Tutorial 5:

- Digital electronics-Boolean identities,
- De Morgan's laws, logic gates and truth tables;
- Simple logic circuits;
- Thermistors, solar cells;
- Fundamentals of microprocessors and digital computers.

Q1:

Simplify the logical expression $[A\bar{B}\ (C + BD) + \bar{A}\ \bar{B}]C$. 10

2015

Q2:

Draw the device structure of a p-n junction solar cell and explain how light energy is converted into electrical energy. Draw and explain its I-V characteristics. 15

2015

Q3:

Why are NAND and NOR gates called universal gates ? Give the logic diagram, Boolean equation and the truth table of a NAND gate. *10*

2016

Q4:

Describe the working of a microprocessor system in block diagram. How is its performance affected in a pipelined processor? 15

2017

Q5:

Construct a digital circuit to add three bits A, B and C and provide their sum and carry as outputs. Show appropriate Boolean expressions and truth table to justify the outputs. 25

Q6:

Why NAND and NOR gates are called universal gates ? Give the logic diagram, Boolean equation and the truth table of a X–OR gate. 10

2022

Q7.

(i) How is digital system different from analog system ? What are the principal reasons for the widespread use of digital electronics ? *4+4=8*

(ii) Give logic diagram, Boolean equation and truth tables of AND, OR and NOT gates. Show that NAND and NOR gates can be utilized as a Universal Gate. *12*

2024

Q8.

(i) माइक्रोप्रोसेसर क्या है? खंडक आरेख सहित एक माइक्रोप्रोसेसर की आन्तरिक कार्यप्रणाली का वर्णन कीजिए।

What is a microprocessor? Describe the internal functioning of a microprocessor with block diagrams.

(ii) तापी प्रतिरोधक (थर्मिस्टर) और सौर सेल किस प्रकार अपनी संरचना व प्रचालन में भिन्न हैं?

How do thermistors and solar cells differ in structure and operation?

10+5=15

2025