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**BIEL-030**

# DIPLOMA – VIEP – ELECTRONICS AND COMMUNICATION ENGINEERING (DECVI) / ADVANCED LEVEL CERTIFICATE COURSE IN ELECTRONICS AND COMMUNICATION ENGINEERING (ACECVI)

00436

**Term-End Examination**

**December, 2014**

## BIEL-030 : DIGITAL ELECTRONICS

*Time : 2 hours* *Maximum Marks : 70*

***Note :*** *Attempt* ***five*** *questions in all. Question no.* ***1*** *is* ***compulsory.***

**1.** Choose the correct answer. *7×2=14*

(a) Ones complement of the binary number 11000101 is

(i) 001111010

(ii) 10111010

(iii) 00111010

(iv) 11000101

(b) Which of the following statements is *true* :

(i) AND and NOT gates are necessary and sufficient for the realization of any logical function.

(ii) OR and NOT gates are necessary and sufficient for the realization of any logical function.

(iii) NOR gates are sufficient to realize any logical function.

(iv) NAND gates are not sufficient to realize any logical function.

(c) A multiplexer has

(i) one data input and a number of data outputs.

(ii) one data output and a number of data inputs.

(iii) one data output, a number of data inputs and a number of select inputs.

(iv) one data output, a number of data inputs and a number of outputs.

(d) A sequential circuit usually consists of

(i) only Flip-Flops

(ii) Flip-Flops and gates

(iii) only gates

(iv) None of the above

(e) A Flip-Flop is used to store

(i) one bit of information

(ii) two bits of information

(iii) one nibble of information

(iv) one byte of information

(f) Memories are used in digital systems to store

(i) instructions

(ii) data

(iii) intermediate and final results

(iv) All of the above

(g) MOS devices are used for VLSI because of

(i) their higher propagation delay.

(ii) lower silicon chip area required.

(iii) availability of enhancement and depletion mode MOSFETs.

(iv) All of the above

**2.** (a) What do you mean by a self-complementing code ? Give examples of two self-complementing codes. *7*

(b) Convert the following decimal numbers to Gray code : *4*

(i) 12

(ii) 286

(c) Convert $(5C7)_{16}$ to decimal. *3*

**3.** (a) State and prove De Morgan's theorem. *7*

(b) Show that both NAND gate and NOR gate are Universal gates. *7*

**4.** (a) Explain the following terms : *7*

(i) Multiplexing

(ii) Demultiplexing

(b) Design a binary full adder circuit. *7*

5. (a) Explain the working of Master Slave J-K Flip-Flop and state its advantage over normal J-K Flip-Flop. 7

(b) Design a mod-4 synchronous counter using J-K Flip-Flop. 7

6. (a) With the help of a neat diagram, explain the working of R-2R ladder network type DAC. 7

(b) Explain Random Access Memories of various types. 7

7. (a) Define the following terms : 7

(i) Fan-in

(ii) Propagation delay

(b) Discuss and draw circuit diagram for Schottky TTL NAND gate. 7

8. Write short notes on any ***four*** of the following : $4 \times 3\frac{1}{2} = 14$

(a) DRAM

(b) Excess-3 code

(c) Twisted ring counter

(d) Shift register

(e) Sequence generator and detection

(f) Half subtractor