E 6286 (Pages : 4) Reg. No.....

Name.....

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, OCTOBER 2013

Fifth Semester

Core Course—DIGITAL ELECTRONICS

(Common for Model I and Mdel II B.Sc. Physics and B.Sc. Physics EEM)

Time : Three Hours Maximum Weight : 25

Part A

Answer **all** *questions.*
Objective type questions, weight 1 *for each bunch.*

BUNCH I

1. Binary number systems uses :
   (a) 2 only. (b) 0 and 1.
   (c) 1 and 2. (d) 1 only.
2. The complement of a variable is always.
   (a) 0. (b) 1.
   (c) Equal to the variable. (d) Inverse of the variable.
3. Which one of the following is not a valid rule in Boolean algebra :
   (a) $A + 1 = 1$. (b) $A = A^c$.
   (c) $AA = A$. (d) $A + 0 = A$.
4. An example of a data storage device is :
   (a) Logic gate. (b) Counter.
   (c) Register. (d) Full adder.

BUNCH II

5. Asynchronous counters are known as :
   (a) Ripple counter. (b) Decade counter.
   (c) Ring counter. (d) Modulus counter.
6. The most suitable gate to check whether the number of 1's in a digital word is even or odd is :
   (a) NAND. (b) XOR.
   (c) NOR. (d) NOT.

7. The binary number 10101 is equivalent to decimal number :
   (a) 19. (b) 12.
   (c) 27. (d) 21.
8. A feature that distinguishes the JK flip-flop from RS flip-flop is the :
   (a) Toggle condition. (b) Preset input.
   (c) Type of clock. (d) Clear input.

BUNCH III

9. Half adder is a logical circuit that performs binary addition of :
   (a) 4 bits. (b) 3 bits.
   (c) 2 bits. (d) None of these.
10. BCD code for 7 is :
   (a) 0011. (b) 0101.
   (c) 0100. (d) 0111.
11. A group of 4 bits is called :
   (a) Byte. (b) Nibble
   (c) Radix. (d) Base.
12. The device used to convert a binary number to a 7-segment display format is :
   (a) Multiplexer. (b) Encoder
   (c) Decoder. (d) Register.

BUNCH IV

13. The universal gate is :
   (a) NOT. (b) NAND.
   (c) OR. (d) XOR.
14. The purpose of including NOT gate is :
   (a) Inverting. (b) Non inverting.
   (c) Addition. (d) Subtraction.
15. In BCD code a decimal digit is represented in :
   (a) 2 bits. (b) 3 bits.
   (c) 1 bit. (d) 4 bits.
16. A multiplexer circuit consists of :
   (a) Only one output. (b) 2 or more output.
   (c) No output. (d) All the above.

$(4 \times 1 = 4)$

Part B

Answer any **five** *questions.*
Short answer questions - Weight 1 each.

17. What is a flip-flop ? What is the use of clocks in flip-flops ?
18. State and explain Duality theorem.
19. Convert the following to sum-of-products form :—
    (a) $(A + B)(B^c + C)(A^c + C)$
    (b) $(B+CA)(C+A^cB)$
20. Convert
    (a) Hexadecimal 3FAC to binary
    (b) Octal 72 to decimal
21. State and explain De Morgan's theorem.
22. What is meant by a redundant group ?
23. What are the functions of multiplexers and demultiplexers ?
24. What is race condition ? How is it eliminated in JK flip-flop ?

$(5 \times 1 = 5)$

Part C

Answer any **four** *questions.*
Snort essay / problems – Weight 2 each.

25. Subtract using 2's complement method :
    (a) 1011.11-1001.10
    (b) 10110 – 10010
26. Explain using diagram, the working of Master-Slave JK flip-flop.
27. What are full adders? Draw the circuit diagram and summarize the circuit action using truth table.
28. Write the Boolean expression in sum-of-pro ducts form for a logic circuit that will have a high output when X = 0,Y = 0,Z = 1 and X = 1,Y = 1, Z = 0 and a low output for all other input states. Draw the bock diagram for this circuit. Construct the table of combinations of input output values and product terms.
29. Write a short note on registers. What is a buffer register ?
30. Convert the following truth table to corresponding Boolean expression using sum-of- products method and simplify the expression using Karnaugh map.

INPUT			OUTPUT
A	B	C	
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	1

(4 × 2 = 8)

Part D (Essays)

Answer any **two** *questions.*
Weight 4 each.

31. Give an account of working of shift register.

32. Explain the working of D/A converter.

33. Describe with circuit diagram, the working of different types of counters.

(2 × 4 = 8)