

## ITS323 – Quiz 4

Name: \_\_\_\_\_

ID: \_\_\_\_\_

Mark: \_\_\_\_\_ (out of 10)

### Question 1 [2 marks]

Assume an analog transmission system is used for transmitting voice calls from SIIT Bangkadi to SIIT Rangsit over a single link. Each voice call from a user is sent with centre frequency of 10kHz and has a bandwidth of 5kHz. What is the minimum bandwidth required for the Bangkadi-Rangsit link to support a maximum of 20 voice calls when using FDM? [2 marks]

### Question 2 [2 marks]

Explain an disadvantage of Synchronous TDM (compared to Statistical TDM). [2 marks]

### Question 3 [6 marks]

Consider a link between A and B that has a one-way propagation delay of 15ms. Stop-and-Wait ARQ is used as the error control protocol over the link. Each frame with data has a transmission time of 5ms. Acknowledgements have a transmission time of 1ms. Assume all processing and queueing delays are 0.

- a) Which of the following values is appropriate for a timeout interval? (circle only one answer) Explain why. (You will only receive marks if the explanation is correct) [2 marks]

10ms 15ms 20ms 30ms 40ms 50ms 120ms

Explanation:

- b) The source A has 2 original data frames to send to destination B. Source starts transmitting the 1<sup>st</sup> frame at time 0. Unfortunately the 2<sup>nd</sup> data frame sent is lost before reaching destination B. There are no other errors. Assuming the values above (including your selected timeout interval), calculate the time when the 2<sup>nd</sup> original data frame has been fully (and successfully) received by the destination B. (You must show calculations) [4 marks]