B.Sc. Sem. V (PHYSICS) Paper :504

Title : Digital Electronics and Solid state devices

Code : 4297 Nov 2014

Time- 2-30

Que.1 [a] What is universal gate? Explain NAND gate as an universal gate with necessary block diagram. [08]

[b] Explain AND gate with transistor circuit. [06]

OR

Que.1 [a] What is called logic circuit? Explain diode based OR gate. [07]

[b] What is NOT gate? Explain it as transistor circuit. [07]

Que.2 Write Boolean expression,reduce it using mapping and implement in NOR logic: [14]
F= m (2,4,6,8,10,13,14,15) using SOP method

OR

Que.2 Write Boolean expression, reduce it using mapping and implement in NOR logic: [14]

F= m (2,4,6,7,12,13,14,15) using POS method

Que.3 [a] Find the minterms for the following and also state their designation [12]
[1]A + BC

[2] AB + ACD

[3] AB + C

[4] ABC + CD

[b] Find designated value of $\overline{WX}\,Y\,\overline{Z}$ [02]

OR

Que.3 [a] Reduce the following expressions to the simplest form and implement in AND/OR/invert logic. [12]

[1] A + $\overline{A}B$ + AB

[2]$A\overline{B} + \overline{A}B + AB + \overline{A\overline{B}}$

[3]$A\overline{B}D + A\overline{B}D + \overline{B\overline{D}}$

[4] (AB + C)(AB + D)

[b] Write De Morgan's theorem and verify it with truth table. [02]

Que.4 [a] Without reducing convert the following expression to AND,OR and NOT logic. [10]
Then convert it in NAND logic circuit (two INPUT) Mention number of gates used.

[1] A + B + AB

[2] (A + $(A + \overline{B} + C)(A\overline{BC}$)

[b] Write application of LED. [04]

OR

Que.4[a] What is DIAC ? Describe its construction, characteristic and operation with necessary circuit diagram. [08]

[b] How a Bipolar transistor can be used as ac and dc switch? [06]

Que.5[a] Explain full adder with block diagram. [06]

[b] What is IC? Explain classification of IC's by function briefly. [08]

OR

Que.5[a] Write short note on diode as an ac switch. [08]

[b] Explain photo diode. [06]