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PRESIDENCY UNIVERSITY BENGALURU

 SCHOOL OF INFORMATION SCIENCE

 MAKE UP EXAMINATION - JULY 2024

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| **Semester: I** | **Date: 11-07-2024,** |
| **Course Code:** **ECE1001** | **Time: 09.30am to 12.30pm** |
| **Course Name:** **Elements of Electronics Engineering** | **Max Marks: 100** |
| **Program: B Tech 2021/20222/2023** | **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 5 QUESTIONS 5Q X 2M=10M** |
| 1 | Semiconductor diode operated with minimum knee voltage ……........…........volts for Ge and …......…........…volts for Si. | (CO 1) | [Knowledge] |
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| 2 | Resistor is a passive device which resists the flow of current through it. The color coding in a certain resistor is found to be 1st band=red, 2nd band=black, 3rd band=yellow, 4th band=gold. Calculate the value of the resistor with its tolerance range. | (CO 1) | [Knowledge] |
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| 3 | Rectification is the process of converting AC to DC. The total number of diodes in full wave bridge rectifier is.................and total number of diodes in center tapped full wave rectifier............... | (CO 2) | [Knowledge] |
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| 4 | The Transistors are operated in three Different Mode / Configuration: CB, CE and CC. Accordingly, α and β are the parameters for a transistor which defines the current gain in a transistor. Write the relation between α and β.  | (CO 2) | [Knowledge] |
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| 5 | The number system with base 16 is Hexadecimal and decimal number system has base 10. Convert (1ACC)16 to (   )10. | (CO 3) | [Knowledge] |
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| 6 | Implement a AND gate using a NOR gate. How many gates are required?  | (CO 3) | [Knowledge] |
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| 7 | Half-wave rectifiers transform AC voltage to DC voltage. List the components in half wave rectifier. | (CO2) | [Knowledge] |
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| **PART B** |
|  **ANSWER ANY 5 QUESTIONS 5Q X 10M=50M** |
| 8 | The **V-I** characteristics of a **P-N**junction diode is a curve between the voltage and current through the circuit. The parameters in the**V-I**curve explains about the diode. List out and explain in brief all the parameters in the **V-I** characteristics of a diode  | (CO1) | [Comprehension] |
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| 9 | 1. Diode is an electronic device that conduct electricity in one direction. The mode of operation and the required details is represented by the Diode Approximation models. Explain all three Diode Approximation models with the required circuits and graphs.  **(5marks)**
2. A PN junction diode is made by sandwiching one P-type and N-type of material. It works in two modes. With the relevant diagrams Explain the working of PN junction diode. **(5 marks)**
 | (CO1) | [Comprehension] |
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| 10 | The bridge rectifier is a type of full-wave rectifier that uses four diodes in a bridge circuit configuration to convert alternating (AC) current to a pulsating DC. Design a full wave Bridge rectifier using diodes with N1 and N2 primary and secondary coil in transformer, also plot the graph of expected wave forms. | (CO2) | [Comprehension] |
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| 11 | Modulation process helps in effective data transmission over a communication. Define the modulation process, explain the need for modulation. With the required waveforms Explain the different types of modulation. | (CO3) | [Comprehension] |
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| 12 | A transistor has three terminals emitter, base and collector. With three types of biasing configurations such as common base, common emitter, common collector. Explain in detail common emitter configuration with required circuit diagram. Also bring out the details of input and output characteristics with required graphs. | (CO3) | [Comprehension] |
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| 13 | There are 3 categories of gates such as basic gates, universal gates and special function gates. With the help of symbolic representation and truth table, Explain all the basic gates and universal gates. | (CO2) | [Comprehension] |
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| 14 | 8085 microprocessor is a program-controlled semiconductor device (IC), which fetches, decodes and executes instructions. The basic units or blocks of a microprocessor are ALU, an array of registers and control unit. With a neat schematic diagram. Explain in detail the block diagram of 8085 microprocessor**.** | (CO4) | [Comprehension] |
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| **PART C** |
|  **ANSWER ANY 2 QUESTIONS 2Q X 20M=40M** |
| 15 | 1. Kirchoff current law states that the algebraic sum of currents at a junction in a network is zero. In the circuit determine the value of I2 and I3. (10 Marks)

1. A silicon diode working a at temperature of 30oC the forward voltage applied across the diode is 0.6V Determine its forward current if the reverse saturation current is 20nA.Assume η=2. (10 marks)
 | (CO1) | [Application] |
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| 16 | **a)** Boolean algebra laws and theorems are a set of rules that are required to reduce or simplify any given complex Boolean expression. Simply the equation **XY+XYZ+XYZ’+X’YZ.** Implement the simplified equation using basic gates **(5marks).****b)**DeMorgan’s theorem is one way of simplification used in Boolean algebra State and prove with the help of truth table DeMorgan’s law for **two** variables **A,B.** **(5marks).c)**Universal gates such as NAND and NOR gates can be used to implement any Boolean function. Realize basic gates and special function gates using **NAND gates** only (**NOT, AND, OR, EXOR, EXNOR).(10 marks).** | (CO2) | [Application] |
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| 17 | 1. In a base bias circuit VCE =6V. IC=3mA, supply voltage is 10V. Assume silicon transistor has β=60. Find Rc, IB, RB . **(10marks).**
2. For the given fixe bias circuit of Si transistor with β=60, Draw the d.c loadline and determine operating point and mark on the plot. Assume VBE=0.7v. **(10marks).**

. | (CO3) | [Application] |