STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.

(For candidates admitted during the academic year 2015-16& thereafter)

SUBJECT CODE : 15PH/MC/EL14

B.Sc. DEGREE EXAMINATION NOVEMBER 2018

BRANCH III - PHYSICS

FIRST SEMESTER

COURSE : MAJOR – CORE

PAPER : ELECTRONICS – I

TIME : 3 HOURS **MAX. MARKS : 100**

SECTION – A

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

CHOOSE THE CORRECT ANSWER**:**

1. The radix of the binary number is
   a) 1 b) 2 c) 8 d) 10
2. The decimal equivalent of octal number 56 is
   a) 49 b) 53 c) 46 d) 66
3. The 2's complement of 1000 is
   a) 0111 b) 0101 c) 1000 d) 0001
4. Boolean algebra is essentially based on
   a) Logic b) symbols c) numbers d) truth table
5. A binary half adder
   a) has an output b) has an input c) is a 1-bit adder d) is a 2-bit adder
6. According to the algebra of logic, $(A + \bar{A})$ equals
   a) $A\bar{A}$ b) 1 c) A d) 0
7. The number of stable states in one short flip-flop is
   d) 4 b) 3 c) 2 d) 1
8. A flip-flop can store
   a) 4 bits of data b) 3 bits of data c) 2 bits of data d) 1 bits of data
9. Which of the following is not a sequential circuit?
   a) counter b) flip-flop c) multiplexer d) shift-register
10. An IC has _____size.
    a) Very large b) large c) extremely small d) small
11. IC's are generally made of
    a) silicon b) germanium c) copper d) none
12. _____cannot be fabricated on an IC.
    a) transistors b) diodes c) resistors d) transformers
13. A pn junction that radiates energy as light instead of as heat is called a
    a) LED b) Photo-diode c) photocell d) zener-diode
14. A photo diode is normally
    a) Forward-biased b) reverse-biased
    c) Neither forward nor reverse biased d) Emitting light
15. When the light increases, the reverse current in a photo-diode
    a) increases b) decreases c) is unaffected d) none

II. FILL IN THE BLANKS:

16. The binary addition $1101_2 + 1011_2$ gives _____
17. A full adder consists of _____
18. Shift register can be used as a _____
19. The most popular types of IC's are _____
20. To display the digit 8 in a seven-segment indicator _____

…2

III. TRUE OR FALSE:

21. Digital circuits can be made by repetitive use of NAND gates.
22. A binary half subtractor consists of an XOR gate and an AND gate.
23. The number of binaries required in a decade counter is 4.
24. Capacitor is most difficult to fabricate in an IC.
25. To display the digit 0 in a seven segment display G must be on.

IV. ANSWER BRIEFLY:

26. Divide using binary method: 10010.1011 ÷ 11.01.
27. Which gate is used to construct a half adder?
28. What are the types of flip-flop?
29. What is an integrated circuit?
30. Give two applications of LED.

SECTION – B

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

31. Subtract 14 from 17 using 1's and 2's compliments.
32. Design a half adder using NAND gates.
33. Simplify using K map: Y = F(A, B,C, D) = Σ(2, 3, 12, 13, 14, 15).
34. Show how a T flip-flop can be implemented using a JK flip-flop and D flip-flop.
35. Design a counter to count 000,001, 011, 101, 000…
36. In LM 317 voltage regulator R_2 is adjusted to 2.4 KΩ. If the value R_1 is 240 ΩK determine the regulated dc. Output voltage for the circuit.
37. What value of series resistor is required to limit the current through a LED to 20 mA with a forward voltage drop of 1 V when connected to a 10 V supply?

SECTION – C

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

38. Explain the various basic logic gates with their truth tables.
39. State and prove DeMorgan's theorem.
40. What are shift registers? Discuss their working in detail. What are the different uses of a shift register?
41. How will you make a monolithic IC?
42. What is photo-diode? How photo-diode does operate? Discuss its characteristics and applications.

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