Model Assignment Questions | | | | | | | | | | |
|--|----------------------------|--------------|--|--|---------------|---------------|---------------|------------------|-----|-------|--|
| Crs C | Crs Code: 17EC33 | | Sem: | 111 | Marks: | 10 | Time: | 90 – 120 minutes | | | |
| Cours | se: | Design a | and Analysis o | of Algorithm | S | | | | | | |
| Note | Each | student | to answer 2-3 | assignmen | ts. Each assi | gnment car | ries equal ma | ark. | | | |
| SNo | l | USN | | Assig | nment Desc | ription | | Marks | CO | Level | |
| 1 | 1KT17 | 7EC001 | Which ampli | iers are call | ed as power | amplifiers | | 10 | CO8 | L2 | |
| 2 | 1KT17 | 7EC002 | Explain the g | eneral featu | ires of a pow | /er amplifier | | 10 | CO8 | L2 | |
| 3 | 1KT17 | 7EC003 | Draw and ex | olain the blo | ock diagram | of class D ai | mplifier | 10 | CO8 | L2 | |
| 4 | 1KT17 | 7EC004 | Explain the classification of power amplifiers based on class of | | | of 10 | CO8 | L2 | | | |
| | | | operation | | | | | | | | |
| 5 | 5 1KT17EC005 | | Why efficiend | Why efficiency of class D amplifiers is almost 100%? where are | | | e 10 | CO8 | L2 | | |
| | | | class D ampl | ifiers used? | | | | | | | |
| 6 1KT17EC006 When is the power dissipation maximum in class A ampl | | A amplifiers | 10 | CO8 | L3 | | | | | | |
| | | | | | | | | | | | |

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| 7 | 1K 17 | -C007 | Give t efficie | the expression for d.c. power input, a.c. power output and ency of a series fed directly coupled class A amplifier. | 10 | C08 | L2 | |
| 8 | 1KT17[| EC008 | Expla class | in the advantages and disadvantages of directly coupled A amplifiers | 10 | CO9 | L2 | |
| 9 | 1KT17 | EC009 | Expla coup | in the advantages and disadvantages of transformer led class A amplifiers | 10 | CO9 | L2 | |
| 10 | 1KT17 | EC010 | Expla | in the three point method of calculating the second | 10 | CO9 | L2 | |
| 11 | 1KT17 | -C011 | `what | is harmonic distorsion | 10 | COg | 12 | |
| 12 | 1KT17 | EC012 | Expla | in series — fed class — A power amplifier. Show that its | 10 | CO8 | L3 | |
| | | | maxir | num conversion efficiency is 25%. | | | - | |
| 13 | 1KT17 | EC014 | Expla | in with circuit diagram the operation of Class-B push- | 10 | CO8 | L2 | |
| | | | Pull a | mplifier using complementary—symmetry transistor pair. | | | | |
| | | | Also r | mention advantages and disadvantages of the circuit. | | | | |
| 14 | 1KT17 | EC015 | Comp | pare the various classes of operation of power amplifiers | 10 | CO8 | L3 | |
| | | | a)Ope | erating cycle b)position of Q point c) efficiency | | | | |
| 15 | 1K 17 | -C016 | An id | leal class B push-pull power amplifier with input and | 10 | CO8 | L3 | |
| | | | outpu | It transformers has VCC = 20V, N2 = 2N1 and RL = 20N. The | | | | |
| | | | uransi | stors has hic = 20. Let the input be sinusoidal. For the num output signal at $V(cE(p)) = V(cc)$ determine : i) The | | | | |
| | | | outo | it signal power ii) The collector dissipation in each | | | | |
| | | | transi | stor Conversion efficiency | | | | |
| 16 | 1KT17 | -C017 | The | following distortion readings are available for a power | 10 | CO8 | 3 | |
| | | | ampli | ifier, D2 = 0.2, D3= 0.02, D4 = 0.06, with II = 3.3A and Rc = | 20 | | -5 | |
| | | | 40. i) | Calculate the total harmonic distortion ii) Determine the | | | | |
| | | | funda | amental power component iii) Calculate the total power. | | | | |
| 17 | 1KT17 | EC018 | | $V_{CC} = 20V$ | 10 | CO8 | L3 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | 5 | \$40KA \$4KN WF | | | | |
| | | | | IONE I I I I I I I I I I I I I I I I I I I | | | | |
| | | | 14 | B=100 For the circuit shown | | | | |
| | | | U, | $\gtrsim 10^{-2100}$ IO = GOIL, C/,(CDE) = 26pE (u (cbc) = | | | | |
| | | | | $\frac{1}{2} \log k^2$ | | | | |
| | | | | $ \begin{array}{c} \downarrow \\ \downarrow $ | | | | |
| | | | 8pF i) | determine fHiand fxo ii) find fp and fT. | | | | |
| 18 | 1KT17 | EC020 | Expla | in characteristics of a quartz crystal. With a neat diagram | 10 | COg | L2 | |
| | | | expla | in the crystal oscillator , in parallel resonant mode. | | Ũ | | |
| 19 | 1KT17 | EC021 | The | following component values are given for the Wein- | 10 | CO9 | L3 | |
| | | | bridg | e oscillator of the circuit of Ri = R2 = 33k.0 CI = C2 = | | | | |
| | | | 0.001 | g R3 = 47 ka R4 = 15ka i) Will this circuit oscillate? ii) | | | | |
| | | | Calcu | Ilate the resonant frequency | | | | |
| 20 | 1KT17 | EC022 | Expla | in the working of push pull class B amplifier with neat | 10 | CO9 | L2 | |
| | | -0 | circui | t diagram. | | 001 | | |
| 21 | 1K1171 | -C023 | Expla diagra | in the working of discrete series voltage regulator with am | 10 | C09 | L2 | |
| 22 | 1KT17 | EC024 | Expla diagra | in the working of discrete shunt voltage regulator with am | 10 | CO9 | L2 | |
| 23 | 1KT17 | EC025 | Whic | h amplifiers are called as power amplifiers | 10 | CO8 | L2 | |
| 24 | 1KT17l | EC026 | Expla | in the general features of a power amplifier | 10 | CO8 | L2 | |
| 25 | 1KT17 | EC027 | Draw | and explain the block diagram of class D amplifier | 10 | CO8 | L2 | |
| 26 | 1KT17 | EC028 | Expla | in the classification of power amplifiers based on class of | 10 | CO8 | L2 | |
| | | | opera | ation | | | | |
| 27 | 1KT17 | EC029 | Why | efficiency of class D amplifiers is almost 100%? where are | 10 | CO8 | L2 | |
| | <u> </u> | | class | D amplifiers used? | | | | |
| 28 | 1KT17 | -C030 | Wher | n is the power dissipation maximum in class A amplifiers | 10 | CO8 | L3 | |

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| Copyrig | | AS. All right | s reserved | the expression for die pewer input ale pewer output and | 10 | 608 | 10 |
| 29 | | _0031 | efficie | ency of a series fed directly coupled class A amplifier | 10 | 000 | |
| 30 | 1KT17 | EC032 | Expla | in the advantages and disadvantages of directly coupled | 10 | COg | L2 |
| | , | | class | A amplifiers | - | | |
| 31 | 1KT17 | EC033 | Expla | in the advantages and disadvantages of transformer | 10 | CO9 | L2 |
| | | | coup | led class A amplifiers | | | |
| 32 | 1KT178 | EC035 | Expla | in the three point method of calculating the second | 10 | CO9 | L2 |
| | | | harm | onic distorsion. | | | |
| 33 | 1K 17 | -C036 | what | is harmonic distorsion | 10 | COg | L2 |
| 34 | 1K 17t | <u>-</u> C037 | Expla | In series – fed class – A power amplifier. Show that its $\pi = 2\pi^{2}$ | 10 | CO8 | L3 |
| - 25 | 11/717 | | Fypla | num conversion elliciency is 25%. | 10 | <u> </u> | 1.2 |
| 35 | | 20030 | | in with circuit diagram the operation of Class-B push- implifier using complementary—symmetry transistor pair. | 10 | 008 | L2 |
| | | | Also | mention advantages and disadvantages of the circuit | | | |
| 36 | 1KT17 | EC040 | Com | pare the various classes of operation of power amplifiers | 10 | CO8 | L3 |
| | | | a)Ope | erating cycle b)position of Q point c) efficiency | | | |
| 37 | 1KT178 | EC041 | An ic | leal class B push-pull power amplifier with input and | 10 | CO8 | L3 |
| | | | outpu | ıt transformers has Vcc = 20V, N2 = 2N1 and RL = 20n. The | | | |
| | | | transi | stors has hfc = 20. Let the input be sinusoidal. For the | | | |
| | | | maxir | num output signal at VcE(p) = Vcc, determine : i) The | | | |
| | | | tranci | ster Conversion officiency | | | |
| 28 | 1KT17 | -C042 | Tho | following distortion readings are available for a power | 10 | C08 | 12 |
| 30 | | _0042 | ampli | ifier. D2 = 0.2, D3= 0.02, D4 = 0.06, with II = 3.3A and Rc = | 10 | 000 | L3 |
| | | | 40. i) | Calculate the total harmonic distortion ii) Determine the | | | |
| | | | funda | amental power component iii) Calculate the total power. | | | |
| 39 | 1KT17 | EC043 | | $V_{CC} = 20V$ | 10 | CO8 | L3 |
| | | | | | | | |
| | | | | | | | |
| | | | | 340KIL 34KN | | | |
| | | | | IONE For the circuit shown | | | |
| | | | v | $R_{22,2kh}$ ro = Goft. C7.(cbe) = | | | |
| | | | | \$10KA \$2KR = 204F 36pF, Cu (cbc) = | | | |
| | | | | 4pF, CCe ti 1 pF, | | | |
| | | | | CWi = 6 pF, Cwo = | | | |
| | | | 8pF i) | determine fHiand fxo ii) find fp and fT. | | 00 | |
| 40 | 1K 17t | <u>-</u> C044 | Expla | in characteristics of a quartz crystal. With a neat diagram | 10 | COg | L2 |
| 41 | 11/17 | C046 | expla | following component values are given for the Wein | 10 | <u> </u> | |
| 41 | | _C040 | brida | e oscillator of the circuit of $Ri = R2 = 22k 0 Cl = C2 = 100000000000000000000000000000000000$ | 10 | COG | 3 |
| | | | 0.001 | g R3 = 47 ka R4 = 15ka i) Will this circuit oscillate? ii) | | | |
| | | | Calcu | late the resonant frequency | | | |
| 42 | 1KT17 | EC047 | Expla | in the working of push pull class B amplifier with neat | 10 | CO9 | L2 |
| | | | circui | t diagram. | | | |
| 43 | 1KT16 | EC001 | Expla | in the working of discrete series voltage regulator with | 10 | CO9 | L2 |
| | 1/7 5 | | diagr | am | | | |
| 44 | 1K 16 | -C007 | Expla | in the working of discrete shunt voltage regulator with | 10 | COg | L2 |
| 1 | 1 | | udyf | alli | | | |

F. EXAM PREPARATION

1. University Model Question Paper

| Course: | | | | | | | Month / | ′ Year | May /2 | 2018 |
|-----------|------|--------------------------|-----------------|-----------------|----------------|-----------|---------|--------|--------|-------|
| Crs Code: | | | Sem: | | Marks: | | Time: | | | |
| - | Note | Answer all FIVE | E full questior | ns. All questic | ons carry equa | al marks. | | Marks | СО | Level |
| 1 | a | JEW SCHEME NOT AVAILABLE | | | | | | 16 / | CO1 | |

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|---------|-------------|--------------------------|----------------|-------|---------|--------------|--|--|--|
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| Copyrig | ht ©2017. d | AAS. All rights reserved | l | | 1 1 | | | | |
| | | | | 20 | | | | | |
| | b | | | | | | | | |
| | С | | | | CO2 | | | | |
| | d | | | | | | | | |
| | | | | | | | | | |
| - | а | | | 16 / | CO1 | | | | |
| | | | | 20 | | | | | |
| | h | | | | CO2 | | | | |
| | с С | | | | 002 | | | | |
| | 2 | | | | | | | | |
| | u | | | | | | | | |
| | | | | | 0 | | | | |
| 2 | а | | | 16 / | C03 | | | | |
| | | | | 20 | | | | | |
| | b | | | | | | | | |
| | С | | | | CO4 | | | | |
| | d | | | | | | | | |
| | | | | | | | | | |
| - | а | | | 16 / | CO3 | | | | |
| | | | | 20 | | | | | |
| | b | | | | COA | | | | |
| | <u>с</u> | | | | 004 | | | | |
| | ر م | | | | | | | | |
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| | | | | | 00- | | | | |
| 3 | а | | | 16 / | CO5 | | | | |
| | | | | 20 | | | | | |
| | b | | | | | | | | |
| | С | | | | CO6 | | | | |
| | d | | | | | | | | |
| - | а | | | 16 / | CO5 | | | | |
| | | | | 20 | | | | | |
| | b | | | | | | | | |
| | C | | | | C06 | | | | |
| | 4 | | | | | | | | |
| | u | | | | | | | | |
| | - | | | 16 / | 007 | | | | |
| 4 | d | | | 10 \ | | | | | |
| | L. | | | 20 | | | | | |
| | b | | | | | | | | |
| | C | | | | C08 | | | | |
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| | | | | | | | | | |
| - | а | | | 16 / | C07 | | | | |
| | | | | 20 | | | | | |
| | b | | | | CO8 | | | | |
| | C | | | | | | | | |
| | h | | | | | | | | |
| | G | | | | | | | | |
| | | | | 46 / | C02 | | | | |
| 5 | d | | | 10 \ | CUY | | | | |
| | | | | 20 | | | | | |
| | b | | | | CO10 | | | | |
| | С | | | | | | | | |
| | d | | | | | | | | |
| | | | | | | | | | |
| | а | | | 16 / | CO9 | | | | |
| | | | | 20 | | | | | |
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| C | | | C010 |

2. SEE Important Questions

d

| Course: | | Analog Circuits Month | n / Year May /201 | | |
|---------|-------|--|-------------------|------------|-------|
| Crs (| Code: | 17EC33 Sem: III Marks: 100 Time: | | 180 m | nutes |
| | Note | Answer all FIVE full questions. All questions carry equal marks. | - | - | |
| Mo | Qno. | Important Question | Marks | CO | Year |
| dul | | | | | |
| е | | | - | | |
| 1 | 1 | Derive an expression for A, Z, and Zo for CE-fixed bias using re- | 8 | CO1 | 2018 |
| | | equivalent model. | | | |
| | - | Define h nevermete c and derive h nevermeters model of CE RIT | 0 | <u> </u> | 2019 |
| | 2 | Define n-parameters and derive n-parameters model of CE-BJ For the emitter follower network of Eig $\Omega_2(a)$. Determine (i) relin Z_{ij} (ii) Z_{ij} | 0 8 | C02 | 2010 |
| | 3 | $i_{\rm V}$ Av | 0 | COI | 2010 |
| | | | | | |
| | | | | | |
| | | \$220KA | | | |
| | | $V_i \rightarrow F$ $B = 100, R = 100, R$ | | | |
| | | $\rightarrow I_i$ | | | |
| | | | | 001 | |
| | 4 | With a neat circuit e: | 8 | CO1 | 2018 |
| | | Pofine h parameters | 0 | <u> </u> | 2010 |
| | 5 | transistor | 0 | CO2 | 2010 |
| | | | | | |
| 2 | 1 | Briefly explain the construction operation and characteristics of n- | 8 | CO3 | 2018 |
| - | - | channel D-type MOSFET. | Ũ | 000 | 2010 |
| | 2 | The fixed-bias configuration of Fig.Q3(b) has an operating point defined | 8 | CO3 | 2018 |
| | | by .1 VGSQ = —2V and IDQ = 5.625mA , with DSS = 10mA and Vp = 8V. | | • | |
| | | Determine : i)g _m ii) rd iv) Zo v) Av. | | | |
| | | 9200 | | | |
| | | 2K2 C2 | | | |
| | | | | | |
| | | + CONTRACTOR | | | |
| | | ZIM2 S VP=-BV | | | |
| | 3 | Explain the small sign | 6 | CO3 | 2018 |
| | 4 | Compare JFET and M _ $7 = 2V$ 7_{20} | 3 | CO4 | 2018 |
| | 5 | Draw the JFET common arain configuration circuit. Derive Z Zo and Av | 7 | CO4 | 2018 |
| | | using small signal model. | | · | |
| | | | | | |
| 3 | 1 | The input power to a device is 10,000W at a voltage of 1000V. The output | 6 | CO5 | 2018 |
| | | 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. | | | |
| | 2 | Describe Miller's effect and derive an equation for Miller input and output | 6 | CO5 | 2018 |
| | | capacitance. | | <u> </u> | 0010 |
| | 3 | uscuss the effect of various capacitors on low-frequency response of BIT amplifier | Ø | CU5 | 2018 |
| | 4 | An amplifier rated 40, W output is connected to a 100 speaker. i) Calculate | Q | $C \cap r$ | 2018 |
| | 4 | the input power required for full power output if the power gain is 250R | | 005 | 2010 |
| | | ii) Calculate the input voltage for rated output if the amplifier voltage gain | | | |
| | | 40dB. (04 Marks) | | | |
| | 5 | b. Determine the high-cutoff frequencies of JFET amplifier for the | 8 | CO4 | 2018 |
| | | following specification: | | • | |

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| | | Title: | Course Plan | Page: | 22 / 22 | 2 |
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| | | CG = 0.01UF, C | | | | |
| | | = IKU, RL = .2 IL | $DSS = \delta I \Pi A$, $VP = -4V$, $Ia = 0052$, $VDD = 20V$, $Cga = 2PF$, | | | |
| | | Cys = 4 PF, CC | 15 = 0.5 FF, C, = 5 FF, 0 = 0 FF and Av=-3 | | | |
| | 1 | Mention the ty | upes of feedback connections. Draw, their block diagrams | 8 | C06 | 2018 |
| 4 | Т | indicating inpu | it and output signal. | 0 | | 2010 |
| | 2 | With a neat | circuit diagram, explain the working principle of FET | 8 | C07 | 2018 |
| | | phaseshift osc | illator, with relevant equations | | | |
| | 3 | What are the | effects of negative feedback in an amplifier? Show how | 6 | C06 | 2018 |
| | | bandwidth of a | an amplifier increases with negative feedback. | | | |
| | 4 | With a neat cii | rcuit and waveforms, explain the working operation of UJT | 5 | CO7 | 2018 |
| | | relaxation osci | llator | | | |
| | 5 | c. Determine | the voltage gain, input and output impedance with | 5 | CO6 | 2018 |
| | | feedback for v | roltage series feedback having A = -100, R, = 10 KO and RO= | | | |
| | | 20 KTL FOR TEED | Dack factor β =-0.1 | | | |
| - | 1 | with a post oir | auit diagram, avalain the operation of a cories fod class A | 0 | <u> </u> | 2019 |
| 5 | 1 | with a neat circ | cuit diagram, explain the operation of a series —red class A ar and prove that $n=25\%$ | 0 | | 2010 |
| | 2 | b Calculate t | he output voltage and the zener current in the regulator | 8 | COo | 2018 |
| | 2 | circuit of Fia. w | γ ith RL = 1K Ω | | 009 | 2010 |
| | | len e en e en e ign e | N= 0 8=50 Vo | | | |
| | | | 20V ZR (regulated | | | |
| | | | (unregulated) {2200 | | | |
| | | | SB. | | | |
| | | | Vz 412V 7 12 | | | |
| | 3 | Calculate the | harmonic nal with | 4 | CO8 | 2018 |
| | | fundamental a | implitude - 25, third | | | |
| | | narmonic amp | billude of 0.1 v and fourth harmonic amplitude of 0.05V. | | | |
| $\left \right $ | 1 | Explain the | namonic uistorition. operation of a transformer coupled puch pull class | 8 | C08 | 2018 |
| | 4 | conversion effi | ciency | 0 | | 2010 |
| | 5 | Explain the | fold —back current limiting circuit of voltage series | 8 | COo | 2018 |
| | 5 | Determine the | regulated voltage and currents of shunt regulation. | | | |