

Question Paper consists of FIVE units, each carrying 14 marks  
 Each unit has TWO questions; either of them should be answered  
 All parts of a question must be answered at one place

- 1.a) Express the following numbers in decimal:  
 (a)  $(10110.0101)_2$  (b)  $(16.5)_{16}$  (c)  $(26.24)_8$  (7M)
- 1.b) Convert the hexadecimal number 64CD to binary, and then convert it from binary to octal. (7M)
- (OR)
- 1.c) Find the 9's and 10's complement of the decimal numbers: (a) 25,478,036 (b) 63,325,600 (7M)
- 1.d) Represent the unsigned decimal numbers 791 and 658 in BCD, and then show the steps necessary to form their sum. (7M)
- 2.a) Demonstrate the validity of the following identities by means of truth tables:  
 DeMorgan's theorem for three variables:  $(x + y + z)' = x'y'z'$  and  $(xyz)' = x' + y' + z'$  (7M)
- 2.b) Simplify expressions to minimum number of literals: (a)  $ABC + A'B + ABC'$  (b)  $x' + yz + xz$  (7M)
- (OR)
- 2.c) Draw logic diagrams of the circuits that implement the original and simplified expressions of  $xy + x(wz + wz')$  (7M)
- 2.d) Obtain the truth table of the function and express this in sum-of-minterms and product-of-maxterms form:  $(b + cd)(c + bd)$  (7M)
- 3.a) Simplify the Boolean functions, using three-variable maps:  
 (a)  $F(x, y, z) = \Sigma(0, 1, 5, 7)$  (b)  $F(x, y, z) = \Sigma(1, 2, 3, 6, 7)$  (7M)
- 3.b) Simplify the Boolean expression, using four-variable maps:  
 $A'B'C'D' + AC'D' + B'CD' + A'BCD + BCD$  (7M)
- (OR)
- 3.c) Convert the following Boolean function from a sum-of-products to a simplified product-of-sums form.  $F(x, y, z) = \Sigma(1, 2, 5, 6, 7)$ .  
 Simplify the following functions, and implement them with two-level NOR gate circuits:  $F = wx' + y'z' + w'yz$  (7M)
- 4.a) Design and draw a Full adder. (7M)
- 4.b) Explain Code Conversion with Example. (7M)
- (OR)
- 4.c) Design and explain about Three-to-eight-line decoder. (7M)
- 4.d) Write about Code Converters. (7M)
- 5.a) Explain about SR latch with NOR gates. (7M)
- 5.b) Explain about JK Flipflop. (7M)
- (OR)
- 5.c) Write about Four-bit register with parallel load. (7M)
- 5.d) Write about BCD ripple counter. (7M)

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