DEPT. OF ELECTRONICS & TELECOMMUNICATION ENGINEERING
GOVERNMENT POLYTECHNIC, BALASORE
QUESTION BANK
ON
TH3- DIGITAL ELECTRONICS

SEMESTER & BRANCH : – 3RD SEM, E & TC ENGINEERING

SHORT QUESTIONS

1. Which codes are known as self correcting codes and why?
2. Why de-multiplexers are referred to as data distributors?
3. Define racing condition.
4. State De- Morgan's theorem.
5. Write down the truth table of a 2 input Exclusive-OR gate?
6. Solve $(1010)_2$-$(1010)_2$ using 1's complement.
7. Subtract $(28)_{10}$ from $(39)_{10}$ by using 2's complement methods.
8. Convert (0011011) from gray to binary.
9. Define don't care condition.
10. Explain the term fan-in and fan-out.
11. Perform excess-3 subtraction of (267-175).
12. What is the difference between weighted and non-weighted codes?
13. What is the meaning of Min. term and Max. term.
14. Convert binary number $(110101.011)_2$ to decimal number.
15. Perform Excess-3 Subtraction of 97 – 72.
16. Define modulus of a counter.
17. What is an encoder and where it is used?
18. State associative and distributive law.
19. Write the truth table of a NAND gat with symbol.
20. Define racing condition. How it can be avoided.
21. Define the term fan in, fan out and propagation delay
22. Find 2's complement substraction of 10110-11010.
23. Distinguish between combinational and sequential logic circuit.
24. Write the truth table of a Exclusive NOR gate
25. Find the 1's complement and 2's complement of the binary 10110100.
26. Convert the decimal number (95)10 into its equivalent BCD and Excess-3 Code
27. What is max term and min term?
28. Draw the block diagram of Full adder using two half adder and one OR gates
29. What is modulus of a counter?

30. Why multiplexers are referred to as data selector?
31. Why Demultiplexers are referred to as data distributors?
32. Convert the decimal no. $(1000)_{10}$ into Binary.
33. Convert (10110101) from binary to gray code.
34. Define the term Fan out and Resolution.
35. What is the difference between weighted and non-weighted binary code.
36. What is parity bit?
37. What is an encoder and where it is used?
38. What is the base or radix of a number system?
39. What is the difference between RAM and ROM?
40. What do you mean by radix of a number system?

LONG QUESTIONS

1. Design a 4:2 encoder with a neat circuit diagram.
2. Design a 4:1MUX with a neat circuit diagram.
3. Design a 3:8 decoder .Give its logic expression and truth table. Implement the logic circuit with basic gates.
4. Design a 2 bit comparator circuit whose outputs are P>Q, P<Q and P=Q where P and Q are each 2 bit nos.
5. Draw the logic circuit of full adder. Give its logic expression, truth table and implement the logic circuit with any one of the universal gates.
6. Show the logic diagram of a clocked JK flip flop. Explain its working with a functional table.
7. Draw the logic circuit of full adder. Give its logic expression, truth table and implement the logic circuit with any one of the universal gates.
8. Explain the operation of 7 segment display and LED.
9. Design a 4 bit combinational logic circuit to produce 1's complement of the 4 bit binary number.
10. Differentiate between combinational and sequential logic circuit.
11. With a neat diagram explain the operation of SISO and PIPO register.
12. Show the logic diagram of a clocked SR flip flop. Explain its working with a functional table.

13. Which gates are referred to as universal gates and why? How other gates can be realized using NOR gates?
14. Define stack, stack top and stack pointer and why it is essential.
15. Design a MOD-10 counter with a neat logic circuit diagram.
16. Simplify and minimize the four variable logic expression using k-map
    $F(A,B,C,D)=\Sigma M(2,3,4,5) +d(10,11,12,13,14,15)$
17. Design a 2 bit comparator circuit whose outputs are P>Q, P<Q and P=Q where P and Q are each 2 bit nos.
18. Explain with a sketch the successive approximation A/D converter.
19. Write short notes on any two of the following:

(a) Explain the working of SIPO shift register. (b) One-bit comparator circuit. (c) Racing condition and how it can be avoided.

20. Explain the working of JK flip-flop and draw its truth table. How JK flip-flop can be constructed into (i) T-flip-flop, (ii) D-flip-flop.
21. Explain the operation of seven segment display.
22. Define a half adder. How a full adder can be constructed using half adder? Draw the logic circuit and truth table of full adder.
23. Simplify the minimal minterm expression of
$f(W, X, Y, Z) = \sum m(0, 1, 2, 5,6,8) + d(3, 4, 7, 14)$ using Karnaugh map & draw logic circuit using NAND gate only.
24. Distinguish between combinational logic and sequential logic.
25. Simplify Boolean expression $X = P\overline{\overline{Q}}+\overline{P}\overline{\overline{R}} + P\overline{\overline{Q}}.R$ & draw logic circuit using NOR gate only.
26. Explain the working of a clocked RS flip-flop using NAND logic circuit.
27. Which gates are called universal gates and how other gates can be realized?
28. Explain the terms RAM, ROM, PROM, EPROM and EEPROM.
29. Explain the working of a 4 bit binary asynchronous counter with circuit and timing diagrams.
30. Explain the working of a clocked RS flip flop using NAND gates. Why the set and reset inputs are known as asynchronous input signals?
31. With neat circuit diagram explain the function of 1:4 De-Mux and 4:1 Mux
32. Draw the circuit diagram of clocked SR Flip-Flop. Explain it with a functional table.
33. Explain the operation of Full Subtractor.
34. Design and explain the working of a 4 bit Ripple counter with neat logic diagram, truth table and timing diagram
35. With neat sketch explain the working of Decimal to BCD Encoder