University	:	Menoufia		Date	:	21/01/2019
Faculty	:	Electronic Engineering		Time	:	3 Hour
Department	:	Electronics and Electrical Comm.		No. of pages	:	2
Academic level	:	3rd Year		Full Mark	:	70 Marks
Course Name	:	Digital Exchange (selected topic)		Exam	:	Final Exam
Course Code	:	ECE 315		Examiner	:	Dr: Saied M. Abd El-atty

Answer the following questions

Question 1: (16M=4/one)

a. What are the main elements of telecommunication switching system? Classify the types of switching (exchange) system.

b. According to you knowledge of PSTN draw the following:

1- PSTN structure with defining designation exchange.

2- Local network.

3- Call within the same Exchange and Calling Handoff

4- Tandem Central Office

5- International Network

c. A three stage switching structure is to accommodate 256×256. For 16 first stage and 16 last stage, determine the number of crosspoints for non-blocking. If the number of crosspoints is reduced by the factor of 3 with non-blocking what is the probability that a call will be blocked? Assume the utilization probability is 25%.

d. What are the forms of signaling? Classify the signaling techniques. State the drawbacks of the in-band signaling in PSTN.

Question 2: (20M=5/one)

a- Describe ISDN and identify its channels,

b- Explain VPN? How does it work?

c- What is meaning of xDSL? Discuss briefly the operation of ADSL

d- Discuss the main keys to differentiate routing algorithms.

e- Describe DS services and its data rate.

Question 3: (9M)

    a- Distinguish among switching techniques and draw the event timing diagram. (3M)

    b- A message with length **1500 byte** is transferred between the source and the destination through a switching network consists of **3 switches as shown below**. The data rate on all link is **256kbs** with packet size **1000 bit** and **20 bits** as a header. The set up time is **0.2s**, with processing time at each switch is **0.02s**, while the average queuing delay at each switch is **0.1s**. The propagation speed over any link is **200 m/μs** with **100km** distance between each two switches. (6M)

> Determine the end-to-end delay time for
>
> **1) Circuit switching**   **2) Datagram switching (pipelining)**
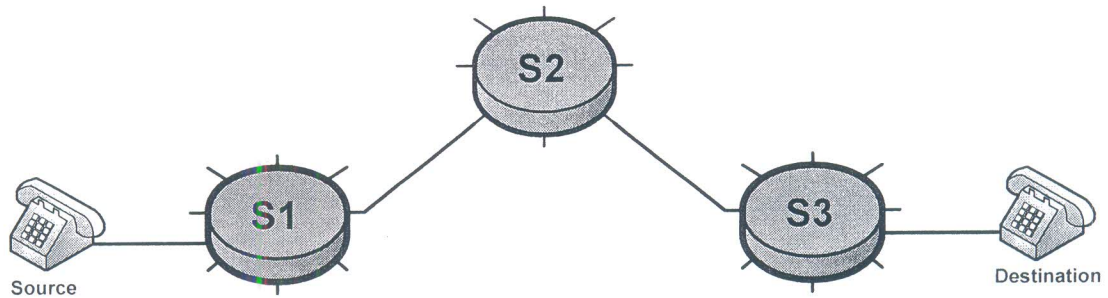
Question 4: Choose Five (5) points ONLY to answer (25M=5/one)

    a- What is IP Multimedia Subsystem (IMS)? Describe IMS architecture.

    b- What is the meaning of IMS Transit and IMS Convergences?

    c- Describe the IMS core network, state briefly the function of each element.

    d- Define SS7 signaling technique and state its merits. Draw a simplified SS7 network, indicating the types of links.

    e- Describe the Call Set Up procedure in PSTN-using SS7.

    f- Clarify with the help of figure the SS7 protocol stack layers. Explain Database Query in SS7 network.

    g- Discuss briefly the addressing and signaling units in SS7 network

Best wishes

Dr. Saied. M. Abd El-atty