Ques 5-a)

ELF files: ELF is the abbreviation for executable & Linkable format and defines the structure for binaries libraries and core files. The formal specifications allows the operating system to interpret its underlying machine instructions correctly.

Elf header displays: The elf file is dynamically linked (DYN - shared object file).

readelf -a <filename>

When we compare the readelf for both the correct compiled file → gcc q5.c and q5.out, we see that program header section differs.

The q5.out file shows → Requesting interpreter ./lib64-amd64-2.27-3ubuntu1-i386.ld

The a.out (correct file version) shows → Requesting program interpreter: /lib64/ld-linux-x86-64.

To correct this we use the patchelf command

patchelf --set-interpreter /lib64/ld-linux-x86-64 q5.out

{This is because the elf file follows intel x86-64 architecture and not amd 64}.

b) Binary file: This is a type of file that is used to store data in the form of contiguous file bytes. Here method of reading is not defined.

These files usually contain instruction in their header to determine how to read the data stored in them. Basically, binary files contain bytes that are intended to be interpreted as something other than text characters.
Moreover, binary files provide multiple benefits compared to plain text files.

→ Efficiency via compression: PNG is a great example of this because it can be used to create small and efficient image files.

→ Better security: Allows businesses to create custom encoding standards, which can be difficult to reverse engineer.

→ Difficult to manipulate: Cannot be read by text processor so editing them is a difficult task.

Configuration data related to software projects are usually stored in binary files. They offer unmatched speed and efficiency when carrying out operations on the stored data.
The only requirement that they present is to have a suitable program for reading such kind of data present in the system.
Also, one important note: If a binary file's header is damaged, it is equivalent to the key being lost, which means you cannot access meaningful data from the file anymore.