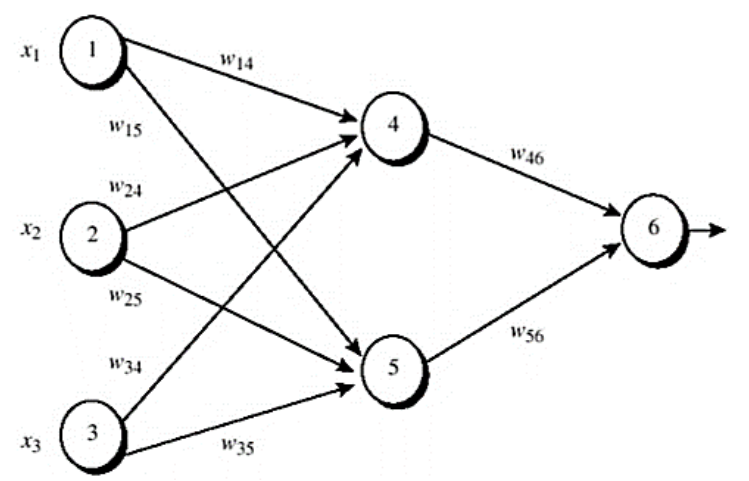
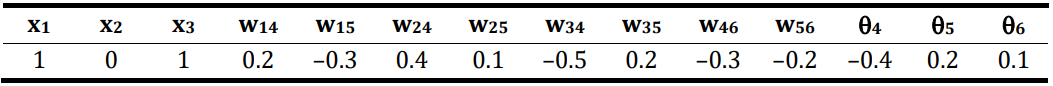
**Introduction to Artificial Intelligence**

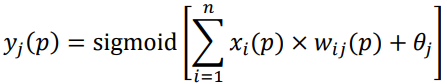
Quiz 8

1. **Problem:**

Consider the following neuron network, which includes 3 input neurons, 2 hidden neurons and 1 output neurons.



Initial input, weight and bias values are

The expected output value is 1. The learning rate is 0.9 Knowing that the actual output at some neuron j is calculated as follows.

where n is the number of inputs of neuron j, 𝑤𝑖𝑗 is the corresponding link from a neuron i in the previous layer to neuron j, and 𝜃𝑗 is the bias at neuron j. Present all calculations required to perform the backpropagation once (i.e., one forward pass and one backward pass) on the given neural network in the following cases

Output )

Output

a) Ignore all biases (precision to 3 decimal places).

Ignore all biases – Forward

Sum4 =

Output4

Sum5 =

Output5

Sum6 =

Output6

Ignore all biases – Backward

Error gradient6

Error gradient5

Error gradient4

Updated weight:

weight46 = weight14 + α ;

weight56 = -0.2;

weight14 = 0.2;

weight15 = -0.3;

weight24 = 0.4;

weight25 = 0.1;

weight34 = -0.5;

weight35 = 0.2;