

F.Y. B. SC. (Computer Science) SEM – I (CBCS - 2016 COURSE) :
WINTER - 2018

SUBJECT: PRINCIPLES OF DIGITAL ELECTRONICS – I

Day : Tuesday
Date : 23/10/2018

W-2018-0899

Time : 11.00 AM TO 02.00 PM
Max. Marks : 60

N.B.:

- 1) All questions are **COMPULSORY**.
 - 2) Figures to the right indicate **FULL** marks.
 - 3) Draw neat and labeled diagrams **WHEREVER** necessary.
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Q.1 A) Select the correct option and rewrite the complete sentence: [06]

a) _____ is a circuit that converts coded input into familiar codes.

- | | |
|---------------------------|--------------------|
| i) Encoder | iii) Demultiplexer |
| ii) Seven segment display | iv) Decoder |

b) According to the Boolean algebra laws $A \cdot \bar{A} =$ _____.

- | | | | |
|------|-------|--------|---------------|
| i) 1 | ii) A | iii) 0 | iv) \bar{A} |
|------|-------|--------|---------------|

c) Decimal equivalence of binary number 10001 is _____.

- | | | | |
|-------|--------|---------|--------|
| i) 55 | ii) 50 | iii) 56 | iv) 65 |
|-------|--------|---------|--------|

d) CMOS stands for _____.

- i) Common metal oxide semiconductor
- ii) Complementary metal oxide semiconductor
- iii) Complementary metal of semiconductor
- iv) Common metal of semiconductor

e) _____ LED's should glow in order to display 2 on the seven segment display.

- | | | | |
|----------|-----------|------------|-----------|
| i) abcdg | ii) acdfg | iii) abdeg | iv) abcde |
|----------|-----------|------------|-----------|

f) The universal gate / gates is / are _____.

- | | | | |
|---------|---------|----------------------|----------|
| i) NAND | ii) NOR | iii) Both (i) & (ii) | iv) none |
|---------|---------|----------------------|----------|

B) Answer all the questions in one sentence: [06]

a) What do you mean by priority encoder?

b) Draw circuit diagram for half adder.

c) Give truth table for NOT gate.

d) Define a decoder .

e) What is K-map?

f) State the importance of Gray code.

P.T.O.

- Q.2** Answer **ANY THREE** of the following: [12]
- Write a short on seven segment display.
 - Perform the following conversions:
 - $(11011.1011)_2 = (?)_8$
 - $(AB.C1)_{16} = (?)_{10}$.
 - Simplify: $(\bar{A} + B + C)(A + \bar{B} + C)$. Also draw simplified diagram.
 - Build OR gate and AND gate using NOR gates only.

- Q.3** Answer **ANY FOUR** of the following: [12]
- Explain the action of full adder with necessary diagram.
 - Perform the following subtraction using 2's complement method:
 $(101100)_2 - (010110)_2$.
 - Define any four features of logic families.
 - Convert the following SOP expression into standard SOP form:
 $Y = AB + AC + B\bar{C}$
 - Simplify the expression using k-map
 $Y = \bar{A}\bar{B}\bar{C}D + \bar{A}BCD + AB\bar{C}D + \bar{A}BCD + \bar{A}BCD + ABCD + \bar{A}BCD$.

- Q.4** Answer **ANY TWO** of the following: [12]
- With necessary diagram explain the action of 2 to 4 decoder.
 - Explain the action of universal adder – subtractor.
 - Implement $Y = (\bar{A} + B)(A + C)$ by using only NAND or NOR gates.

- Q.5** Answer **ANY TWO** of the following: [12]
- State and prove De-Morgan's theorem.
 - Construct the Hamming code for the data 1010 with even parity.
 - What do you mean by multiplexer? Explain the working of 4:1 multiplexer with logic diagram.

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