Register Number:

DATE: 24-11-2020

ST. JOSEPH'S COLLEGE (AUTONOMOUS), BANGALORE-27
B.Sc. ELECTRONICS– III SEMESTER
SEMESTER EXAMINATION: NOVEMBER/DECEMBER 2020
EL 318 DIGITAL ELECTRONICS

Time- 2 ½ hrs **Max Marks-70**

This paper contains TWO printed pages and THREE parts

PART-A

Answer any **FIVE** questions. 5×8=40

1 a) With the help of examples explain the weighted and non weighted codes.
b) What is Gray code? Outline the procedure for converting a given binary number to its Gray code equivalent and a given Gray code to its binary equivalent (4+4)

2 a) Draw the circuit diagram of a two input NOR gate using diodes, transistor and resistors. Explain its operation with truth table.
b) State and prove De Morgan's theorem using truth table. (4+4)

3 a) State and explain the Duality theorem.
b) Draw three continuous negative ideal pulses and describe duty cycle.
c) With the help of a diagram explain current sourcing & sinking in a standard TTL NAND gate. (2+2+4)

4 a) Draw the two input TTL NAND gate and explain its operation. What is the significance of Totem - pole configuration.
b) Discuss any four parameters of TTL device. (4+4)

5 a) Write the truth table for FULL Subtractor. Show how a FULL Subtractor can be constructed using 2 Half Subtractors and a OR gate.
b) Construct 8:1 Multiplexer and describe it's working. Mention the need for strobe line. (4+4)

6 a) What is an encoder? Draw the logic diagram of a decimal to BCD encoder and write its truth table. What is priority encoder?
b) Write the logic diagram of a BCD to SEVEN segment decoder using IC 7446, along with the functional table. (4+4)

7 a) Explain CLEAR and PRESET functions using a truth table for a JK flip flop.
b) Draw the circuit for a SIPO shift register and explain its working its working for a given data D=1011. (4+4)

PART-B

Answer any **FIVE** questions. 5×4=20

8 a) Subtract $(76)_8$ from $(125)_8$ using 2' s complement.
b) Add $(34)_{10}$ and $(19)_{10}$ in BCD. (2+2)

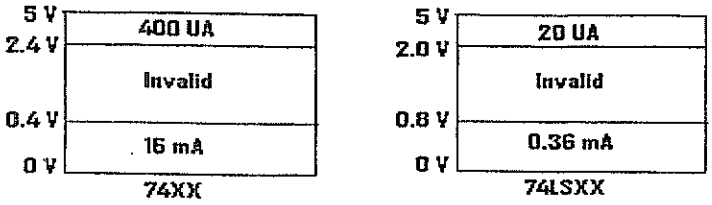
9. Expand the following SOP expression to minterm and maxterm.

$$A + B\overline{C} + A\,B\,\overline{D} + A\,B\,C\,D$$

10. Using K maps simplify the expression and draw its equivalent logic gate.

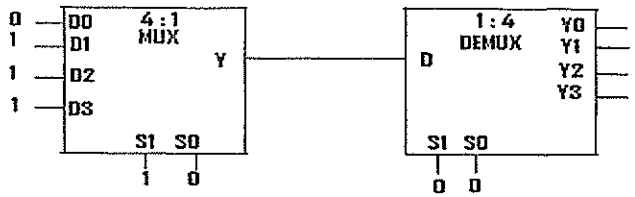
F(A,B,C,D) = $\sum$ m (1,3,5,7,8,9,12,13) and F(A,B,C,D,)= $\sum$ d (2,6,14).

11 a) Determine the fan-out when 74XX drives 74LSXX. (2+2)

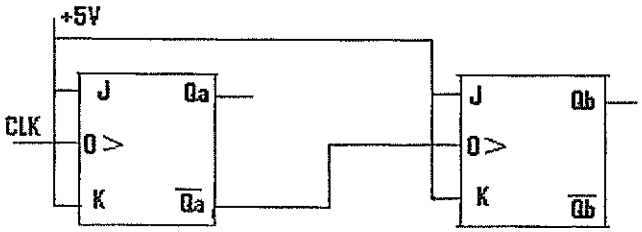


b) The propagation delay time for a gate is 10 ns and power dissipation of 2mW. If 6 such gates are connected in series, what is the total time delay and power dissipation of the circuit.

12. What will be the outputs at Y and Y_0, Y_1, Y_2 and Y_3.



13. Draw the output waveforms at Qa and Qb for four clock pulses.



14. Construct an Asynchronous Mod-12 counter and draw the timing diagram.

PART- C

Answer any **FIVE** questions. 5×2=10

15. Why Gray code belongs to a class of minimum change code.
16. Which is the fastest logic family? What is the disadvantage of the same.
17. Write the algebraic terms of a 4 -variable expression having a Maxterm M_3 and M_9.
18. A De multiplexer can switch from 64 data input to its one output line, how many selections lines are required ? Explain.
19. Realize a Half subtractor using basic gates.
20. Mention how RS flip flop can be converted to D flip flop.
21 Distinguish between Jonson and Ring counter.

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