STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.
(For candidates admitted during the academic year 2011-2012 and thereafter)

SUBJECT CODE : 11PH/MC/BE14

B.Sc. DEGREE EXAMINATION NOVEMBER 2013
BRANCH III - PHYSICS
FIRST SEMESTER

REG. NO._____

COURSE : MAJOR CORE
PAPER : ELECTRONICS - I
TIME : 30 MINUTES **MAX. MARKS : 30**

SECTION – A
TO BE ANSWERED IN THE QUESTION PAPER ITSELF
ANSWER ALL QUESTIONS: **(30x1=30)**

CHOOSE THE CORRECT ANSWER:

1. To get the Norton current , you have to
   (a) Short the load 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. Maximum power will be transferred from a load of 10 ohm resistance to a load of
   (a) 5 ohm (b) 20 ohm (c) 10 ohm (d) 40 ohm

4. The binary number 11101 is equivalent to decimal number
   (a) 29 (b) 12 (c) 21 (d) 27

5. The inputs of the NOR gate are connected together. The resulting circuit is
   (a) OR gate (b) NOT gate (c) AND gate (d) EX – OR gate

6. The NAND gate is AND gate followed by
   (a) AND gate (b) NOT gate (c) NAND gate (d) OR gate

7. In the Boolean expression $Y = A\bar{B} + \bar{A}B$, If A = 0 and 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 -B (d) A

9. The output of full subtractor gives
   (a) sum and carry (b) carry only
   (c) barrow only (d) difference and barrow

10. A JK flip –flop is in the toggle condition when
    (a) J=1,K=0 (b) J=K=1 (c) J=K=0 (d) J=0,K=1

11. To construct mod – 9 counter, the number of flop flops necessary are
    (a) 7 (b) 5 (c) 4 (d) 2

...2

12. The ripple counter which counts 0 to 7 is
    (a) 3 bit ripple counter (b) 4 bit ripple counter
    (c) 7 bit ripple counter (d) 8 bit ripple counter

13. The integrated circuit which contains 100 to 1,00,000 circuit is called as
    (a) SSI (b) MSI (c) LSI (d) VLSI

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. To get Thevenin voltage, you have to _____ the load resistor .
17. In Boolean algebra, A + 2A = _____ .
18. In K- map a group of four 1's is called as _____ .
19. Flip flop is also called as _____ multivibrator
20. The foundation on which an IC is built is called _____ .

STATE WHETHER THE FOLLOWING ARE TRUE OR FALSE:

21. Efficiency at maximum power transfer is 50 %
22. The NAND gate is a universal gate
23. Karnaugh map is a technique to simplify the differential equations
24. Race around problem occurs in JK master – slave flip – flop
25. In monolithic ICs all components are fabricated by diffusion process.

ANSWER BRIEFLY:

26. State Ohm's law.

27. Write the one's complement of 11010.

28. What is POS?

29. What is a shift register?

30. What is SSI?

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

SECTION – B

ANSWER ANY FIVE QUESTIONS: **(5x5=25)**

1. State and prove Thevenin's theorem.

2. Perform the following operations
   (i). Divide 101101 by 101
   (ii). Multiply 11101 by 101

3. Simplify the following Boolean

$$Y = \overline{AB + BC + CA}$$

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 1001 and 1010.

6. Explain the function of decade counter with logic circuit and truth table.

7. Explain, how integrated resistor and capacitor are made.

SECTION – C

ANSWER ANY THREE QUESTIONS: **(3x15=45)**

8. State and explain
   (i). Kirchoff's law
   (ii) Norton's theorem.

9. Explain, how NAND and NOR gates are used as universal building blocks.

10. State and prove DeMargan's theorem with equivalent logic circuit and truth table.

11. Explain the function of right shift and left shift register with logic circuit, wave form and truth table.

12. Explain different stages of fabrication of monolithic integrated circuit.

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