SECTION B *Total: [45 marks]*

12. (a) *(Notation: * is **and**, + is **or**, – is **not**)*
Award [1 mark] for each correct sub-expression in the "+" relation, up to [3 marks max].

W*H + W*-S + -W*-H

Alternative equivalent solution:
W*(H+-S) + -W*-H *[3 marks]*

(b) *Award [1 mark] for each correct pair of rows up to [4 marks max].*
Accept correct rows in any order.

W	H	S	T
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

[4 marks]

(c) Odd index gives S = 1; *[1 mark]*

continued ...

Question 12 continued

(d)   *Award **[1 mark]** for correct looping **and** output;*
        *Award **[1 mark]** for testing condition `TIRED[INDEX]=1`;*
        *Award **[1 mark]** for condition for H;*
        *Award **[1 mark]** for condition for W;*

```
loop INDEX from 0 to 7
    if TIRED[INDEX] = 1 then
        if INDEX mod 2 = 1 then
            S=1
        else S=0
        end if
        if (INDEX div 2) mod 2 = 1 then
            H=1
        else H=0
        end if
        if INDEX div 4 = 1 then
            W=1
        else W=0
        end if                   //alternative: INDEX>3
        output W, H, S
    end if
end loop
```

Alternative:

```
loop INDEX from 0 to 7
    if TIRED[INDEX] = 1 then
        TEMP = INDEX //TEMP is a new local var
        S = TEMP mod 2
        TEMP = TEMP div 2
        H = TEMP mod 2
        TEMP = TEMP div 2
        W = TEMP mod 2
        output  W, H, S
    end if
end loop                                                    ***[4 marks]***
```

(e)   *Award [1 mark] for looping through the collection;*
        *Award [1 mark] for getting **both** name and TIRED array;*
        *Award [1 mark] for using a variant of TEST that returns values for W **and** H (explanation*
         expected);

```
while not end of STUDENT collection
    get next NAME, get TIRED
    newTest(TIRED)    //it must be able to return values for W and H
    if W = 1 and H = 1
        output NAME
    end if
end while
```

Alternative:

```
loop while STUDENT.hasNext()
    TEMP = STUDENT.getNext()
    NAME = Temp.name
    newTest(Temp.tired) //it must be able to return values for W and H
    if W = 1 and H = 1
        output name
    end if
end while
```

Question 12 continued

> *Accept answers not pseudocode, for example:*
> For each element in the collection STUDENT;
> Retrieve **both** Names and Tired;
> Use a variant of TEST(TIRED) and **returns** values for W **and** H to output the corresponding name when both are 1;   *[3 marks]*

Total: [15 marks]

13. (a) Data is in the cloud/computing infrastructure;
SW necessary for the activities is in the cloud;
Access to SW is with thin client (terminal/computers) by web browsing (on the extranet);   *[3 marks]*

   (b) *Award up to [6 marks max].*
Security in storage;
   Data is stored in the server of the service provider;
   The organization has no direct control of its data;
   Legislation in the country of the provider may be weaker than in the user's country;
   Cases of provider's corruption/bankruptcy/data loss are a risk to the organization;

Security in transmission;
   Applications running in-site may require data in SaaS;
   Hence longer transmission times and higher risk of
   failure/attack/interception;   *[6 marks]*

   (c) *Award up to [2 marks max] .*
An external extension to a company's local network;
Limited access;
Uses internet protocols;   *[2 marks]*

   (d) VPN authenticates the sender before (establishing the tunnel);
VPN access is always encrypted, whereas extranet has limited encryption;
VPN transmission is always encrypted;
VPN users have access to everything whereas extranet users only have access to (enabled) specific services;   *[4 marks]*

Total: [15 marks]