First Name :…… Last Name: …… G:…….

A TDM system multiplexes **16 sources**:

- Each source transmits at **64 Kbps** , Each frame contains **1 byte per source**
- Additional overhead includes:
  - **2 bytes for synchronization** , **2 bytes for control**

1. Calculate the **size of one frame in bits**

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2. Calculate the **total data rate of the link**

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3. Calculate the **frame rate (frames per second)**

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4.Calculate the **system efficiency (%)**

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Correction

Number of sources: 16
Rate per source: 64 Kbps
Data per source per frame: 1 byte
Overhead: 2 bytes sync + 2 bytes control

1. Calculate the size of one frame in bits. [1.5 pts]

Data: 16 × 1 byte = 16 bytes
Overhead: 2 + 2 = 4 bytes
Total frame size = 20 bytes
20 × 8 = 160 bits

Answer: 160 bits

2. Calculate the total data rate of the link. [1.5 pts]

Frame carries 1 byte = 8 bits per source
Frame rate = 64,000 / 8 = 8000 frames/s

Link rate = 160 × 8000 = 1,280,000 bps

Answer: 1.28 Mbps

3. Calculate the frame rate (frames per second). [1.5 pts]

Frame rate = 64,000 / 8
= 8000 frames/s

Answer: 8000 frames/s

4. Calculate the system efficiency (%). [1.5 pts]

Useful data = 16 × 8 = 128 bits
Total frame = 160 bits

Efficiency = (128 / 160) × 100 = 80%

Answer: 80%