**Question 1**

1. Describe the features of a java monitor. [8 marks]
2. Explain why a java monitor considered as *re-entrant?*  [5 marks]
   1. Give a suitable java code example to illustrate a java monitor used for controlling access to a shared resource. [12 marks]
   2. Explain how mutual exclusion is achieved with respect to the code example given in part (i) [8 marks]

**Question 2**

1. Describe the features of a java *semaphore*. [8 marks]
2. What are the advantages of using a java monitor over a semaphore? [7 marks]
   1. Give a suitable java code example to illustrate a java semaphore used for strict interleaving of actions of two concurrent actions [12 marks]
   2. Explain how mutual exclusion is achieved with respect to the code example given in part (i) [6 marks]

**Question 3**

1. Explain what is meant by a *process*? What methods do most operating system provid for communication between processes? [7 marks]
2. Explain the following multi-threaded programming issues:
   1. Interference [5 marks]
   2. Synchronisation [2 marks]
   3. Fairness [5 marks]
   4. Deadlock [2 marks]
3. Explain each of the following terms with respect to the interaction of threads with the main memory, and thus with each other.
   1. use [2 marks]
   2. assign [2 marks]
   3. load [2 marks]
   4. store [2 marks]
   5. read [2 marks]
   6. write [2 marks]

**Question 4**

Using Finite State Process (FSP) define three processes to model the WorkerA, WorkerB and the IroningBoard

Using your two processes define a composite process that models the complete system

Briefly explain how you have ensured mutual access to the shared resource with respect to the composite process