Test – Network and Service Management and Operations – M.EEC – Example test
Duration: 1h30 min. No memory help allowed. Always justify your answers.

Part I. Network management and quality (V1, V3, V4)
30%, questions have the same weight.

1. Identify the different network planes. Provide examples of specific protocols that run on each plane.
2. What are the main FCAPS functions of management? Briefly describe each one.
3. What are the different ways that can you characterize an application's network quality requirements? Explain why you think these requirements are independent or related to each other.
4. Explain why best effort networks fail to provide adequate quality when heavily used. Discuss which mechanisms can be used to improve quality beyond best effort.
5. Explain the role that monitoring plays in supporting the FCAPS components.

Part II. Network concepts (V5, V6, V7, V8)
40%, questions have the same weight.

1. What is the network address and broadcast address of 162.49.31.193/18?
2. How many /30 sub-networks can you fit in 10.234.24.64/26? What are the network and broadcast addresses of the 2nd sub-network?
3. Describe the structure of the authoritative DNS servers and how that relates to the structure of the domain names themselves.
4. Explain the iterative name resolution process for www.up.pt involving authoritative servers.
5. Identify the three types of routing algorithms that are best known in computer networks; discuss the differences between the algorithms.
6. Provide an example of internal and of external routing protocol. Discuss why internal routing protocols are not adequate for the Internet.
7. Discuss the benefits of SDN regarding the separation of control/software and forwarding/hardware.

Part III. DevOps (V2, V9, V10)
30%, questions have the same weight.

1. Discuss the difficulties in the process of software development that led to the introduction of the devops approach.
2. Discuss the major differences between traditional release deployment and the devops/agile approach; identify "silos" where different teams work.
3. Discuss some of the difficulties in automating the deployment of a system with multiple devices and interfaces; identify automation techniques that can help overcome those difficulties.
4. Explain how device APIs work; what are the fundamental building blocks that most devices use for their APIs?
5. Describe the Continuous Integration / Continuous Deployment model and discuss how the different CI/CD steps can apply to infrastructure code / devops for networking.