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BIEL-030

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

Term-End Examination

00919

December, 2017

BIEL-030 : DIGITAL ELECTRONICS

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt any* ***five*** *questions. Question no.* ***1*** *is* ***compulsory.*** *Use of scientific calculator is allowed.*

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

(a) The NAND gate output will be low if the two inputs are

(i) 0 0

(ii) 0 1

(iii) 1 0

(iv) 1 1

(b) What is the binary equivalent of the decimal number 368 ?

(i) 101110000

(ii) 110110000

(iii) 111010000

(iv) 111100000

(c) The simplification of the Boolean expression $\overline{(\bar{A}\,B\,\bar{C})} + \overline{(A\,\bar{B}\,C)}$ is

(i) 0

(ii) 1

(iii) A

(iv) BC

(d) The number of control lines for an 8-to-1 multiplexer is

(i) 2

(ii) 3

(iii) 4

(iv) 5

(e) How many flip-flops are required for mod 16 counter ?

(i) 5

(ii) 6

(iii) 3

(iv) 4

(f) EPROM contents can be erased by exposing it to

(i) Ultraviolet rays

(ii) Infrared rays

(iii) Burst of microwaves

(iv) Intense heat radiations

(g) A ring counter consisting of five flip-flops will have

(i) 5 states

(ii) 10 states

(iii) 32 states

(iv) Infinite states

2. (a) What is a Flip-Flop ? What is the difference between a latch and a flip-flop ? List out the applications of a flip-flop. *1+3+3=7*

(b) With relevant diagram, explain the working of master slave JK flip-flop. *7*

3. Design a BCD to seven-segment decoder that accepts a decimal digit and generates the appropriate output for segments in a display indicator. *14*

4. (a) What are the advantages of CMOS logic ? Explain CMOS inverter with the help of a neat circuit diagram. *7*

(b) What is Tri-state logic ? Explain tri-state logic inverter with the help of a circuit diagram. Give its truth table. *7*

5. (a) Draw the logic diagram of a full subtractor using half subtractors and explain its working with the help of truth table. 7

(b) Explain how a shift register can be used as a ring counter giving the waveforms at the output of the flip-flops. 7

6. (a) Reduce the following equation using K-map : 7

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

(b) Write the expression for the Boolean function

$F(A, B, C) = \sum m\,(1, 4, 5, 6, 7)$ in standard POS form. 7

7. (a) Distinguish between ROM, PROM, EPROM and EEPROM. 7

(b) Design a synchronous counter using IC 74191. 7