

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.
(For candidates admitted during the academic year 2019-2020 and thereafter)

B.Sc. DEGREE EXAMINATION NOVEMBER 2023
BRANCH III - PHYSICS
THIRD SEMESTER

COURSE : MAJOR – CORE
PAPER : ELECTRONICS I
SUBJECT CODE : 19PH/MC/EL33
TIME : 3 HOURS

MAX. MARKS : 100

SECTION – A

ANSWER ALL QUESTIONS: 25 MARKS
I. CHOOSE THE CORRECT ANSWER: (10 X 1 = 10)

1. The Decimal equivalent of 64_H is _____
a) 200_{10} b) 100_{10}
c) 64_{10} d) 150_{10}

2. The process of converting the AC voltage signal into the DC voltage signal is called _____.
a) Rectifier b) Rectification c) Inductor d) breakdown voltage

3. According to De-Morgan's theorem, NAND gate is _____.
a) Bubbled OR b) Bubbled AND c) Bubbled XOR d) Bubbled NOR

4. Which of the following codes is used for labeling the cells of a Karnaugh map?
a) Hexadecimal b) 8421 binary c) Octal d) Gray

5. Race around condition can be avoided in digital logic circuits using _____.
a) Master slave JK flipflop b) Shift register c) Full adder d) AND gate

6. To serially shift a byte of data into a shift register there must be a _____.
a) One clock pulse b) One load pulse c) eight clock pulses d) two bit pulse

7. _____ ICs are the most commonly used
a) thin film b) monolithic c) hybrid d) none of the above

8. Which of the following is most difficult to fabricate in an IC?
a) multimeter b) inductor c) resistor d) capacitor

9. What is approximately the sum of the number of protons and neutrons of an atom?
a) atomic number b) atomic mass c) mass number d) isobars

10. What is associated with random motion due to thermal agitation in the movement of holes and electrons in a silicon crystal?
a) Diffusion b) drift c) Osmosis d) recombination

II. FILL IN THE BLANKS: (5 X 1 = 5)

11. The full adder is a _____ input and _____ output combinational circuit.
12. If the counter has 3 flip-flops, then the maximum binary number that it counts is equal to _____.
13. The fastest data access is provided using _____.
14. Epitaxial growth is best suitable for growing _____.
15. A 16 KB RAM will have a storage capacity of _____ bits.

III. ANSWER BRIEFLY:**(5 X 2 = 10)**

16. Differentiate between analog and digital signals.
17. Which gate is used to construct a half adder?
18. What are the types of flip-flop?
19. Write any four advantages of integrated circuits.
20. How does LED differ from an ordinary diode? Give any two applications of LED.

SECTION – B**ANSWER ANY FIVE QUESTIONS:****(5 x 6 = 30)**

21. a) Convert the following octal numbers into their equivalent decimal number.
i) 23_8 ii) 770_8 iii) 152_8
b) Convert the following octal numbers into hexadecimal numbers.
i) 23_8 ii) 770_8 iii) 152_8
22. i) Using Boolean identities, reduce the given Boolean expression: $F(X, Y, Z) = X'Y + YZ' + YZ + XY'Z'$
ii) What is the equivalent expression for the Boolean expression $X'Y'Z + YZ + XZ$?
23. Illustrate the working of J K flip flop. Discuss on the race around condition.
24. Explain the working of shift right and shift left registers with neat diagram.
25. Explain the circuit features in an IC circuit.
26. Differentiate Integrated and diffused resistor.
27. Describe the working and construction of a multicolor LED with necessary diagram.

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

28. What are analog and digital signals?. Explain in detail.
29. What is a full adder? How is a full adder built using two half adders? Explain the working with a suitable example.
30. What are the difference between counters and registers? With necessary diagram, truth table and waveform, explain the function of a binary ripple counter
31. Explain the fabrication of capacitor and resistor in a monolithic IC.
32. What is a photo diode? How does a photodiode operate? Discuss its characteristics and applications.
