

**STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.**  
**(For candidates admitted during the academic year 2011-12)**

**SUBJECT CODE :11PH/MC/BE14**

**B.Sc. DEGREE EXAMINATION NOVEMBER 2011**  
**BRANCH III - PHYSICS**  
**FIRST SEMESTER**

**COURSE : MAJOR – CORE**  
**PAPER : BASIC ELECTRONICS**  
**TIME : 30 MINS** **MAX. MARKS : 30**

**SECTION – A**

**ANSWER ALL QUESTIONS: ( 30 x 1 = 30 )**

**CHOOSE THE CORRECT ANSWERS:**

1. To get Thevenin voltage, you have to  
(a) Short the local resistor      (b) Open the load resistor  
(c) Short the voltage source      (d) Open the voltage source
2. The open circuit voltage at the terminals of load  $R_L$  in a network is 30v. Under the conditions of maximum power transfer, the load voltage will be  
(a) 30v      (b) 10v      (c) 5v      (d) 15v
3. The Norton resistance of a network is 20 ohm and the shorted load current is 2 A. If the network is loaded by a resistance equal to 20 ohm the current through the load will be  
(a) 2 A      (b) 0.5 A      (c) 4 A      (d) 1 A
4. The binary number 10101 is equivalent to decimal number  
(a) 19      (b) 12      (c) 21      (d) 27
5. The inputs of the NAND gate are connected together. The resulting circuit is  
(a) OR gate      (b) AND gate      (c) NOT gate      (d) EX – OR gate
6. The NOR gate is OR gate followed by  
(a) AND gate      (b) NOT gate      (c) NAND gate      (d) OR gate
7. In the Boolean expression  $Y = A\bar{B} + A\bar{B}$ , If  $A = B = 1$ , then Y is equal to  
(a) 1      (b) 0      (c) either 1 or 0      (d) none of these.
8.  $A + A.B =$   
(a) B      (b) A + B      (c) A      (d) A- B
9. The output of full subtractor gives  
(a) sum and carry      (b) carry only      (c) borrow only      (d) difference and borrow
10. Race around problem occurs in  
(a) RS flip flop      (b) RST flip flop      (c) D flip flop      (d) JK flip flop

11. To construct mod – 7 counter, the number of flop flops necessary are  
(a) 7                      (b) 5                      (c) 3                      (d) 2
12. 4 bit ripple counter counts  
(a) 0 to 15              (b) 0 to 12              (c) 0 to 8              (d) 0 to 4
13. SSI contains  
(a) more than 1,00,000 circuits              (b) 100 to 1,00,000 circuits  
(c) between 30 to 100 circuits              (d) less than 30 circuits
14. In ICs the component which cannot be integrated directly is  
(a) diode              (b) transistor              (c) resistor              (d) inductor
15. In the following, the linear IC is  
(a) OP AMP              (b) NAND              (c) EX – OR              (d) NOR

**FILL IN THE BLANKS**

16. The Norton's current some time is called \_\_\_\_\_ .
17. In Boolean algebra, the plus sign ( + ) indicates \_\_\_\_\_.
18. Octet is a group of \_\_\_\_\_ 1's.
19. Flip flop can be used to \_\_\_\_\_ information .
20. In \_\_\_\_\_ ICs all the discrete components are integrated within a single piece of wafer.

**TRUE OR FALSE.**

21. The maximum power transfer theorem is used in electronics circuit.
22. The only function of NOT gate is to act as a universal gate.
23. Don't care condition is a condition in a logic network in which the output is independent of the state of the input.
24. Flip – flop is a monostable multivibrator.
25. Whenever two inputs of a gate undergo transitions at the same time race problem occurs.

**ANSWER BRIEFLY**

- 26 Write the equation for Ohm's law.

27. Draw the symbol for EX – OR gate.

28. What is SOP ?

29. What is a shift register ?

30. What is MSI ?

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**TIME : 2 ½ HOURS** **MAX. MARKS : 70**

**SECTION – B**

**ANSWER ANY FIVE QUESTIONS: ( 5 x 5 = 25 )**

1. State and prove Kirchoff's law.
2. Perform the following operations
  - (i). Divide 11011 by 100
  - (ii). Multiply 1111 by 0111
3. Simplify the following Boolean and draw the logic circuit for the simplified equation.

$$Y = ABC + \bar{A}\bar{B}C + A\bar{B}\bar{C}$$

4. Minimize the Boolean expression using karnaugh map.  
 $f ( ABCD ) = ( 1, 5, 10, 11, 14, 15 )$
5. Draw the parallel four bit binary adder logic circuit with full adder and half adder block diagrams and add 1010 with 1101
6. Explain the function of master – slave JK flip – flop with logic circuit and truth table.
7. Explain, how integrated resistor and capacitor are made?

**SECTION – C**

**ANSWER ANY THREE QUESTIONS: ( 3 x 15 = 45 )**

8. State and explain
  - (i). Thevenin's theorem
  - (ii) Norton's theorem.
9. Explain, how NAND and NOR gates are used as universal building blocks.
10. What is k – map ? Explain two variable, three variable and four variable k – maps with example.
11. Explain the function of 4 – bit ripple counter with logic circuit, truth table and wave form.
12. Explain different stages of fabrication of monolithic integrated circuit.

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