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MAIN EXAMINATION

JANUARY – APRIL 2015 TRIMESTER

FACULTY OF SCIENCE

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

REGULAR PROGRAMME

DIT 009: INTRODUCTION TO COMPUTER NETWORKS

Date: April 2015	**Duration: 2 Hours**
INSTRUCTIONS: Answer Question ONE and ANY OTHER TWO Questions	

Q1. a) Define the following terms:

i) Computer network **(1 mark)**

ii) Communication protocol **(1 mark)**

iii) Topology **(1 mark)**

iv) Layering **(1 mark)**

v) Model **(1 mark)**

b) Briefly describe **FOUR** advantages and **FOUR** disadvantages of computer networks. **(8 marks)**

c) Describe the role of the following layers:

i) Application layer **(2 marks)**

ii) Transport layer **(2 marks)**

iii) Network layer **(2 marks)**

d) What are the **FOUR** considerations that need to be made when choosing a topology? **(4 marks)**

e) State an advantage of each of the following topologies.

i) Bus **(1 mark)**

ii) Star **(1 mark)**

iii) Ring **(1 mark)**

f) Describe **THREE** advantages of fiber optic cable over twisted pair and coaxial cables. **(3 marks)**

g) What is the advantage of a Local Area Network (LAN) over a point-to-point network? **(1 mark)**

Q2. a) Describe the following topologies..

i) Bus **(1 mark)**

ii) Star **(1 mark)**

iii) Ring **(1 mark)**

iv) Mesh **(1 mark)**

b) State the role of the following devices that are used to setup a network.

i) Network Interface Card (NIC) **(1 mark)**

ii) Repeater **(1 mark)**

iii) Hub **(1 mark)**

iv) Bridge **(1 mark)**

v) Router **(1 mark)**

vi) Switch **(1 mark)**

c) List any **THREE** wireless transmission waves. **(3 marks)**

d) A signal radiated from an antenna travels along one of the following three routes. Briefly describe them (use diagrams)

i) Group wave **(1 mark)**

ii) Sky wave **(1 mark)**

iii) Line-of-sight (LOS) **(1 mark)**

e) Describe the difference between coaxial cable and twisted wiring based on the following factors.

i) Cost **(1 mark)**

ii) Data rate **(1 mark)**

iii) Security **(1 mark)**

iv) Electromagnetic compatibility **(1 mark)**

Q3. a) Briefly describe the following types of locality of reference.

i) Spatial **(1 mark)**

ii) Temporal **(1 mark)**

b) Explain why locality of reference makes Local Area Network more effective**.** **(2 marks)**

c) Discuss the operations of the following LAN technologies:

i) Ethernet **(2 marks)**

ii) Token ring **(2 marks)**

iii) Fiber Distributed Data Interconnect (FDDI) **(2 marks)**

iv) Asynchronous Transfer Mode (ATM) **(2 marks)**

d) Domain name system (DNS) defines two types of servers. Briefly describe their roles:

i) Primary server **(1 mark)**

ii) Secondary server **(1 mark)**

e) What is an advantage of a hierarchical namespace over a flat name space for a system the size of the internet? **(1 mark)**

f) What is the purpose of the inverse domain? **(1 mark)**

g) Distinguish the following terms as used in the domain name system.

i) Recursive and iterative resolution **(2 marks)**

ii) Fully Quantified Domain Name and Partially Quantified Domain Name. **(2 marks)**

Q4. a) What is the fundamental difference between Wide Area Network (WAN) and Local Area Network (LAN)? **(2 marks)**

b) Identify and describe the **THREE** WAN connection types giving a technology used in each. **(9 marks)**

c) Describe **FOUR** cases where Time Division Multiplexing (TDM) can be used. **(4 marks)**

d) State **THREE** advantages of frame relay over X.25 and **TWO** advantages of frame relaying over TDM. **(5 marks)**

Q5. a) Briefly describe the following data transfer features that Transmission Control Protocol (TCP) provides:

i) Connection oriented **(2 marks)**

ii) Reliable **(2 marks)**

iii) Full duplex **(2 marks)**

iv) Byte stream **(2 marks)**

b) Describe the following mechanisms that TCP implements to meet reliability guarantees.

i) Sequency **(2 marks)**

ii) Flow control **(2 marks)**

iii) Retransmission and duplicate handling **(2 marks)**

c) List **TWO** applications that use User Datagram Protocol (UDP). **(2 marks)**

d) State **TWO** advantages of UDP over TCP. **(4 marks)**

END