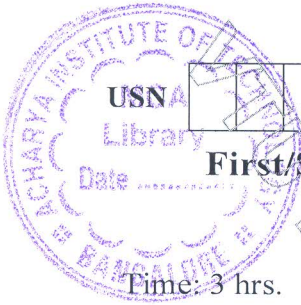


CBCS SCHEME



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15ELN15/25

First/Second Semester B.E. Degree Examination, June/July 2023

Basic Electronics

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- Explain V – I characteristics of a diode with neat sketch. (04 Marks)
 - With circuit diagram, explain the working of Center – tapped full – wave rectifier. Draw its input and output wave – forms. (06 Marks)
 - Define ‘ α ’ and ‘ β ’. Also derive the relation between them. (06 Marks)

OR

- Sketch the transistor input and output characteristics of CE configuration and briefly explain the three regions of operation. (08 Marks)
 - Find the value of ‘ α ’ and ‘ β ’, ‘ β ’ and I_E for a transistor that has $I_B = 100 \mu A$ and $I_C = 2mA$. (04 Marks)
 - With circuit diagram, explain Half – Wave rectifier with Capacitor filter. (04 Marks)

Module-2

- Explain the operation of voltage divider bias, with neat circuit diagram and necessary equations using approximate analysis. (08 Marks)
 - Write the ideal characteristics of an Operations Amplifier. (04 Marks)
 - Define the following terms with respect to Op – amp: i) Slew rate ii) CMRR. (04 Marks)

OR

- Draw the circuit diagram of Op – amp integrator and derive the expression for its output voltage. (04 Marks)
 - A base bias circuit with a 12 volts supply uses a transistor with $\beta = 70$. Design the circuit so that $I_C = 2mA$ and $V_{CE} = 9V$. (Assume $R_E = 0$). (06 Marks)
 - Draw the circuit diagram of three input inverting summing circuit using Op – amp and find the output voltage, if $V_1 = 1V$, $V_2 = 2V$, $V_3 = 4V$, $R_1 = 1k\Omega$, $R_2 = R_3 = 3k\Omega$ and $R_3 = 2k\Omega$. (06 Marks)

Module-3

- State and prove DeMorgan’s law, for two variables. (04 Marks)
 - Convert $(342.56)_{10} = (?)_2 = (?)_8 = (?)_{16}$. (04 Marks)
 - Draw the logic circuit of full adder using two half adders. Write the truth table and equations for sum and carry. (08 Marks)

OR

- Perform the subtraction $(11010)_2 - (10000)_2$ using both 1’s complement and 2’s complement. (04 Marks)
 - Realize the basic gates using only NAND gates. (04 Marks)
 - Simplify and realize the following expression using only NAND and only NOR gates.
 $Y = AB + AC + BD + CD$. (08 Marks)

Module-4

- 7 a. With block diagram, explain Micro Controller based stepper motor control system. (08 Marks)
b. What is a Flip – Flop? Explain the operation of RS latch using NOR gates. (08 Marks)

OR

- 8 a. With circuit diagram and truth table, explain clocked SR flip – flop. (08 Marks)
b. With neat block diagram, explain the architecture of micro controller 8051. (08 Marks)

Module-5

- 9 a. What is Modulation? Explain the need for modulation and list the different types of modulation schemes. (06 Marks)
b. Explain the construction and principle of operation of LVDT. (06 Marks)
c. List the desirable properties of good transducer. (04 Marks)

OR

- 10 a. Derive the voltage equation for amplitude modulated wave. (06 Marks)
b. A 500 Watts 1MHz carrier is amplitude modulated with a sinusoidal signal of 1kHz. The depth of modulation is 60%. Calculate band width , power in the side bands and total power transmitted. (04 Marks)
c. Give the comparison between AM and FM. (06 Marks)
