

**UNIVERSITY OF BOLTON**  
**SCHOOL OF CREATIVE TECHNOLOGIES**  
**BSC (HONS) COMPUTER NETWORKS AND**  
**SECURITY**  
**SEMESTER 1 EXAMINATION 2024/25**  
**NETWORK MANAGEMENT**  
**MODULE NO: SEC6206**

Date: Wednesday 8<sup>th</sup> January 2025

Time: 10:00 – 12:00

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**INSTRUCTIONS TO CANDIDATES:**

There are FIVE questions on this paper.

Answer ANY FOUR questions.

All questions carry equal marks.

You may use a calculator to aid you in answering appropriate questions.

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School of Creative Technologies  
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Module No. SEC6206

**Question 1**

- 1a)** With the aid of a diagram evaluate the architecture of a typical flow monitoring solution used in data networks.

**[12 marks]**

- 1b)** A key aspect of network management is monitoring the flow of traffic through devices. Define what a flow is and provide details on five of the seven unique keys.

**[7 Marks]**

- 1c)** Contrast the differences between Netflow/IPFIX, SNMP and sFLOW

**[6 marks]**

**Total 25 marks**

**Question 2**

- 2a)** Give a critical analysis of the various elements of an SNMP protocol stack. In particular include layers involved at both the ends and across the network. Your description of the end system should include the interaction of SMI, ASN.1 and BER. You may use diagrams to help with your discussion

**[15 Marks]**

- 2b)** Explain in detail how you would remotely retrieve data from managed devices such as a Router and Switch using SNMP commands at the command line prompt. If you wanted to traverse a group of OID's what command would you use?

**[10 Marks]**

**Total 25 marks**

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School of Creative Technologies  
BSc (Hons) Computer Networks and Security  
Semester 1 Examination 2024/25  
Network Management  
Module No. SEC6206

**Question 3**

- 3a)** The Management Information Base (MIB) is one of the fundamental elements of Network Management systems. Give an descriptive account of the MIB structure, it's role and details about interface and RMON areas.

**[5 Marks]**

- 3b)** Critically appraise what a Network Management System consists of. Include the various functions and features of the Telecommunications Management Network (TMN). Also include the impact of SNMP on the ITU standards. Give practical examples of management systems used at different levels of the management structure.

**[15 Marks]**

- 3c)** In a multi-vendor environment that contains various versions of SNMP and non-SNMP devices, show how these problems can be overcome and accommodated with an SNMP Management system.

**[5 Marks]**

**Total 25 marks**

**Question 4**

- 4a)** For the most part network traffic across the Internet is *bursty* meaning that congestion is a natural element of networking. With the aid of diagrams or graphs critically contrast the differences between TCP Reno and TCP TAHOE

**[9 Marks]**

- 4b)** Most of the TCP Algorithms are made up of several congestion control policies discuss why we need these policies and critically contrast at least two of the congestion policies using graphs, packet flow diagram to help support your discussion.

**[16 Marks]**

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School of Creative Technologies  
BSc (Hons) Computer Networks and Security  
Semester 1 Examination 2024/25  
Network Management  
Module No. SEC6206

**Question 5**

- 5a)** What is SNMP, MIB, Inform, trap and set request? Evaluate the Components and states ports are used in SNMP? Support your answer with examples.

**[15 marks]**

- 5b)** In the context of network management, explain the significance of fragmentation. Provide at least three reasons why fragmentation is important in the efficient management of networks. Additionally, discuss the potential challenges that may arise in a network that does not handle fragmentation appropriately.

**[10 marks]**

**Total 25 marks**

**END OF QUESTIONS**