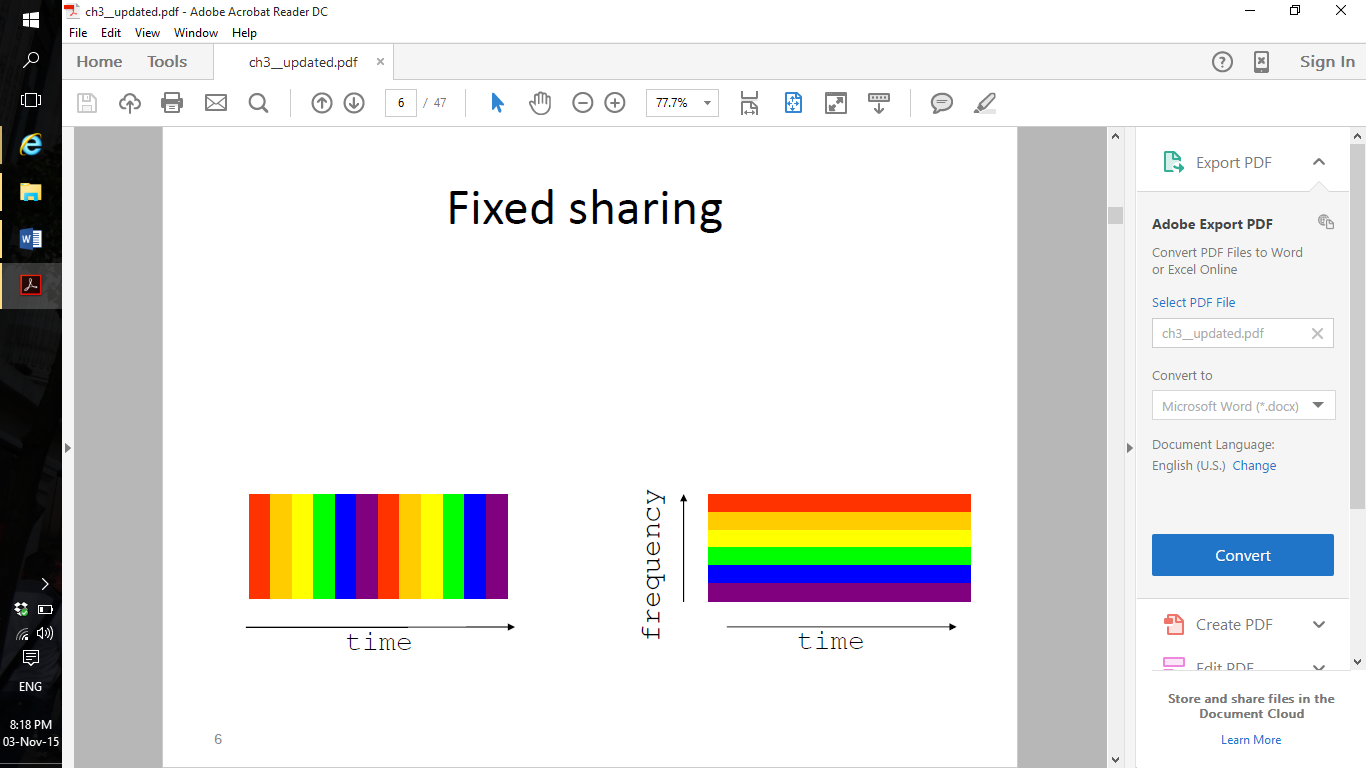
**Question 1: (10 marks)**

Choose the correct choice:

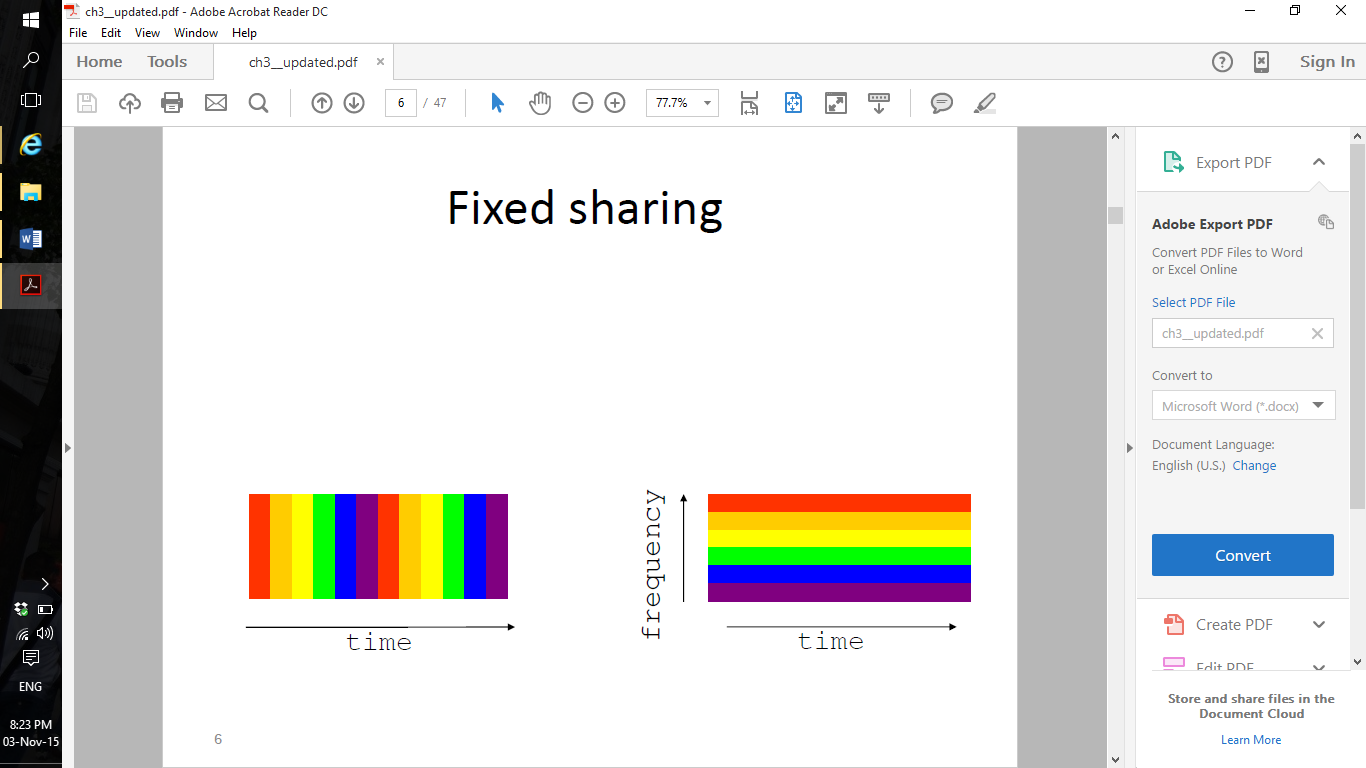
1. Which of Store-and-Forward Implementation Techniques is best to be used to transmit multimedia data :
   * Message Switching
   * Packet Switching
   * Frame Relay
   * Cell Relay
2. In Store-and-Forward Implementation after processing what will happen to the message:
   * storage
   * waiting
   * Transmission
   * Propagation
3. Mobile telephone networks can serve large number of subscribers at the same time as long as calls are:
   1. Rejected as needed
   2. Timed division multiplexed
   3. Geographically isolated
   4. No congestion in the network.
4. Representing data with continuously varying electromagnetic waves is :
   * Digital signal
   * FDM
   * Dynamic multiplexing
   * Analog signal
5. Integrating multiple signals into a signal transmitted over a shared medium TDM
   * FDM
   * Multiplexing
   * Circuit switching
   * Propagating
6. Based on the below figure , this is:

* TDM



* FDM
* Multiplexing.
* Network bandwidth.

1. Based on the below figure , this is:



* + TDM
  + FDM
  + Multiplexing
  + Network bandwidth.

1. High-speed network transmits data efficiently using:
   * ATM and FDM.
   * Stub Network and Store-and-forward.
   * Store-and-forward and cell relay.
   * Cell relay and frame relay.
2. (Delay Time – Rejected Calls)

Which is used to measure the performance in store and forward networks and which is used to measure circuit switching network?

Delay Time - store and forward , Rejected Calls circuit switching network

**Question2**: (3 mark)

In store and forward networks, Request rate is calculated by using the equation:

Request rete: R [messages / time unit]

In circuit switching networks, Call duration is calculated by using the equation:

Call duration: D = [time unit /call ]

**Question3:** (6 mark)

If we have 8 connection each 2Kbps are multiplexed together. A unit is 1 byte

* the duration of 1 bit before multiplexing

duration of 1 bit = 1 / 2000 = 0.0005 sec

* the transmission rate of the link

16 kbps

* the duration of a time slot

1 byte / 8 = 1 sec

* the duration of a frame

1 second \* 8 = 8 second

**Question 4:** (3 mark)

A network uses FDM, if the total frequency of the medium is 18 KHz, and if each of the sub-channel will use 6 KHz, how many channels and devices can share this medium?

F = N . f  
N = F/f

18 k / 6 k = 3 channels

**Question5:** (3 marks)

If we have eight channels, each with a 200-KHz bandwidth, are to be multiplexed together. What is the minimum bandwidth of the link if there is a need for a guard band of 5 KHz between the channels to prevent interference?

(8\*200) + (7\*5) = 1600+35 = 1635 kHz