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 2014
BRANCH III - PHYSICS
FIRST SEMESTER

REG. NO._____

COURSE : MAJOR CORE
PAPER : BASIC ELECTRONICS
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. Kirchhoff's current law is applicable to only
   (a) closed loops in a network (b) electronic circuits
   (c) junctions in a network (d) electric circuits

2. The super position theorem is essentially based on the concept of
   (a) duality (b) linearity (c) reciprocity (d) non- linearity

3. While calculating the thevenin resistance, constant current sources in the circuit are
   (a) replaced by 'open'
   (b) replaced by 'short'
   (c) treated in parallel with other voltage sources
   (d) converted into equivalent voltage sources

4. The binary equivalent of decimal number 28 is
   (a) 11110 (b) 11100 (c) 10101 (d) 11111

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

6. The universal gate is
   (a) AND gate (b) NOT gate (c) OR gate (d) NOR gate

7. In the Boolean expression $Y = A\bar{B} + \bar{A}B$, If A =1 and B = 1, then Y is equal to
   (a) 1 (b) 0 (c) either 1 or 0 (d) none of these

8. A (A + A.B) =
   (a) A (b) A + B (c) A - B (d) AB

9. The output of full adder 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 – 7 counter, the number of flop flops necessary are
    (a) 7 (b) 5 (c) 4 (d) 3

...2

12. Four bit ripple counter counts
(a) 1to 17 (b) 0 to 15 (c) 0 to 16 (d) 1 to15

13. Medium Scale integrated circuit contains
(a) 1to 30 circuits (b) 30 to 100 circuits
(c) 100 to 100,000 circuits (d) above 1,00,000 circuits

14. In ICs the component which cannot be integrated directly is
(a) diode (b) transistor (c) Inductor (d) resistor

15. Large and complicated circuits are formed by
(a) Hybrid IC (b) Thick and thin IC (c) Monolithic IC (d) None of these.

FILL IN THE BLANKS:

16. According to Kirchoff's voltage law, the algebraic sum of all IR drops and emfs in any closed loop of a network is always _____.
17. In Boolean algebra, A + AB = _____ .
18. In K- map a group of eight 1's is called as _____.
19. Flip flops can be used to _____ information .
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 OR gate is used for multiplication.
23. Four variable Karnaugh map has 8 min- terms.
24. Race around problem occurs in JK flip – flop.
25. An integrated circuit consists of a single crystal chip made of silicon.

ANSWER BRIEFLY:

26. State Ohm's law.

27. Write the two's complement of 1101.

28. What is SOP?

29. What is a flip- flop?

30. What is SSI?

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SECTION – B

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

1. State and prove Norton's theorem.
2. Perform the following operations.
   (i) Divide 101010 by 111.
   (ii) Multiply 101010 by 111.
3. Simplify the following Boolean and draw the logic circuit for the simplified equation.
   $Y = ABC + A\bar{B}C + AB\bar{C}$.
4. Minimize the Boolean expression using karnaugh map.
   f (ABCD) = (1, 5, 10, 11, 14, 15)
5. a) Subtract using 2's complement 50 from 24.
   b) Convert 476.825 into binary number.
6. Design a potential divider circuit to obtain 5/2 of the source voltage.
7. Explain, how integrated diode and transistor are made?

SECTION – C

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

8. State and explain
   (i) Kirchoff's law
   (ii) Thevenin's theorem.
9. Explain, how NAND and NOR gates are used as universal building blocks.
10. With necessary logic circuit and truth table, explain the function of Half adder, Full adder and parallel binary adder.
11. Explain the function of 4 – bit ripple counter with logic circuit, truth table and wave form.
12. Explain the different stages of fabrication of monolithic integrated circuit.

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