D 92252   (Pages : 2)   Name..................................

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THIRD SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2015

(CUCBCSS—UG)

Core Course—Computer Science

BCS 3B 04—FUNDAMENTALS OF DIGITAL ELECTRONICS

Time : Three Hours   Maximum : 80 Marks

Part A

Answer all the questions.
Each question carries 1 mark.

1. What is meant by a bit ?

2. What is BCD ?

3. The AND operation can be produced with two ———— gates.

4. Name an universal gate.

5. A half adder is characterized by ———— inputs and ———— outputs.

6. What is A.A.'C ?

7. How many flip-flops are required for mod-16 counter ?

8. Asynchronous counters are also known as ————.

9. A modulus-10 Johnson counter requires how many flip-flops.

10. Define an encoder.

(10 × 1 = 10 marks)

Part B

Answer all the questions.
Each question carries 2 marks.

11. Convert $(101101.01101)_2$ to Octal and Hexadecimal number.

12. Explain the basic properties of Boolean Algebra.

13. What is a K-map ? What are the limitations of K-map ?

14. Simplify the expression $xyz + xyz' + x'z$.

15. What is a demultiplexer ? Explain.

(5 × 2 = 10 marks)

Turn over

Part C

*Answer any **five** questions.*
Each question carries 4 marks.

16. What are binary logic gates ? Explain the basic logic gates with diagrams.

17. Explain various combinational circuits.

18. Convert $(E5)_{16}$ and $(B2F8)_{16}$ to equivalent decimal numbers.

19. What is Gray code ? Explain Binary to Gray code conversion and Gray code to binary conversion with examples.

20. Define a decoder. Draw the truth table and logic diagram of a 3×8 active high decoder.

21. With relevant diagram, explain the working of master slave JK flip-flop.

22. State and prove De Morgans laws.

23. What is a flip-flop ? What is the difference between a latch and a flip-flop ? List out the applications of flip-flop.

$(5 \times 4 = 20$ marks$)$

Part D

*Answer any **five** questions.*
Each question carries 8 marks.

24. Simplify using K Map in SOP forms. $f(A, B, C, D) = \Sigma (0, 2, 8, 9, 10, 11, 14, 15)$. Draw the logic diagram of simplified form.

25. What are sequential circuits ? Explain SR flip-flop and JK flip-flop with block diagram and truth table.

26. With the help of a neat diagram, explain the working of successive approximation A/D converter.

27. Define a register. Construct a shift register from SR flip-flop. Explain its working.

28. Design a 3 bit up/down counter using JK flip-flop and explain its function with timing diagram.

29. Write notes on :

    (a) Excess-3 code.   (b) ASCII code.

    (c) Hamming code.   (d) BCD.

30. Simplify in POS forms using K-map $f(w, x, y, z) = \pi (1, 2, 5, 8, 11, 13, 15)$ and $d(w, x, y, z) = \pi (0, 3, 6, 7, 14)$.

31. What is a shift register ? What are its various types ? List out some applications of Shift register.

$(5 \times 8 = 40$ marks$)$