21/12/23

DOON UNIVERSITY, DEHRADUN
End Semester Examination, 3rdSemester, 2023
Academic Year 2023-24 (Odd Semester)
School of Physical Science, Department Physics
Programme Name: B. Sc. Honors with Research 3rd Semester
Course Code: Digital, Analog and Instrumentation (PHG-103)

Time Allowed 2.0 Hours **Maximum *Marks:* *50***

Note: All questions are compulsory and marks are indicated in front of each section.

SECTION: A

(Very Short Answer Type Questions; 4×3=12)

Q1. Name three possible connection of transistor.

Q2. Give the energy band description of semiconductors. Which are the most commonly used semiconductors.

Q3. What do you understand by damped and undamped electrical oscillation.

Q4. State and prove De Morgan's theorem.

SECTION: B

(Short Answer Type Questions; 4×5=20)

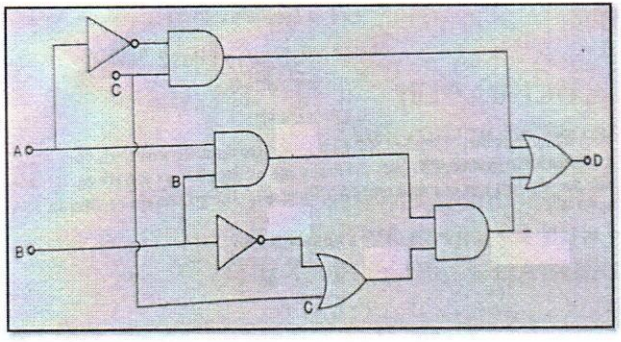
Q1. What is a transistor. Draw the symbol of npn and pnp transistor and specify the leads.

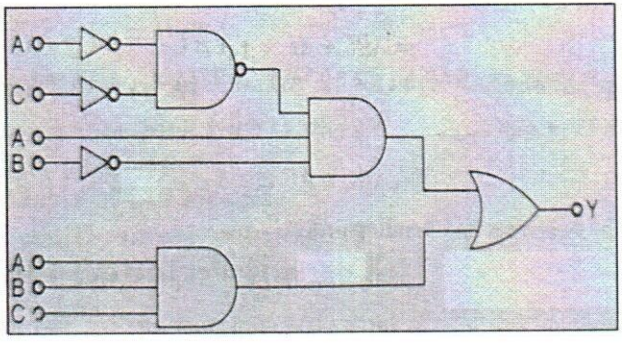
Q2. What do you understand by intrinsic and extrinsic semiconductors.

Q3. Reduce the expression

$$\overline{\overline{AB} + \overline{A} + AB} \qquad AB + \overline{A\overline{C}} + A\overline{B}C\,(AB + C)$$

Q4. Simplify the network shown in figure so that it may be realised with fewer gates





SECTION: C

(Long Answer Type Questions; 3×6=18)

Q1. What is photo diode. How does photo diode work. Draw its characteristics.

Q2. What is an oscillator. Explain the circuit operation of phase shift oscillator along with its advantage and disadvantage.

Q3. What is OP-AMP? What are the characteristics of ideal operational amplifier? Draw and explain the circuit of inverting and non-inverting OP-AMP.