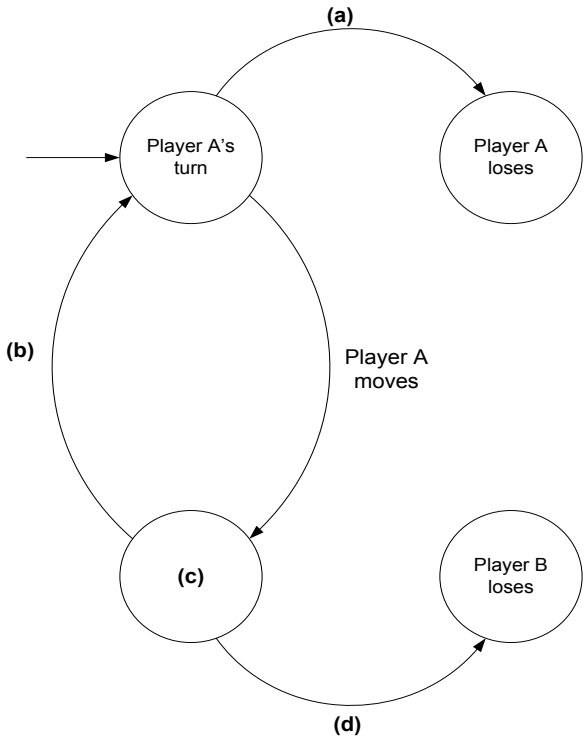
0 1 **Figure 3** shows an incomplete state transition diagram for the AQA Board Game. With reference to the game rules complete **Table 3**.

Figure 3



Complete **Table 3** by filling in the unshaded cells with the correct description for **Figure 3**.

Table 3

Label	Description
(a)	
(b)	
(c)	
(d)	

Copy the contents of all the unshaded cells in **Table 3** into your Electronic Answer Document.

[2 marks]

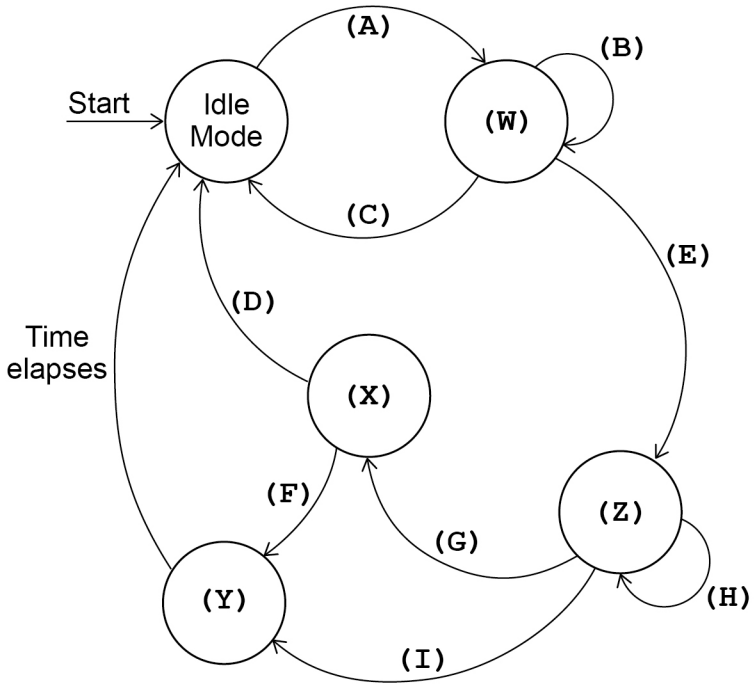
0 2 A parking meter has an Add hours button (+), an Accept button, a coin slot, a payment card reader, a Cancel button and a number keypad.

The system operates in a specific sequence:

- the system is initially in Idle Mode
- when the user presses the + button the system goes into Select Hours Mode with the parking time set to 1 hour and the payment owed set to £1.00
  - each time the user presses the + button again, the number of hours' parking time increases by 1 and the payment owed increases by £0.50
  - when the user presses the Accept button the system goes into Payment Due Mode and the user is able to make payments using cash or a payment card
  - the user can cancel the operation by pressing the Cancel button
- using cash:
  - each time the user inserts a coin (except the final coin), the value of it is deducted from the payment owed
  - when the final coin that completes the payment is inserted, the system goes into Paid Mode
- using a payment card:
  - when the user inserts a payment card into the card reader, the meter goes into a mode that allows the user to enter their PIN
  - the user then enters their PIN on the keypad
  - if the PIN is correct, the system goes into Paid Mode; otherwise the system goes into Idle Mode
- the system remains in Paid Mode until the time paid for has elapsed.

Figure 2 shows a partially completed state transition diagram that represents the operation of the parking meter. Four of the states are labelled **(W)** to **(Z)** and events are labelled **(A)** to **(I)**.

Figure 2



Complete **Table 3** by filling in the unshaded cells with the correct labels from **Figure 2**. You should write:

- which labels **(A)** to **(I)** represent which event(s)
- which labels **(W)** to **(Z)** represent which state.

Some of the cells in the table may need to be assigned more than one label.

Each label **must** only be used once.

Table 3

Event / State	**Label(s): (A) to (I), (W) to (Z)**
Card Payment Mode	
Enter correct PIN	
Enter incorrect PIN	
Insert a coin (except final coin)	
Insert final coin	
Insert payment card	
Paid Mode	
Payment Due Mode	
Press Accept	
Press Cancel	
Press + button	
Select Hours Mode	

Copy the contents of all the unshaded cells in **Table 3** into your Electronic Answer Document.

[6 marks]

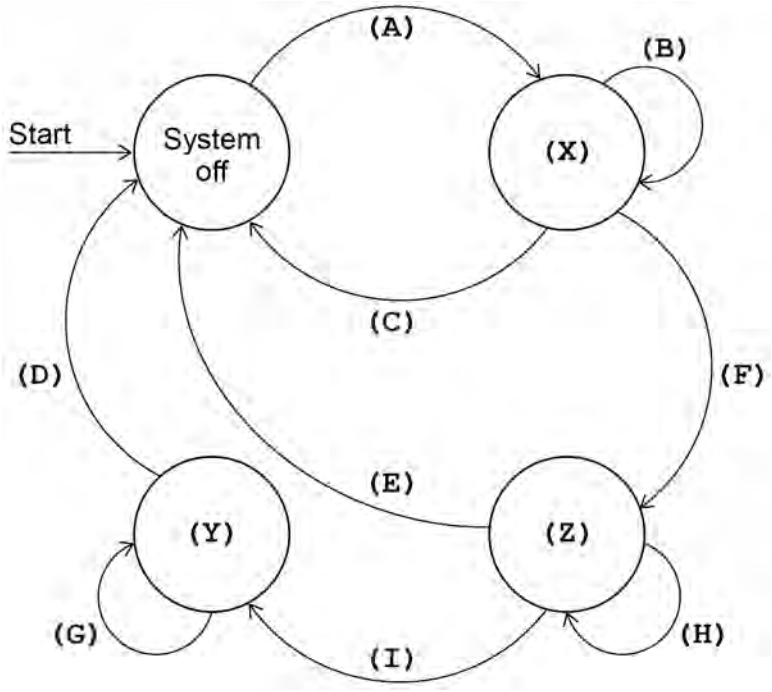
0 3 A security system uses a motion sensor, a keypad and an alarm bell.

The system operates as follows:

- the system is initially off
- when the system is switched on it goes into sensing mode
- the system can be switched off at any time by entering the correct code on the keypad
- if the system detects movement while in sensing mode it goes into alert mode
- after the system has been in alert mode for 10 seconds, it enters the alarm bell ringing mode
- if an incorrect code is entered on the keypad, once the system has been switched on, the system remains in its current mode.

Figure 1 shows a partially completed state transition diagram that represents the operation of the security system. Three of the states are labelled **(X)** to **(Z)** and events are labelled **(A)** to **(I)**.

Figure 1



Complete **Table 1** by filling in the unshaded cells with the correct labels from **Figure 1**. You should write:

- which labels, **(X)** to **(Z)**, represent which state
- which labels **(A)** to **(I)** represent which event(s).

Some of the events will be assigned more than one label.

Each label **must** only be used once.

Table 1

Event / State	**Label(s): (A) to (I), (X) to (Z)**
Alarm bell ringing mode	
Alert mode	
Detect movement	
Enter correct code	
Enter incorrect code	
Sensing mode	
Switch on	
10 second delay elapsed	

Copy the contents of all the unshaded cells in **Table 1** into your Electronic Answer Document.

[6 marks]