Answer the following questions:

1. State true or false.

   a) When a new process is scheduled for execution, a process called as *context switch* is followed by the OS which involves **storing the state of the running process**, so that it can be restored for resuming execution at a later point.

   Answer: True

   b) A program is an active entity.

   Answer: False

   c) Heap segment of a program occupies a fixed space in memory as a program runs.

   Answer: False

   d) Ready queue is the set of all processes residing in main memory, ready and waiting to execute.

   Answer: True

   e) The `init` process, which is the parent of all processes in a Linux system, has a process ID of 1.

   Answer: True

2. Name the Linux command that is used to list the system calls that are invoked by a process.

Answer: strace

3. List three scenarios when a process enters a `waiting state`.

Answer:

a) When the process needs to wait for an input

b) When the CPU time slice expires and the next process needs to be given the CPU

c) An interrupt occurs

4. Complete the following program by adding suitable code segments in the three `switch case` blocks as defined below:

a) `Case -1:` Display error message and `exit` from the program
b) `Case 0:` Use `exec` system call to execute the `ps -A` command.
c) `Default:` Wait for the termination of the child process and then display process IDs of both parent and the child.

```c
int main()
{
   int pid; int rv;
   pid=fork();

   switch(pid){
   case -1:

     /* 1. code for case -1 */

     case 0:

       /* 2. code for case 0 */

    default:

      /* 3. code for default case */

   }
}
```

Answer:

```c
1. printf("Error with fork");

   exit(1);

2. execl("/bin/ps", "ps", "-A", NULL);

3. wait(NULL);

   printf("Parent ID %d, Child ID %d", getpid(), pid);
```