

# IAT1 - DSD (18EE35) - A Section

Max Marks: 50M

Total No. of Questions: 27

Instructions:

1. You must login through official email id
2. Attempt all questions.
3. Symbols and abbreviations carry their intended meaning
4. A' is read as NOT(A) or A bar
5. Read  $2^n$  as 2 to the power of n
6. Read  $m(1,2,3)$  as MINTERMS and  $M(1,2,3)$  as MAXTERMS
7. Q1 to Q10 carries ONE mark each (Total 10M)
8. Q11 to Q25 carries TWO marks each (Total 30M)
9. Q26 to Q27 carries 5 marks each (Total 10M)

Your email address (**kashif.a@cmrit.ac.in**) will be recorded when you submit this form. Not you? [Switch account](#)

\* Required

Name \*

Enter your FULL NAME in CAPITAL LETTERS

Your answer

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USN \*

Enter your Complete USN in CAPITAL LETTERS (Ex: 1CR19EE001)

Your answer

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[CO1,L1] Q1.  $A \cdot A' = *$

1 point

- 0
- 1
- Undefined
- $A + A'$

[CO1,L1] Q2.  $A + A'B = *$

1 point

- $A'B$
- $A$
- $A + B$
- $A' + B$

[CO1,L1] Q3. A 4-variable K-map has \*

1 point

- 2 Cells
- 4 Cells
- 8 Cells
- 16 Cells

[CO1,L1] Q4. Binary number 11110 is represented in decimal as \*

1 point

- 30
- 29
- 65
- 44



[CO1,L1] Q5. The function  $f(X,Y,Z) = X'YZ + XZ + XYZ' + X'Y'Z$  is in \*

1 point

- standard sum of product form
- sum of product form
- product of sum form
- standard product of sum form

[CO1,L1] Q6. For converting the function  $f(A,B,C) = A + ABC$  into its standard form the first term in the expression has to be \*

1 point

- anded with  $(B + B')(C + C')$
- anded with  $(B \cdot B')(C \cdot C')$
- ored with  $(B + B')(C + C')$
- ored with  $(B \cdot B')(C \cdot C')$

[CO1,L1] Q7. In Quine McClusky method of minimization the two minterms compared from the consecutive groups will be grouped only when they have \*

1 point

- 2 bit change
- 3 bit change
- 4 bit change
- 1 bit change



[CO1,L1] Q8. An m bit decoder has how many possible outputs? \*

1 point

- $2^{(m+1)}$
- $2^n$
- $2^{(n-1)}$
- $2^m$

[CO1,L1] Q9. IC 74139 is a \*

1 point

- Dual 2:4 decoder
- 3:8 decoder
- 5:32 decoder
- 4:16 decoder

[CO1,L1] Q10. A decoder with active low outputs must be connected to which gate to get a SOP expression? \*

1 point

- ABD gate
- NAND gate
- OR gate
- NOR gate



[CO1,L1] Q11. Minimum number of \_\_\_\_\_ are required to implement a 2-input XNOR gate \* 2 points

- 4 NAND gates
- 4 NOR gates
- 6 NAND gates
- 6 NOR gates

[CO1,L2] Q12. From the given boolean expression choose the equivalent boolean expression written using maxterms  $f(A,B,C) = m(1,2,5)+d(0,3)$  \* 2 points

- $f(A,B,C) = M(4,6,7)+d(0,3)$
- $f(A,B,C) = M(4,5,7)+d(0,3)$
- $f(A,B,C) = M(4,6,7)+d(0,4)$
- $f(A,B,C) = M(3,6,7)+d(0,3)$



[CO1,L2] Q13. In the k map shown how many essential prime implicants are available? \* 2 points

	1			1
	1			1
	1			
	1		1	1

- 4  
 3  
 2  
 1

[CO1,L2] Q14. Convert the following SOP to its standard SOP.  $f(A,B,C) = AC + AB + BC$  \* 2 points

- $ABC + A'BC + AB'C$   
  $ABC + A'BC + ABC'$   
  $ABC + A'B'C' + AB'C' + A'BC'$   
  $ABC + A'BC + AB'C + ABC'$



[CO1,L2] Q15. Convert the following POS to its proper canonical form. 2 points

$$f(A,B,C) = (A+B')(B'+C) *$$

- $(A+B'+C)(A+B'+C')(A'+B'+C)$
- $(A+B'+C)(A+B'+C')$
- $(A+B'+C)(A+B'+C')(A'+B'+C')$
- $(A+B'+C)(A'+B'+C')(A'+B'+C)$

[CO1,L2] Q16. Minimize the following function in POS minimal form using 2 points

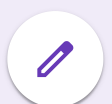
$$\text{K-Maps: } f(A,B,C,D) = M(6,7,8,9)+d(10,11,12,13,14,15) *$$

- $Y = A'(B'+C') + (A'+B')$
- $Y = A'(B'+C)$
- $Y = A'(B'+C') + (A+B'+C)$
- $Y = A'(B'+C')$

[CO1,L2] Q17. Minimize the following function in SOP minimal form using 2 points

$$\text{K-Maps: } f(A,B,C,D) = m(1,5,6,12,13,14)+d(2,4) *$$

- $Y = BC'+BD'+A'C'D'$
- $Y = BC'+B'D'+A'C'D$
- $Y = BC'+BD'+A'C'D$
- $Y = B'C'+ABD'+A'C'D$

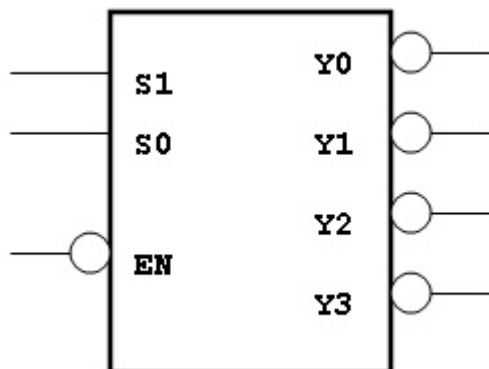


[CO1,L2] Q18. In the prime implicant selection chart shown which terms are considered as essential prime implicants? \* 2 points

		0	1	2	5	6	7	8	9	10	14
(0, 1, 8, 9)	$b'c'$	X	X					X	X		
(0, 2, 8, 10)	$b'd'$	X		X				X		X	
(2, 6, 10, 14)	$cd'$			X		X				X	X
(1, 5)	$a'c'd$		X		X						
(5, 7)	$a'bd$				X		X				
(6, 7)	$a'bc$					X	X				

- $b'c'$  and  $a'bc$
- $b'c'$ ,  $b'd'$ ,  $cd'$ ,  $a'c'd$ ,  $a'bd$ ,  $a'bc$
- $b'c'$  and  $cd'$
- $a'c'dd$ ,  $a'bd$  and  $cd'$

[CO1,L2] Q19. For the 2 to 4 decoder shown if the input  $S_0$  and  $S_1$  are 1 and 0 respectively and the enable input  $E$  is 1 then which output pin is activated? \* 2 points



- Y0
- Y2
- none will get activated
- Y1



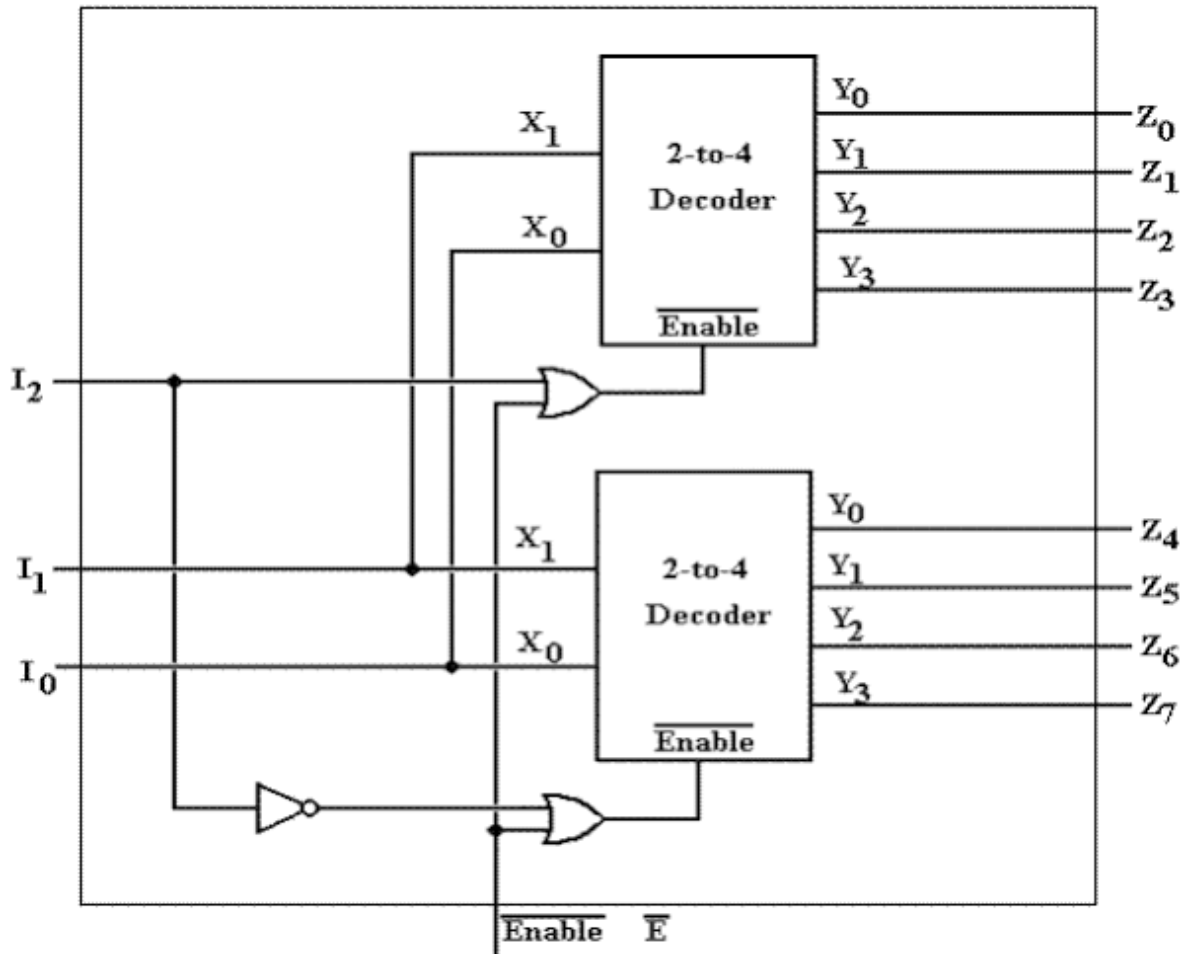
[CO1,L2] Q20. If two 2-bit numbers (assume AB and CD as the two 2-bit numbers) are multiplied then the SOP expression for the MSB of the output will be \* 2 points

- ABCD
- $AB'C + ABD'$
- BD
- $A'BC + BCD' + AC'D + AB'D$



[CO1,L2] Q21. The decoder shown in the figure is a \*

2 points

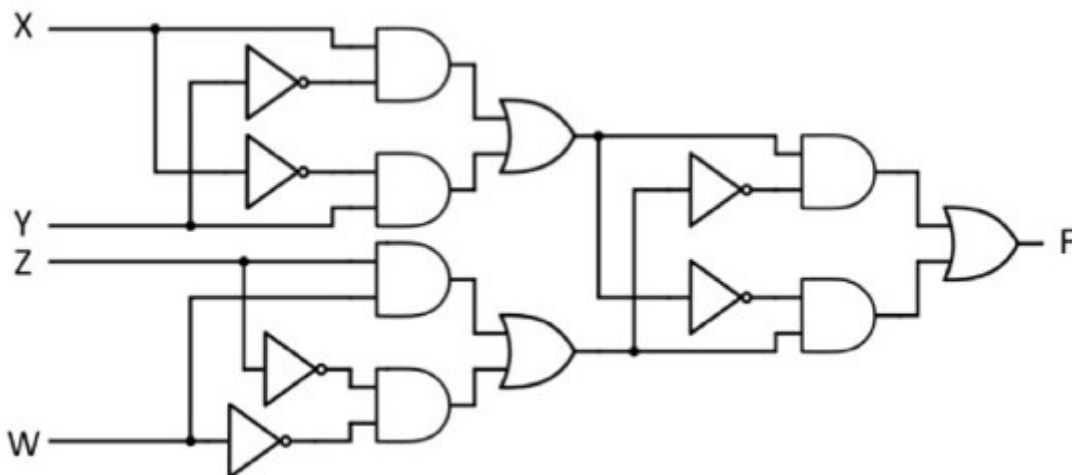


- 4:8 decoder  
 3:8 decoder  
 2:4 decoder  
 4:16 decoder



[CO1,L2] Q22. The output F is \*

2 points

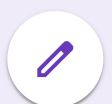


- (X xor Y) xor (Z xnor W)
- (X xor Y) xnor (Z xnor W)
- (X xnor Y) xnor (Z xor W)
- (X xnor Y) xor (Z xor W)

[CO1,L2] Q23. Minimize the function using k-map  $f(A,B,C,D,E) = m(0,1,4,5,8,9,12,13,16,17,20,21,24,25,28,29)$  \*

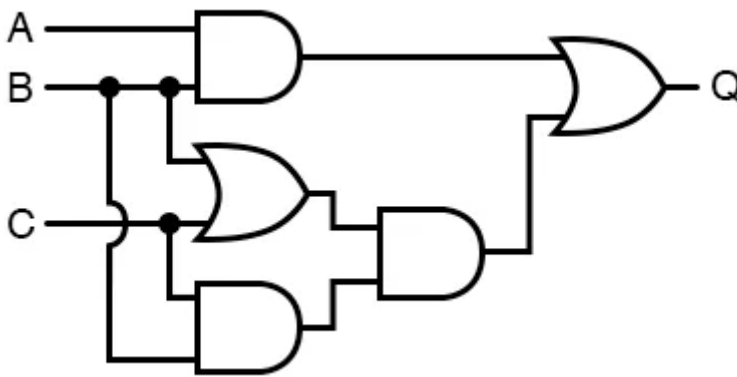
2 points

- $Y = A'D'$
- $Y = D'$
- $Y = A'D' + AD'E + ABCD'E' + A'B'C'E$
- $Y = AD' + A'D + ABC'D + B'C'E$



[CO1,L2] Q24. Output Q in the figure shown is equal to \*

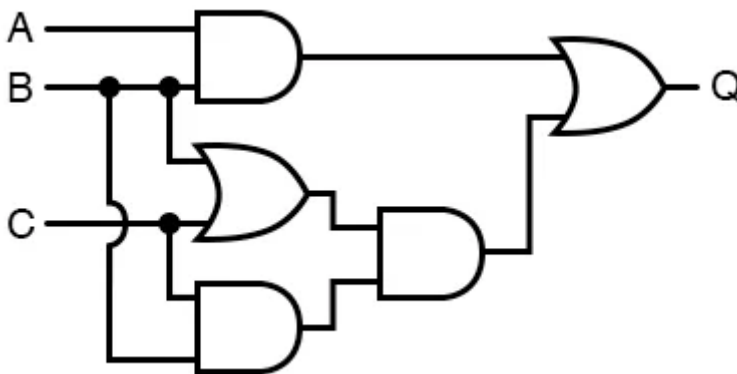
2 points



- $AB + BC + (B+C)$
- $AB + BC$
- $A(B+C)$
- $B(A+C)$

[CO1,L2] Q25. Minterms for output Q in the figure shown are \*

2 points



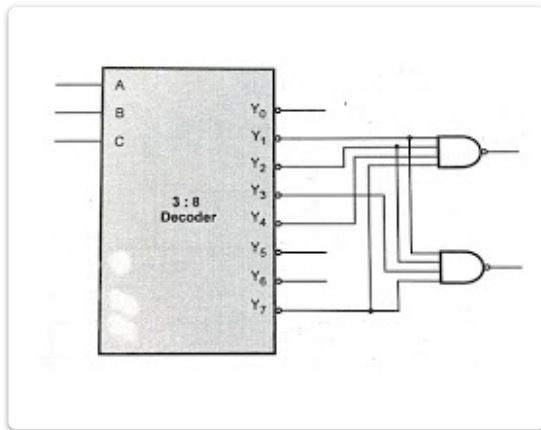
- $m(3,7)$
- $m(1,2,3,5,6,7)$
- $m(3,6,7)$
- $m(6,7)$



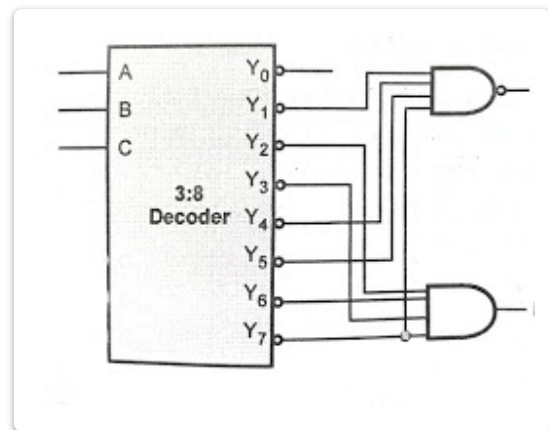
[CO1,L3] Q26. Solve the function  $f(W,X,Y,Z) = m(2,6,8,9,10,11,14,15)$  using Quine McClusky method and select the final expression containing all the essential prime implicants. \* 5 points

- $YZ' + WX' + WY'$
- $YZ' + WX' + WY$
- $XYZ' + W'X + WY'$
- $Y'Z' + WXZ' + W'XY'$

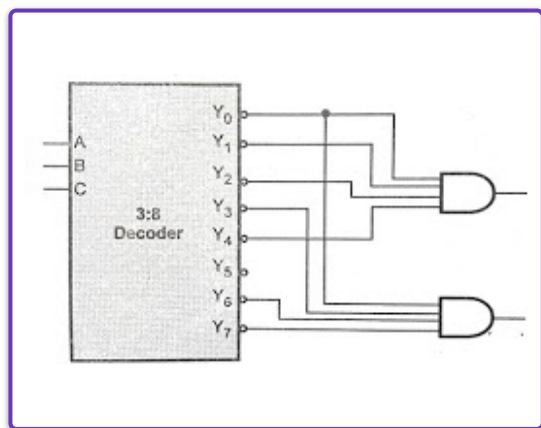
[CO1,L3] Q27. Which of the logic circuit represents the implementation of a full adder using a decoder? \* 5 points



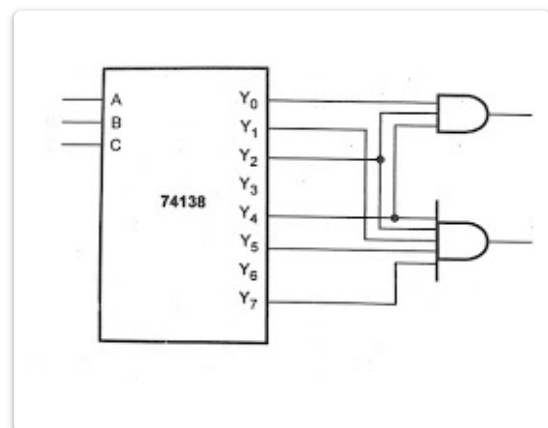
Option 1



Option 2



Option 3



Option 4

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