

Register No:

Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FOURTH SEMESTER B.TECH DEGREE EXAMINATION(R,S), MAY 2024**Electrical and Electronics Engineering****(2020 SCHEME)****Course Code : 20EET206****Course Name : Digital Electronics****Max. Marks : 100****Duration:3 Hours**

Scientific calculator is allowed in the examination hall.

PART A*(Answer all questions. Each question carries 3 marks)*

1. Realise basic logic gates using NOR gates.
2. What is the speciality of Gray code? How it is different from Excess-3 code?
3. Draw the diagram of a half adder.
4. In a K-Map with variables A and B, if the diagonal cells are filled with '1s', write the possible expressions.
5. Abstract about a multiplexer in digital electronics.
6. With proper example, discuss about a code converter.
7. Draw the diagram of a 4 bit asynchronous counter.
8. Differentiate between SR flip-flop and JK flip-flop.
9. Draw the block diagram of a successive approximation register analog to digital converter.
10. Explain the state machines in digital circuits.

PART B*(Answer one full question from each module, each question carries 14 marks)***MODULE I**

11. (a) Compare and contrast binary and hexadecimal number systems 7
(b) Find the octal equivalents of 23, 157, 1104, 1944, 3418, 4096 and 16256 7

OR

12. (a) Compare and contrast various signed number representation schemes in digital electronics. 9
(b) Justify usage of two's complement method for subtraction of two binary numbers. 5

MODULE II

13. Explain the operation of a 4 bit adder/subtractor to perform addition operation when Mode = 1 14
else subtraction operation.

OR

14. (a) Prove that (i) $AB + AC = A(B + C)$ (ii) $(A + B) + C = A + (B + C)$ 6
(b) Reduce the given expressions (i) $Z = A'B'C + A'B'C' + ABC + ABC'$ 8
(ii) $Y = (A + B + C). (A' + B + C'). (A + B' + C). (A + B + C')$

MODULE III

15. (a) Realise a two bit magnitude comparator using basic logic gates. 7
(b) Abstract about a parity checker with neat diagrams 7

OR

16. (a) Abstract about significance and relevance of ALU in computer systems 5
(b) Design a Logical unit with logical operations - OR (opcode = 00), AND (opcode = 01), NAND (opcode = 10) and NOR (opcode = 11) 9

MODULE IV

17. (a) With neat diagrams and tables, explain the working of a Ring counter. 7
(b) Draw the diagram of a Serial In Parallel Out shift register. 7

OR

18. Design a synchronous up/down counter to count from "000" to "111" if control signal is HIGH 14
else from "111" to "000".

MODULE V

19. (a) What is the role of a Programmable Logic Array in digital electronics? 5
(b) Compare and contrast PLA and PAL. 9

OR

20. (a) Justify the usage for VHDL for modeling of digital circuits. 4
(b) What are the different styles of modeling in VHDL? 10
