**Branch : CSE & IT** **Batch : English**

# Operating Systems

## Memory Management

**DPP 03**

**[MCQ]**

**1.** Which of the following are contiguous allocation technique in memory management?

(a) Paging

(b) Overlays

(c) Segmentation

(d) Buddy system

**[MCQ]**

**2.** Consider the following statements:

**(i)** Overlaying is only possible when program can be divided into independent modules.

**(ii)** Overlaying is needed when process is larger than amount of memory allocated to it.

**(iii)** Overlaying requires special support from operating system and performed in kernel mode.

Which of the following is correct?

(a) All (i), (ii) and (iii) are correct.

(b) (ii) and (iii) are correct.

(c) (i) and (iii) are correct.

(d) (i) and (ii) are correct.

**[MSQ]**

**3.** Which of the following statements is/are TRUE?

(a) In fixed length partition, each memory partition should be of same size.

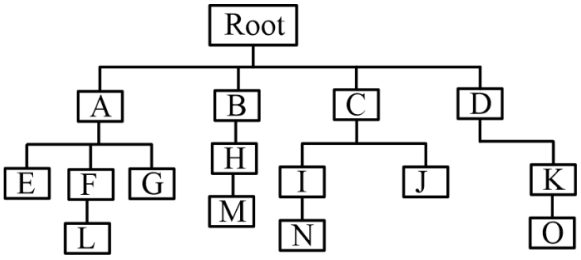
(b) Memory address protection is done with the help of registers.

(c) Free-space management is done using binary bits.

(d) In fixed-length partition, two program can reside in one partitions.

**[NAT]**

**4.** Consider the following diagram representing a program, blocks connected horizontally are independent modules and blocks connected vertically are dependent modules.




Memory requirement of each block is as follows:

Root: 10 KB

| | | |
|---|---|---|
| A: 5 KB | F: 9 KB | K: 7 KB |
| B: 6 KB | G: 6 KB | L: 4 KB |
| C: 4 KB | H: 2 KB | M: 5 KB |
| D: 9 KB | I: 7 KB | N: 8 KB |
| E: 8 KB | J: 3 KB | O: 6 KB |

What is the minimum amount of memory (in KB) is sufficient to execute this program using overlay's when routine loading also needs 20 KB of space?

**[MCQ]**

**5.** Consider the following statements:

(i) Next fit may execute faster than first fit.

(ii) Worst fit suffers from internal fragmentation

Which of the following statements is CORRECT?

(a) Only (i) is correct.

(b) Only (ii) is correct.

(c) Both (i) and (ii) are correct.

(d) None of these

**[MCQ]**

**6.** Match the following:

| | |
|---|---|
| (i) Fixed partition | (1) Suffers from external fragmentation. |
| | (2) suffers from internal fragmentation. |
| (ii) Variable partition | (3) Flexible degree of multiprogramming. |
| | (4) Preferred allocation policy is worst fit. |
| | (5) Preferred allocation policy is best fit. |

(a) 1-(i), 2-(ii), 3-(i), 4-(ii), 5-(i)

(b) 1-(ii), 2-(i), 3-(ii), 4-(ii), 5-(i)

(c) 1-(i), 2-(i), 3-(ii), 4-(i), 5-(ii)

(d) 1-(ii), 2-(ii), 3-(i), 4-(i), 5-(ii)

**[MCQ]**

**7.** Given memory partitions in order as:

$P_1$: 200 KB; $P_2$: 400 KB; $P_3$: 150 KB; $P_4$: 500 KB. How would worst fit algorithm place processes (in order) requiring size 215 KB, 300 KB, 25 KB, 400 KB.

**Note:** The space left after filling a partition is not used by any process.

(a) $P_4$, $P_1$, $P_3$, 400 KB wait.

(b) $P_1$, $P_2$, $P_3$, 25 KB wait.

(c) $P_4$, $P_2$, $P_3$, 400 KB wait.

(d) $P_3$, $P_2$, $P_4$, 300 KB wait.

**[NAT]**

**8.** Consider a five memory partitions of size 100 KB, 200 KB, 300 KB, 450 KB, and 600 KB. The partitions are required to be allotted to six processes of size 180 KB, 50 KB, 210 KB, 30 KB, and 80 KB. Calculate the memory wastage using best-fit algorithm?

# Answer Key

1. **(b, d)**
2. **(d)**
3. **(b, c)**
4. **(52 KB)**
5. **(c)**
6. **(b)**
7. **(c)**
8. **(1100)**

# Hints & Solutions

**1. (b, d)**

Contiguous memory allocation technique includes:

(i) Overlays

(ii) Partitions (fixed length and variable length partition)

(iii) Buddy system

Non-contiguous memory allocation technique includes:

(i) Paging

(ii) Segmentation

(iii) Segmented-paging

**2. (d)**

**(i)** Overlaying is only possible when program can be divided into independent modules. **Correct**.

**(ii)** Overlaying is needed when process is larger then amount of memory allocated to it. **Correct**.

Overlays refer to a technique used to mange memory efficiently by overlaying (replacing) a portion of memory with another program. If size of process is smaller than allocated memory than it can run easily and in such case no need of overlaying is required.

**(iii)** Overlays are implemented by user, and no special support is needed from operating system. So, (iii) is **Incorrect**.

Therefore, option d is correct.

**3. (b, c)**

Memory partitions can be of different sizes. Option 'a' false.

Memory address protection is done with the help of base and limit registers. Option 'b' is True.

Free-space management is done using binary bits, if the bit is '0' the partition is free, if the bit value is '1' the partition is in use. Option 'c' is True.

In fixed-length, only one program can reside in one partition. Option 'd' is false.

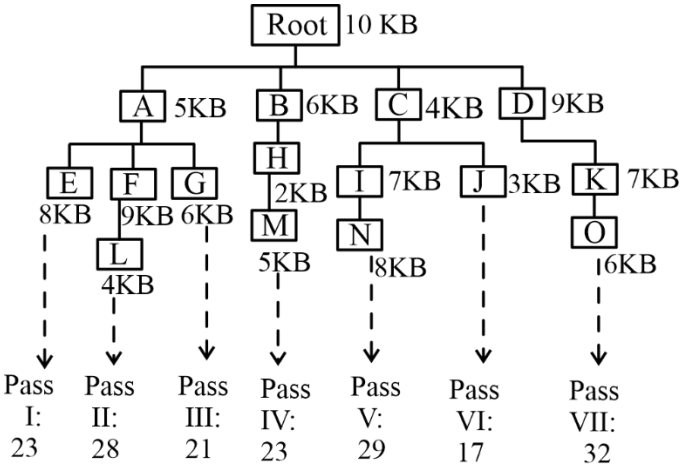
**4. (52 KB)**

Total space required to execute this program

= size of program + routine loading

= 99 KB + 20 KB

= 119 KB




So, pass VII requires 32 KB of space maximum of all passes, minimum amount of memory to execute this 119 KB program

= 32 KB + 20 KB (routine loading)

= 52 KB

**5. (c)**

(i) Next fit may execute faster than first fit.

(ii) Worst fit suffers from internal fragmentation

Both statements are correct. Therefore, c is correct option.

**6. (b)**

Fixed partition:

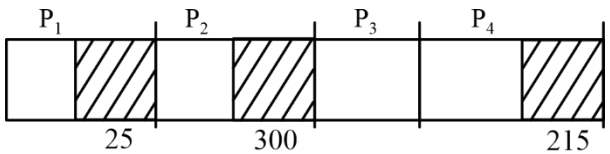
- Internal fragmentation.
- Has limited degree of multi-programing.
- Best fit is most preferred allocation policy.

Variable partition:

- Suffers from external fragmentation.
- Has flexible degree of multi-programming.
- Worst fit is most preferred allocation policy.

**7. (c)**

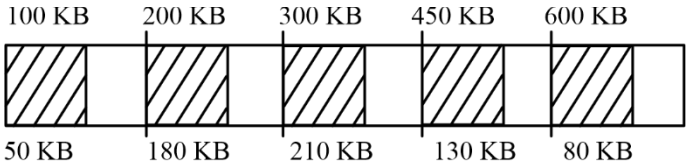
Worst fit: The largest partition is occupied first.




Order: $P_4$, $P_2$, $P_1$, 400 KB waits.

**8. (1100)**

The memory allocation is as follows:




Total space wastage = 50 + 20 + 90 + 420 + 520

= 1100