1. Which of the following is true of compaction?

A) It can be done at assembly, load, or execution time.

B) It is used to solve the problem of internal fragmentation.

C) It cannot shuffle memory contents.

D) It is possible only if relocation is dynamic and done at execution time.

Ans: D

2. The _____ binding scheme facilitates swapping.

A) interrupt time B) load time C) assembly time D) execution time

Ans: D

3. A(n) ____ page table has one page entry for each real page (or frame) of memory.

A) inverted B) multi-level C) single-level D) virtual

Ans: A

4. For the dynamic storage-allocation algorithms below, answer the questions below.

a) which results in the smallest leftover hole in memory?

b) which results in the largest leftover hole in memory?

A) First fit B) Best fit C) Worst fit D) None of the above

Ans: B, C

5. For dynamically linked library, which of the following is(are) true?

A) Routine is not loaded in main memory until it is called

B) A program does not have to be stored, in its entirety, in main memory for execution

C) Better disk space utilization than using statically linked library

D) A stub is included in the image for each library-routine reference

Ans: C, D

6. For dynamic loading, which of the following is(are) true?

A) Address binding is delayed until load time

B) Allow unused routines to stay out of main memory

C) Better memory space utilization.

D) All processes that use the same library execute only one copy of the library code in memory.

Ans: B, C

7. What is(are) the purpose of paging the page tables?

A) reduce memory space for page table

B) Save memory access time for address translation

C) To break one single large page table into multiple smaller ones.

D) To allow virtual address space larger than physical memory space

Ans: C

1. Given the logical address 0xAEF9 (in hexadecimal) with a page size of 256 bytes.

a) What is the page number? b) What is the page offset?

Ans: 0xAE, 0xF9

2. Consider a 32-bit address for a two-level paging system with an 8 KB page size. The outer page table has 1024 entries. How many bits are used to index the second-level page table?

Ans: 9

3. A 32-bit logical address with 8 KB page size and 4-byte page entry. What's the total size (in bits) for a conventional single-level page table?

Ans: 2^{24}

8KB=2^{13}

$2^{(32-13)} \times 32 = 2^{24}$

4. An operating system has a 21-bit virtual address and a 2-KB page size. The system supports up to 64KB of physical memory. How many entries are there in each of the following?

a. A conventional, single-level page table

b. An inverted page table

Ans: a. $2^{(21-11)}=2^{10}$

b. 2^{16}

5. Compare the memory organization schemes of contiguous memory allocation, pure segmentation, and pure paging with respect to the following issues.
   a. External fragmentation

b. Internal fragmentation
c. Ability to share code across processes

Ans: contiguous allocation: a (yes) b (no) c (no)

Pure segmentation: a (yes), b(no), c(yes)

Pure paging: a(no), b (yes), c(yes)

29. For internal fragmentation, which of followings are true?
A) Internal fragmentation occurs when memory is allocated and returned to the system, resulting in the free memory broken up into small chunks that are too small to be useful.
B) Internal fragmentation occurs when a process is assigned memory more than it actually requested.
C) Internal fragmentation won't occur if the allocated memory is contiguous.
D) Internal fragmentation problem can be solved by memory compaction.

46. Inverted page tables require each process to have its own page table.
Ans: False

47. Without a mechanism such as an address-space identifier, the TLB must be flushed during a context switch.
Ans: True

What is(are) the purpose of paging the page tables?
E) reduce memory space for page table
F) Save memory access time for address translation
G) To break one single large page table into multiple smaller ones.
H) To allow virtual address space larger than physical memory space