Course Code	**:**	**BCSL-056**
Course Title	**:**	**Network Programming and Administration Lab**
Assignment Number	**:**	**BCA(V)/L-056/Assignment/2026-27**
Maximum Marks	**:**	**50**
Weightage	**:**	**25%**
Last date of Submission	**:**	**31st October, 2026 (For July 2026 Session)**
	:	**30th April, 2027 (For January 2027 Session)**

Note: This assignment has two questions. Answer all the questions. These questions carry 40 marks. Rest 10 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation. Make necessary assumptions.

Q1:

(a) Write a TCP client and TCP server program in C language on Unix/Linux, where the client program interacts with the server as specified below: **(12 Marks)**

i. The client connects to the server and sends a string.

ii. The server program sends an acknowledgment message confirming receipt of the string.

iii. The server program converts the received string to UPPERCASE and calculates the total number of vowels present in it, then sends both results back to the client.

iv. The client receives the processed output and sends a final acknowledgment back to the server before terminating the connection.

(b) Write the step-by-step procedure to install a packet analyzer (e.g., ***Wireshark or tcpdump***) on Unix/Linux. Explain the distinction between capture filters and display filters with two practical examples for each. **(8 Marks)**

Q2:

(a) Execute the following Linux commands on your terminal and present the command syntax along with sample outputs: **(8 Marks)**

i. head

ii. grep

iii. ping

iv. cat

(b) Configure a DNS server (such as BIND9) or FTP server (such as ***vsftpd***) on a Linux operating system. Provide a complete step-by-step installation and configuration guide, and show how to view and sort active service connections using commands like ***netstat or ss***. **(12 Marks)**

Q1:

(a) Write a TCP client and TCP server program in C language on Unix/Linux, where the client program interacts with the server as specified below: (12 Marks)

i. The client connects to the server and sends a string.
ii. The server program sends an acknowledgment message confirming receipt of the string.
iii. The server program converts the received string to UPPERCASE and calculates the total number of vowels present in it, then sends both results back to the client.
iv. The client receives the processed output and sends a final acknowledgment back to the server before terminating the connection.

(b) Write the step-by-step procedure to install a packet analyzer (e.g., Wireshark or tcpdump) on Unix/Linux. Explain the distinction between capture filters and display filters with two practical examples for each. (8 Marks)

Answer

(a) Program design

The program uses TCP over the IPv4 loopback address 127.0.0.1 and port 9090. The server creates a listening socket, accepts one client connection, receives one string, sends an acknowledgment, converts the stored string to uppercase, counts the vowels, and sends both results back. The client then sends a final acknowledgment and closes the connection. SO_REUSEADDR is enabled on the server so that the program can be restarted without waiting for the old socket state to expire.

Server program: server.c

```
#include <arpa/inet.h>
#include <ctype.h>
```