

F.Y. B. SC. (COMPUTER SCIENCE) SEM – I (2014 COURSE) :

WINTER - 2017

SUBJECT : DIGITAL ELECTRONICS – I

Day : Tuesday
Date : 07/11/2017

Time : 12.00 NOON TO 02.00 PM
Max. Marks : 40

W-2017-0733

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Draw diagrams **WHEREVER** necessary.

Q.1 Attempt ANY TWO of the following: [10]

- a) Explain the action of 1 : 4 decoder with logic diagram and truth table.
- b) Construct the Hamming code for the message bits 1001 using even parity system.
- c) With neat logic diagram, symbol and truth table explain the working of full-adder.

Q.2 Attempt ANY TWO of the following: [10]

- a) What are universal gates? Construct AND and XOR gates using NOR gates.
- b) Explain the working of 2:1 multiplexer with logic symbol, diagram truth table.
- c) With neat logic diagram and truth table explain the working of decimal – to – BCD priority encoder.

Q.3 Attempt ANY TWO of the following: [10]

- a) What is a demultiplexer? Explain the working of 1:4 demultiplexer with logic diagram, symbol and truth table.
- b) State and explain De-Morgan's theorem with logic diagram and truth table.
- c) Reduce the following four variable functions to its minimum sum of product form:

$$Y = \overline{A} \overline{B} \overline{C} \overline{D} + \overline{A} \overline{B} C \overline{D} + \overline{A} B \overline{C} \overline{D} + \overline{A} B C \overline{D} + \overline{A} \overline{B} C D + \overline{A} B C D + \overline{A} \overline{B} C \overline{D} + \overline{A} B C \overline{D} + A \overline{B} C \overline{D}.$$

Q.4 Attempt ANY FIVE of the following: [10]

- a) Subtract 1011 from 0010 using 2's complement.
- b) Draw symbol and write truth table for the following gates:
i) NAND gate ii) OR gate
- c) What is Karnaugh map? Give the structure of 4 -variable K-map.
- d) Convert the following: i) $(1100110101)_2 = (?)_8$ ii) $(CF3D)_{16} = (?)_{10}$
- e) Draw logic diagram for half adder.
- f) Define the following parameters of logic families:
i) Speed of operation ii) Power dissipation.
- g) Perform the following conversions:
i) $(1010111001011)_2 = (?)_{16}$ ii) $(76)_{10} = (?)_2$

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