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Code No.: 22214 AS

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (E.E.E.) II Year II-Semester Advanced Supplementary Examinations, June/July-2017

Digital Electronics and Logic Design

Time: 3 hours

Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A ($10 \times 2 = 20$ Marks)

1. Implement two input XOR gate using NOR gates only.
2. Simplify the Boolean expression, $x^1yz + x^1yz^1 + xy^1z^1 + xy^1z$.
3. Briefly explain the characteristics of digital IC's.
4. Explain the function of a decoder.
5. Differentiate between serial adder and parallel adder.
6. Solve the following arithmetic sum in Excess-3.
i) $3453+2568$ ii) $2374+9435$
7. Briefly explain about the latch circuit.
8. What is a ring counter?
9. State the differences between a truth table and a state table.
10. List the applications of registers.

Part-B ($5 \times 10 = 50$ Marks)

(All bits carry equal marks)

11. a) Minimize the function using Karnaugh-Map and obtain minimal SOP and POS function.
 $f(A, B, C, D) = \pi(1, 2, 3, 8, 9, 10, 11, 14) + \Sigma d(7, 15)$.
b) Determine canonical POS form for the function $T(x, y, z) = x(\bar{y} + z)$.
12. a) Explain the TTL logic family with a neat diagram.
b) Explain how a decoder can be converted in to a Demultiplexer with relevant block diagrams and truth tables.
13. a) Design a full subtractor by using two half subtractors.
b) Design a combinational circuit for a 4-bit magnitude comparator.
14. a) Draw the schematic circuit of S-R-Flip-Flop with negative edge triggering using NAND gates and explain its operation with proper truth-table. Convert this flip-flop to J-K flip-flop and explain its operation.
b) Design a synchronous counter using T flip flop for the given sequence $F = \Sigma(0, 2, 5, 3, 6, 4)$
15. a) Bring out the differences among a PAL and PLA.
b) Explain the concept of state and state diagram in the design of counters and also draw a state diagram for the given sequence of 10101.
16. a) Design a combinational circuit and draw a block diagram for a 4×16 decoder constructed with two 3×8 decoders.
b) Express the following functions in sum of min terms and product of max terms
i) $F(x, y, z) = (xy + z)(y + xz)$ ii) $F(x, y, z) = 1$
17. Write short notes on any two of the following:
a) Shift register
b) BCD arithmetic
c) Sequence Detectors
