Homework 2: VPC Network, Load Balancer, and Cloud Architectures

Correct answers are labeled red bold.
Some necessary explanations are labelled blue.

Q1: Which of the following statement about Virtual Private Cloud (VPC) is NOT correct?

A. A virtual private cloud (VPC) is a virtualized private cloud within a public cloud (GCP, AWS) for an organization.
B. To access a VPC network, Virtual Private Network can be used to build an encrypted tunnel between on-premises IT resources and the VPC.
C. VPC is a global resource in GCP, while VPC is a regional one in AWS.
D. Every user can access an established VPC without authentication. (Incorrect: Authentication must be applied to VPCs.)

Q2: Which of the following statements is correct?

A. There are many regions and zones for both GCP and AWS.
B. In each region, there will be a number of zones. In each zone, there will be one or more discrete data centers with redundant power, networking, and connectivity.
C. Normally, zones in a region are interconnected with high-bandwidth, low-latency networking, over fully redundant, dedicated metro fiber providing high-throughput, low-latency networking between AZs.
D. All of the above.

Q3: Which of the following statements is NOT correct?

A. In GCP, VPC routes define paths for packets leaving instances to a destination.
B. Firewall rules apply to both outgoing (egress) and incoming (ingress) traffic in the network.
C. In GCP, every default VPC network has implied firewall rules and you could delete them. (Incorrect: you cannot delete implied firewall rules but override them.)
D. GCP firewall rules are stateful, meaning they track the state of network connections and automatically allow return traffic regardless of the rules for ingress or egress.

Q4: Which one of the following is FALSE about load balancing?

A. Load balancing improves the distribution of workloads across multiple computing resources.
B. Load balancing aims to optimize resource use, maximize throughput, minimize response time, and avoid overload of any single resource.
C. Using multiple components with load balancing instead of a single component may increase reliability and availability through redundancy.
D. All are true.

Q5: Given two servers A and B, which of the following Load Balancing algorithm should be considered if A has more CPU cores than B?

A. Round Robin. (Incorrect: Round Robin should be used given the identical specs (computer power).)
B. Weighted Round Robin. (Correct: Weight Round Robin has different weights to reflect hardware discrepancy (different computing capacity).)
C. Least Connections. (Incorrect: Least connections consider the number of connected instances, not the hardware.)
D. Random. (Incorrect: Random is considering hardware discrepancy.)

Q6: Which of the following statements about load balancer is correct?

A. To determine the destination, the layer 4 load balancer considers the IP address and ports, as well as the contents in the package. (Incorrect: No contents will be considered/inspected for Layer 4 Load Balancer.)
B. The layer 7 load balancer cannot direct Internet traffic based on the contents in the packet. (Incorrect: Layer 7 load balancer, often implemented by Software, can direct Internet traffic by inspecting the contents in the packet (URL contents).)
C. **The layer 4 load balancer has a faster-transferring performance than the layer 7 load balancer in terms of latency.** (Correct: Layer 4 considers no contents in the packet, but just the IP address.)
D. None of the above.