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PRESIDENCY UNIVERSITY BENGALURU

SCHOOL OF ENGINEERING

SUMMER TERM EXAMINATION - AUGUST 2024

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| **Semester :2nd** | **Date :05-08-2024** |
| **Course Code :ECE2001** | **Time :**1:00PM to 4:00PM |
| **Course Name :Analog Electronics** | **Max Marks :100** |
| **Program :B Tech** | **Weightage :50%** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and non-programmable calculator are permitted.*
4. *Do not write any information on the question paper other than Roll Number.*

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| **PART A** | | | |
| **ANSWER ANY 4 QUESTIONS 4Q X 5M=20M** | | | |
| 1 | Transistor Biasing is the process of setting a transistors DC operating voltage or current conditions to the correct level.Explain Base bias circuit. | (CO2) | [Knowledge] |
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| 2 | Rectifiers are used inside the power supplies of almost all electronic equipment. In power supplies, the rectifier is normally placed in series following the transformer, a smoothing filter, and possibly a voltage regulator. Explain the operation of a half-wave rectifier with the help of a circuit diagram and relevant waveforms. | (CO1) | [Knowledge] |
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| 3 | Clampers are also called direct current restorers as they clamp the waveforms to a fixed DC potential. These are frequently used in test equipment, sonar, radar systems and are used for removing distortions. Describe the working of a positive clamper circuit with a neat circuit diagram. | (CO3) | [Knowledge] |
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| 4 | Semiconductors can be pure elements, such as silicon or germanium, or compounds such as gallium arsenide or cadmium selenide. What is semiconductor diode ? Explain the VI characteristics of Diode. | (CO5) | [Knowledge] |
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| 5 | JFET or Junction Field Effect Transistor is one of the simplest types of field-effect transistor. Illustrate the working of the n-channel JFET with neat diagrams in detail. | (CO3) | [Knowledge] |
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| 6 | In electronics, the Barkhausen stability criterion is a mathematical condition to determine when a linear electronic circuit will oscillate. Explain the Barkhausen criteria for oscillation. | (CO1) | [Knowledge] |
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| **PART B** | | | |
| **ANSWER ANY 5 QUESTIONS 5Q X 10M=50M** | | | |
| 7 | a)There are two types of FWR. Draw the circuit diagram of full wave rectifier with 4 diodes. Explain its principle of working with relevant waveforms.  b)An a.c. supply of 230V is applied to a half-wave rectifier circuit through a transformer turn ratio of 10:1. Find i)output DC voltage ii)The peak inverse voltage.Assume the diode to be ideal. | (CO6) | [Comprehension] |
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| 8 | Zener diodes are the most common electronic components used as stable voltage references for electronic circuits.What is Zener Diode ?Explain Zener diode as a Voltage Regulator. | (CO5) | [Comprehension] |
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| 9 | In electronics, biasing is the setting of DC operating conditions of an electronic component that processes time-varying signals. List the transistor biasing techniques. With a neat circuit explain the voltage divider configuration with appropriate expressions. | (CO2) | [Comprehension] |
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| 10 | A BJT uses both electrons and holes as charge carriers. Illustrate the working of the transistor with its input and output characteristics when the emitter is common to input and output terminals. Derive the expression of current gain for CE configuration for the transistor. | (CO2) | [Comprehension] |
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| 11 | Oscillators are positive feedback amplifiers. Phase-shift oscillators are often used at audio frequency as audio oscillators. Explain the working of the RC Phase shift Oscillator with a neat circuit diagram. Illustrate in detail why 3 stages of RC are used in the circuit. | (CO4) | [Comprehension] |
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| 12 | E-MOSFET has no conducting channel between two terminals, the source terminal, and the gate terminal.With a neat diagram explain the working principle of the enhancement type MOSFET. | (CO3) | [Comprehension] |
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| 13 | A transistor amplifier with proper positive feedback can act as an oscillator. Explaining the concept of Feedback, also explain the working of Colpitts Oscillator with a neat diagram. | (CO4) | [Comprehension] |
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| **PART C** | | | |
| **ANSWER ANY 2 QUESTIONS 2Q X 15M=30M** | | | |
| 14 | A transistor has three terminals. One of the three terminals could be connected to form the common input and output terminal. Compare the different transistor configurations illustrating their input and output parameters with typical input and output characteristics. Derive the relationship between Alpha and Beta. | (CO2) | [Application] |
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| 15 | A transistor can work as an oscillator to produce continuous undamped oscillations of any desired frequency. Explaining the concept of positive Feedback and with a neat circuit diagram illustrate the working of the Hartley Oscillator and derive an expression for frequency of oscillation of Hartley oscillator. | (CO4) | [Application] |
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| 16 | Feedback amplifiers are used in most of the electronic amplifier circuits. What are Feedback Amplifiers? Explain the concept of Negative Feedback, derive the expression for gain and explain the 4 types with the help of a neat block diagram. | (CO3) | [Application] |