Sample Paper

Introduction to Computer Systems (IT1020)

Duration: 2 Hours

Instruction to Candidates:

- This Paper contains 4 questions on 5 pages.
- This paper preceeded by a 10 minutes reading period. The supervisor will indicate when answering may commence.
- Each question carries equal marks.
- Answer ALL FOUR questions.
- The total marks obtainable for this examination is 100.
- This examination accounts for 50% of the module assessment.
- This is a closed book examination.

Part A-Computer Organization

Question 1 **(25 Marks)**

a) A Digital Logic Circuit (DLC) is needed to identify integers which are exactly divisible by 2 or 3. The circuit should have four binary inputs and one output F. If those binary integers are exactly divisible by 2 or 3, the circuit should output high (1) or else the output should low(0) .Consider decimal zero is divisible by 2 or 3.

   i. Construct the truth table for the above mentioned circuit.
   ii. State the Boolean expression for the output F in sum of product (SOP) form.
   iii. Draw a K-map to indicate the SOP that you have written as the answer to part ii.
   iv. Obtain the simplified answer for the K-map that you have stated in part iii.
   v. Draw a circuit diagram based on the simplified answer that you have written as the answer to iv.

b) Draw 2X5X2 PLA and indicate following expression on it. A'B'+A'B+AB

Question 2 **(25 Marks)**

a) Design the circuit diagram of 1-2 Decoder and write down the characteristic table of it.
b) Draw a block diagram of parallel adder to represent addition of two binary numbers.
c) Explain what an operating system is with aid of a diagram.
d) Explain different methods to achieve security related to an operating system.
e) Explain how data stored in accumulator can be transferred to a particular memory location, with aid of a diagram.
f) Briefly explain the instruction execution life cycle aid of a diagram.

Part B- Data Communication and Computer Networks

Question 3 **(25 Marks)**

a) Name the ISO-OSI seven-layers.

b) Describe the type of task is offered by the Data Link layer.

c) Briefly explain the processes at each layer when we send data from source computer to destination computer. Refer Figure 3.

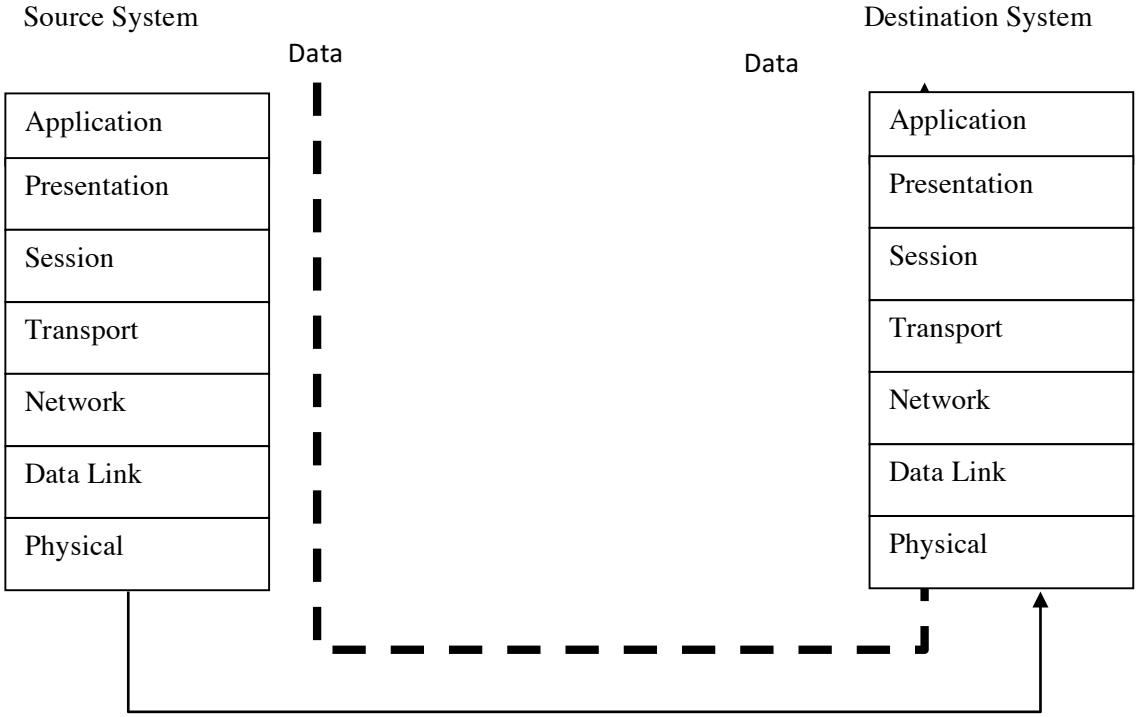

Figure 3

d) Find the class and Network ID in each of the IPv4 addresses given. Note that some addresses are given in binary and others in dotted decimal notation.

a. 10000001 00001011 00001011 1110111
b. 11000001 10000011 00011011 1111111
c. 14.3.2.1
d. 227.11.78.56

e) Given the network address 192.64.76.128/18, find the following.

a. Class
b. Network ID
c. Subnet Mask
d. 1st usable IP address
e. Last usable IP address
f. Broadcast Address

Question 4 **(25 Marks)**

a) Ethernet is the main weird communication standard defined by IEEE 802 standardization. Name the other two wired standards offered via IEEE 802?

b) Compare and contrast the following with respect to cable length and speed.
   a. Standard Ethernet
   b. 10 Gigabit Ethernet

c) Describe what is meant by Media Access Control.

d) Describe what is meant by Redundancy in a Small Network.

e) Name four categories of threats to Network Security.

f) Name and describe the "Triple A" related to keeping a network safe.

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