

**DIPLOMA – VIEP – ELECTRONICS AND
COMMUNICATION ENGINEERING (DECVI) /
ADVANCED LEVEL CERTIFICATE COURSE IN
ELECTRONICS AND COMMUNICATION
ENGINEERING (ACECVI)
Term-End Examination
December, 2015**

BIEL-030 : DIGITAL ELECTRONICS

Time : 2 hours

Maximum Marks : 70

Note : Attempt any *five* questions. Question no. 1 is *compulsory*. All questions carry equal marks.

1. Attempt *all* the multiple choice and *True/False* questions. $7 \times 2 = 14$
- (a) Gray code is a self-complementing code. [T/F]
 - (b) One KB is equal to 1024 bytes. [T/F]
 - (c) 1's complement of 101001 is 010110. [T/F]
 - (d) What is the function of EX-OR Gate ?
 - (i) $F = A + B$
 - (ii) $F = A \oplus B$
 - (iii) $F = A . B$
 - (iv) None of the above

- (e) A flip-flop can store
- (i) 2 bit
 - (ii) 1 bit
 - (iii) 4 bit
 - (iv) None of the above
- (f) What is the full form of POS ?
- (i) Sum of Product
 - (ii) Product of Square
 - (iii) Product of Sum
 - (iv) None of the above
- (g) How many inputs are required for 4×1 multiplexer ?
- (i) 4
 - (ii) 8
 - (iii) 16
 - (iv) 32

2. (a) Minimize the following Boolean functions

using Boolean's law : $2 \times 3 \frac{1}{2} = 7$

$$(i) F(a, b, c) = \bar{a} \bar{b} c + \bar{a} b \bar{c} + \bar{a} b c + a b \bar{c} + a b c$$

$$(ii) F(a, b, c) = a \bar{b} \bar{c} + a \bar{b} c + \bar{a} \bar{b} \bar{c}$$

- (b) (i) Convert the Decimal Number 12-6875 into Binary Number.
- (ii) Convert the Binary Number 110001-010 into Decimal Number. $2 \times 3 \frac{1}{2} = 7$

3. Minimize the following Boolean functions using K-map and implement logic circuit : $2 \times 7 = 14$

(a) $F(A, B, C, D) = \sum(0, 1, 3, 5, 9, 10, 12)$

(b) $F(A, B, C, D) = \sum(0, 1, 5, 7, 9, 10, 15) + d\{2, 6, 8\}$ using NAND Gate only.

4. (a) Draw and explain NAND and X-NOR Gates. $3+3=6$

(b) Discuss sequence generator and detector circuits. 8

5. (a) What is TTL logic ? Explain Realization of NAND Gate using TTL logic. 7

(b) What is ECL logic ? Explain ECL OR Gate and ECL NOR Gate with diagrams. 7

6. (a) Explain the following : 7
- (i) Cumulative, Associative and Distributive Laws
 - (ii) De Morgan's Theorem
- (b) Differentiate between combinational circuit and sequential circuit with examples. 7
7. What is Demultiplexer ? What is the application of a Demultiplexer ? Draw and explain 1 : 8 Demux. 14
8. Write short notes on any **four** of the following : $4 \times 3 \frac{1}{2} = 14$
- (a) Universal Gate
 - (b) Full Adder
 - (c) 4-bit Shift Register
 - (d) J-K flip-flop
 - (e) Synchronous Counter
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