Q1. T/F questions
(a) [ ] The starting address of any segment in the real mode is a multiple of 16.
(b) [ ] In a 386-based system, to access an instruction in real mode, the CPU has to provide a 20-bit logical address based on the content of the IP and CS registers.
(c) [ ] The most significant 16 bits of the EAX register in a Pentium microprocessor are not used in real mode operation.
(d) [ ] There are at most 4 active segments at any time instant in an 8086-system through an application program can occupy a number of memory segments in the main memory.
(e) [ ] Segments cannot overlap with each other.
(f) [ ] Register IP is a segment register and a special purpose register.
(g) [ ] Given that the content of an offset register and that of a segment register are, respectively, FFH and 10H. The real mode address produced by this register pair is 1000H.
(h) [ ] A segment register is used to define the starting address of a segment.
(i) [ ] An offset register is used to specify the displacement of a datum from the starting address of the segment in which the datum is.
(j) [ ] The ending address of a segment is determined by the offset register used to access a data.
(k) [ ] If a datum is relocatable, it can still be accessed with the same original program after being moved to somewhere else in the memory.
(l) [ ] Registers SS and SP always work together to generate a 20-bit real mode address.
(m) [ ] The starting address of any paragraph is a multiple of 16.

Q2. (a) What is the memory overhead of a page system? A page memory system of 2G bytes is used in an 80386 computer system. Compute the memory overhead required to implement this page memory system.

(b) What is the time overhead of a page system? Suggest a method used in an 80386 system to reduce this overhead.

Q3. Fill the following table to show the differences between the protected mode and the normal mode in an 80386 system.

<table>
<thead>
<tr>
<th></th>
<th>Real mode</th>
<th>Protected mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size of a segment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Base address of a segment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Content of segment register</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>