ITS 323 – QUIZ 4(2) ANSWERS

First name: _____ Last name: _____

ID: _____ Total Marks: _____
out of 10

Question 1 [4 marks]

a) In packet switching networks, queuing delay is always larger than the other delay components (transmission, propagation, processing).

True **False**

b) Queuing delay may occur in packet switches if multiple input lines are sending to the same output line at the same time.

True False

c) Queuing delay in packet switches does not depend on the arrival rate of packets at a switch.

True **False**

d) Datagram packet switching uses headers; virtual circuit packet switching does not use headers.

True **False**

e) A virtual circuit packet switch may reserve resources for a connection during connection setup.

True False

f) In a virtual circuit packet switching network, the source and destination must transmit/receive at the same speed (or data rate).

True **False**

g) In routing, increasing the amount of information about the network that is available to nodes, will increase the accuracy of routing decisions.

True False

h) In routing, increasing the amount of information about the network that is available to nodes, will increase the overheads introduced into the network by routing protocols.

True False

i) In routing, increasing the amount of information about the network that is available to nodes, will decrease the overheads introduced into the network by routing protocols.

True **False**

j) With datagram packet switching, decreasing the packet size will result in larger delays because of the extra overhead of headers

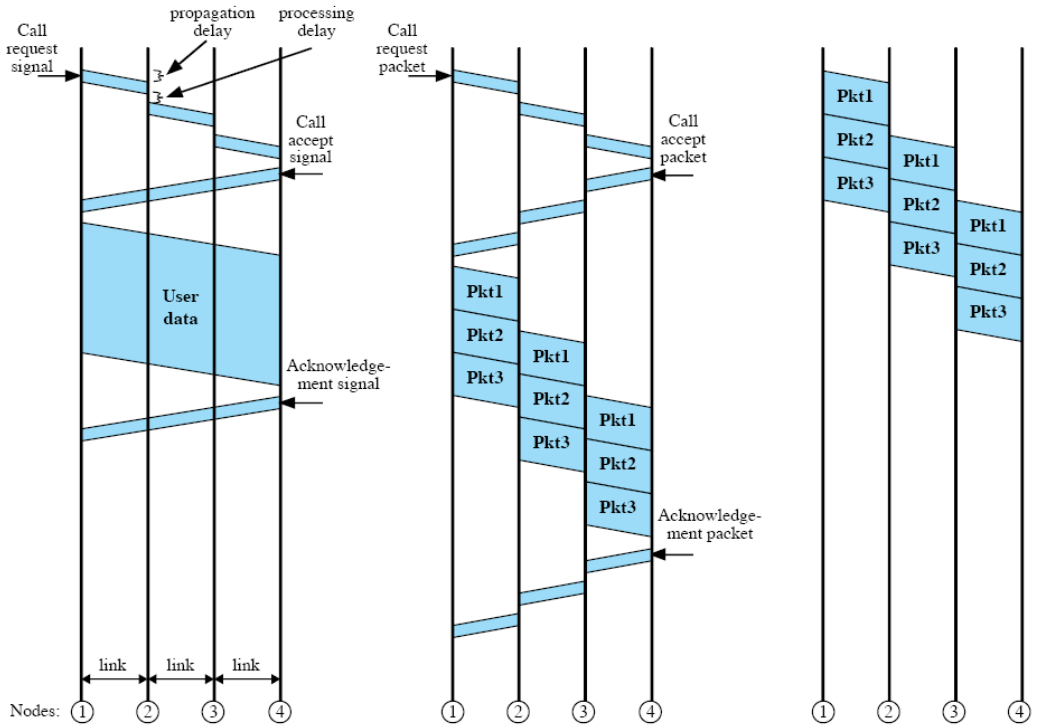
True **False**

k) With datagram packet switching, increasing the packet size will result in shorter delays because of the reduced overhead of headers

True **False**

Question 2 [4 marks]

Compare the delay in sending data using Circuit Switching versus Datagram Packet Switching as shown below.



You may assume:

- Number of links, **L** = 4/5/4
- Packet Switching:
  - Entire packet consists of Header and Data
  - Header transmission time, **H** = 2/1/1ms
  - Data transmission time, **D** = 10/15/10ms
  - Number of packets is **P** = 10
- Circuit Switching:
  - Time between sending call request signal until receiving call accept signal is **C** = 10/20/40ms.
  - Time between sending and receiving the call acknowledgment is **A** = 5/10/20ms.
- All other processing, propagation and queuing delays are 0.

a) What is the total delay for Datagram Packet Switching? [2 marks]

Answer

P packets, each takes H + D. To transmit from source takes: P x (H + D)

The last packet needs also be transmitted over the remaining (L-1) links: (L-1) x (H + D)

Total delay = P x (H +D) + (L-1) x (H + D)

P	*H (ms)*	*D (ms)*	*L*	*Delay (ms)*
10	2	10	4	156
10	1	15	5	224
10	1	10	4	143

b) What is the total delay for Circuit Switching (assuming same amount of data to be sent as in Datagram Packet Switching above)? [2 marks]

Answer

Call request and accept: C

Data transfer: P x D

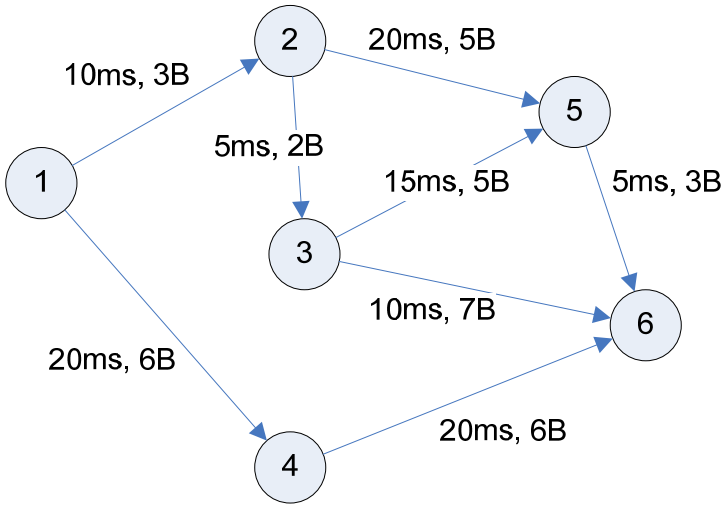
Call ack: A

Total delay = C + P x D + A

P	*D (ms)*	*C (ms)*	*A (ms)*	*Delay (ms)*
10	10	10	5	115
10	15	20	10	180
10	10	40	20	160

Question 3 [2 marks]

Consider the network below.



The delay (in milliseconds) and price (in Baht per MB) of each simplex link is shown. If a routing algorithm chose a path from 1 to 6 to be 1 – 2 – 5 – 6 / 1 – 2 – 3 – 6 / 1 – 4 – 6 then what metric was used by the least cost routing algorithm (select no more than one answer):

i. Hops

ii. Delay

iii. Price

Answer

The metric will be the one that gives the least cost over a path. The path cost for each metric (and each path) is shown in the table below.

Path	*Hops*	*Delay*	*Price*	*Metric*
1-2-5-6	3	35	**11**	Price
1-2-3-5-6	4	35	13	-
1-2-3-6	3	**25**	12	Delay
1-4-6	**2**	40	12	Hops