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Family name	Given name	Student number	

ENS1161 Computer Fundamentals

Test 3

10/10.

(a) Find the value of M = x (y' + yz) , if (x, y, z) = (0, 1, 1).

$$\begin{aligned} M &= 0(0 + 1 \cdot 1) \\ &= 0(0 + 1) \\ &= 0 \cdot 1 \\ &= 0 \end{aligned}$$

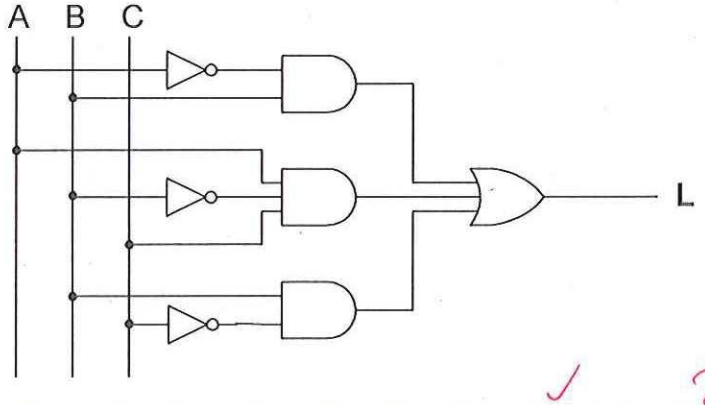
✓ 1.

(b) List the combinations of (x, y, z) for which G(x,y,z) = x (y' + z) + x'yz will be equal to 1.

$$\begin{aligned} (x, y, z) &= (0,1,1) \\ &= (1,0,0) \\ &= (1,0,1) \\ &= (1,1,1) \end{aligned}$$

✓ 2

(c) Write a Boolean expression for the output L of the circuit shown:



✓ 2

$$L = A'B + AB'C + BC'$$

(d) Use de Morgan's laws to express Q = (x' + xyz)' as a sum of products.

$$\begin{aligned} Q &= (x' + xyz)' \\ &= x(x' + y' + z') \\ &= xx' + xy' + xz' \\ &= xy' + xz' \end{aligned}$$

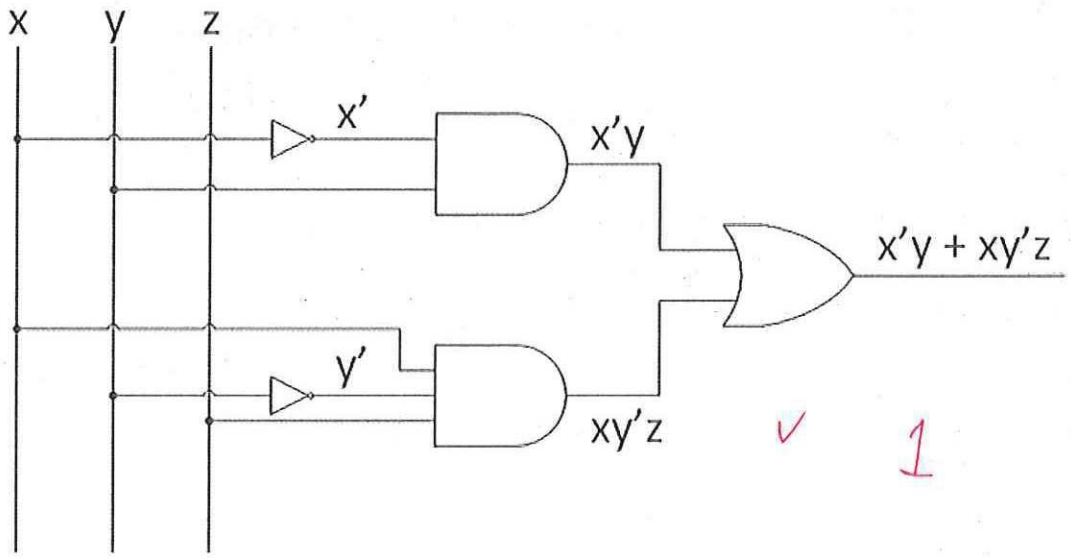
✓ 2

(e) Expand P(x, y, z) = x'y + yz into a **complete** sum of products.

$$\begin{aligned} P &= x'y(z + z') + yz(x + x') \\ &= x'yz + x'yz' + xyz + xy'z \end{aligned}$$

✓ 2

(f) Draw a circuit corresponding to the function J(x, y, z) = x'y + xy'z



✓ 1

[1 + 2 + 2 + 2 + 2 + 1 = 10 marks]