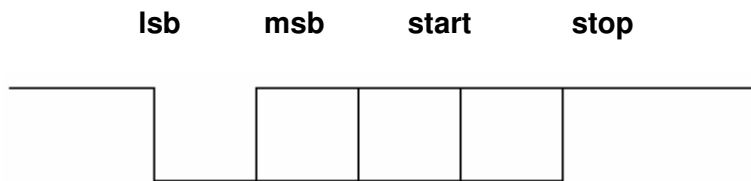


1 Link each **term** to its **meaning** for an asynchronous transmission system.

term	meaning
stop bit	brief logic 0
start bit	steady logic 1
packet	can happen at any time
serial data	bits sent one after the other
asynchronous	data framed by start and stop bits

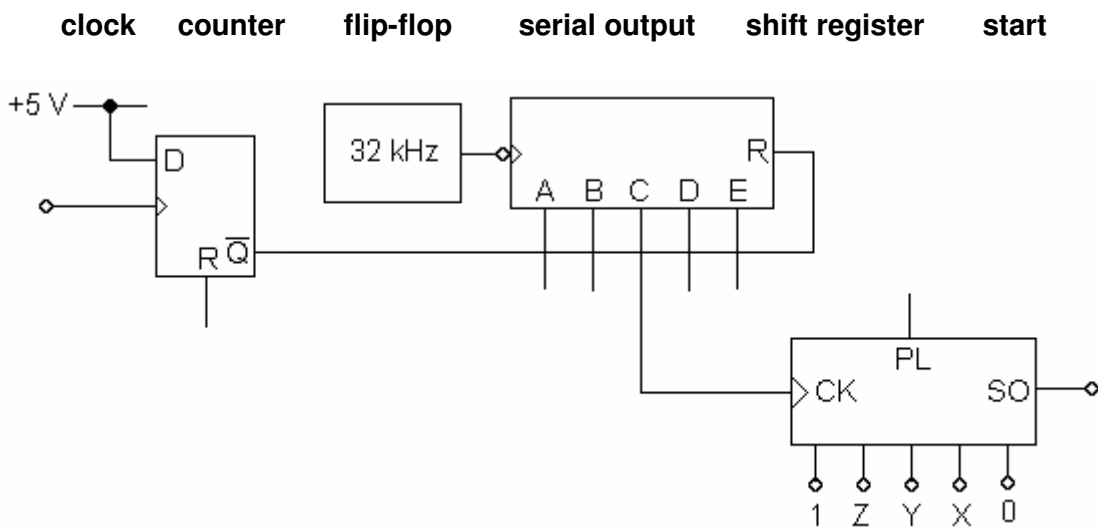
2 Add these labels to the timing diagram for the asynchronous transmission of a word XYZ.



3 Do calculations to complete this table for asynchronous transmission of an analogue signal.

data	sample rate	maximum frequency	bit rate	bandwidth
8 bits		3.4 kHz	$6\,800\text{ s}^{-1}$	
	40 kHz		$560\,000\text{ s}^{-1}$	
6 bits		16 kHz		
	36 kHz			324 kHz

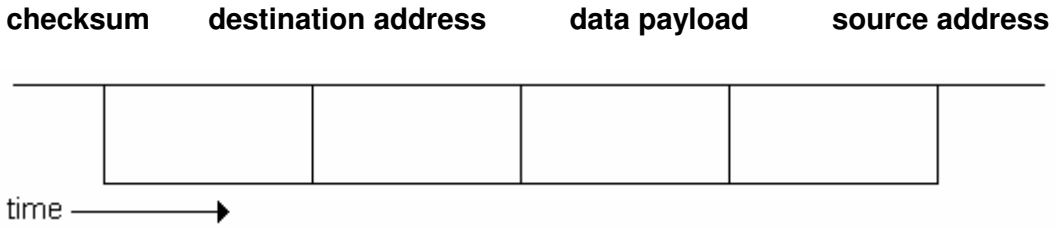
4 Add these labels to the incomplete asynchronous transmitter circuit.



5 Add a NOR gate and an AND gate to complete the circuit above.



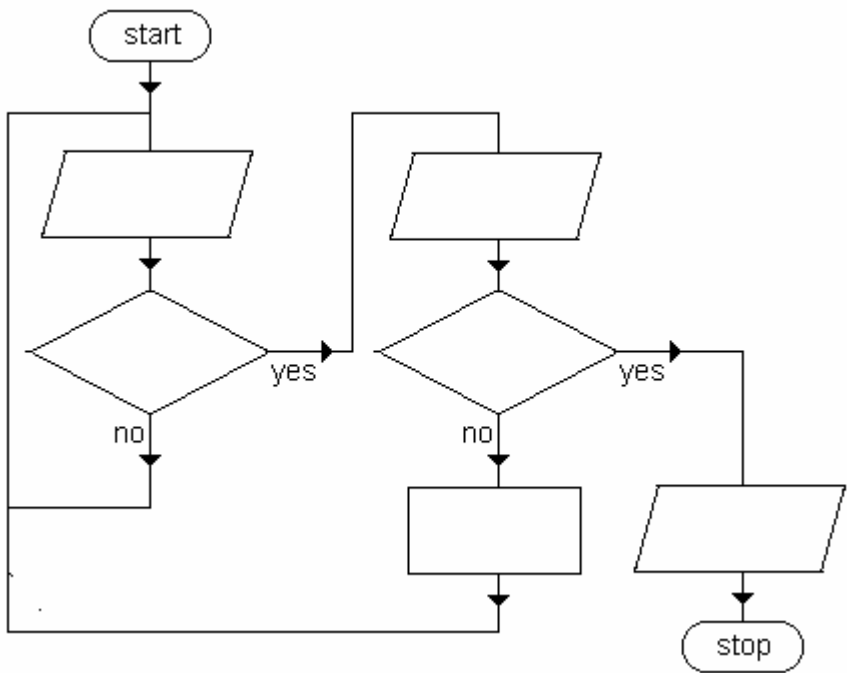
11 Complete this timing diagram for a packet on an ethernet cable. Choose from these blocks.



12 Link each **part** of a packet with its **function**.

part	function
checksum	a series of bits carrying information
data payload	word indicating which receiver accepts the data
source address	allows the receiver to detect errors in transmission
destination address	allows the receiver to identify the packet transmitter

13 Complete the flowchart for a transmitter when it places a packet on the cable.



Choose from these words.

- sample the cable
- cable quiet for 10µs
- wait for random time
- start transmitting packet
- finish transmitting packet
- is packet on cable correct

14 Complete the calculation for an ethernet system. Use these numbers.

**24      640      800      1500      9600**

The bandwidth of the cable is 400 kHz, so the bit rate is \_\_\_\_\_ kbits s<sup>-1</sup>. The packet length is 512 bits, so its transmission time is \_\_\_\_\_ µs. The maximum packet rate is therefore \_\_\_\_\_ s<sup>-1</sup>. The cable connects 64 computers. If they all transmit packets at the same rate, each transmits \_\_\_\_\_ packets s<sup>-1</sup>. The data payload is 400 bits, so the data transmission rate for each computer in this situation is only \_\_\_\_\_ bits s<sup>-1</sup>