

Two Hours

UNIVERSITY OF MANCHESTER
INSTITUTE OF SCIENCE AND TECHNOLOGY

CT211 Networking and Open Systems

For candidates taking:

BSc IN COMPUTATION
SECOND YEAR SESSIONAL

BSc IN COMPUTING SCIENCE
SECOND YEAR SESSIONAL

BSc IN INFORMATION SYSTEMS ENGINEERING
SECOND YEAR SESSIONAL

BSc IN COMPUTING AND GEOGRAPHY
SECOND YEAR SESSIONAL

MEng, BEng IN SOFTWARE ENGINEERING
SECOND YEAR SESSIONAL

Answer **three** questions

The use of electronic calculators is NOT permitted

Note: Do not answer more than the required number of questions. Clearly
cross out anything you do not wish to be marked

PTO

UMIST, 2000

(2)

1) Answer all parts

- (a) Describe in general terms, the problems that can exist when exchanging information between two computing systems. (5 marks)
- (b) Explain how a layered system architecture provides a solution to these problems, and briefly describe the role of each of the layers in the ISO OSI Model. (9 marks)
- (c) Under what circumstances might it be impractical for systems to use the ISO OSI Model for efficient and reliable communication? Give an example of an alternative system architecture. (6 marks)

2) Answer both parts

(a) Describe the advantages and disadvantages of the following transmission media for data communications:

- (i) co-axial cables
- (ii) fibre-optics
- (iii) microwave

(12 marks)

(b) Two rural hospitals have decided to join together and have one combined patient administration system. Discuss the factors that will affect your choice of transmission medium between the two hospitals.

(8 marks)

(3)

3) Answer all parts

- (a) Describe the role and responsibilities of the Network Layer in the ISO OSI Models. (5 marks)
- (b) Discuss the causes of network **congestion** and describe two approaches to congestion control. (9 marks)
- (c) The staff in one of the departments in a large organisation complain that the 'network runs slowly' between 8.30-9.30am. Suggest solutions to this problem. (6 marks)

4) Answer all parts

- (a) Describe the Network and Transport layer components of the TCP/IP protocol. (8 marks)
- (b) Explain the role of a **firewall** in networking. Describe the operation of a typical firewall in the context of the TCP/IP protocols. (8 marks)
- (c) How would you prevent unwanted e-mails from reaching your computer? (4 marks)

(4)

5) Answer all parts

(a) Explain, giving examples, the need for security in an Open System.

(6 marks)

(b) Describe the main features of private and public-key encryption techniques.

(10 marks)

(c) You have developed an computer application that requires a user to firstly set, and then enter this personal password to use the system. What mechanism would you incorporate in the application to allow recovery when the user's password has been forgotten or lost?

(4 marks)

END OF PAPER