Branch : CSE & IT Batch : Hinglish

Computer Network

Flow Control

DPP 01

[MCQ]

1. Which of the following is/are the true statement (s) about the type of acknowledgement in stop & wait protocol?

(a) It supports cumulative acknowledgement
(b) It supports Individual acknowledgement
(c) It supports cumulative as well as individual acknowledgement
(d) None of the above

[MCQ]

2. If the bandwidth of the line is 100 mbps, RTT is 50 usec and frame size is 50 bits the find out the link utilization in stop & wait.

(a) 2% (b) 4%
(c) 10% (d) 1%

[NAT]

3. In stop & wait protocol, sender wants to transmit 15 data packets to the receiver. Out of these 15 packets, every 5^{th} data packet is last calculate the total number of packets sent by sender.

[NAT]

4. A stop & wait ARQ protocol in used by the sender to send frames in a dependable manner. The frames are transmitted at 100 kbps rate and have a 1000 byte size. The size of acknowledgement is 10 bytes and receiver receives it at 10 kbps transmission rate. The propagation delay in one direction is 50 m sec. delay in one direction is 50 m sec. calculate the sender throughput in bytes/sec (to the closet integer) Assume that number frame is being lost.

[MCQ]

5. Assume that in stop and wait protocol the probability of frame being lost is N then what will be mean number of transmission of a frame?

(a) $\frac{1}{N}$ (b) $\frac{1}{1-N}$
(c) $\frac{1}{N-1}$ (d) N

[MCQ]

6. Stop and wait protocol is used for transmitting data between two devices over a communication channel. It is a simple protocol consider the following statements about stop and wait protocol.

S1 : Stop and wait protocol offers the flow control.
S2 : Sender and receiver window size is 1.
S3 : Sender and receiver window size is N.
S4 : Stop and wait protocol is half duplex.

Which of the following statement (s) is/are true?

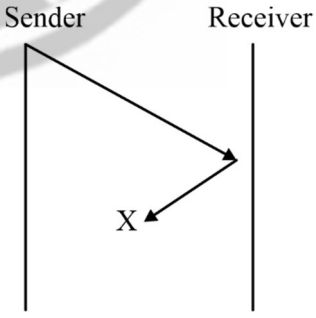
(a) S1, S3 (b) S1, S2, S3, S4
(c) S1, S2 S4 (d) S2, S3, S4

[NAT]

7. The bit rate of a channel is 8 kbps, and one-way propagation delay is 40 msec. The protocol used for the channel is stop and wait. The acknowledgement frame transmission time is negligible. The minimum frame size needed to achieve channel efficiency of at least 50% is _____bytes.

[MCQ]

8. Consider the following diagram:



Among the problems is stop and wait protocol. Which of the following problems represented by the give diagram.

(a) Lost data
(b) Lost acknowledgement
(c) Delayed acknowledgement
(d) Delayed data

Answer Key

1. **(b)**
2. **(d)**
3. **(18)**
4. **(1101)**
5. **(b)**
6. **(c)**
7. **(80)**
8. **(b)**

Hints & Solutions

1. (b)

Stop & wait supports only individual acknowledgement

2. (d)

Bandwidth = 100 mbps
RTT = 50 μsec.
Frame size = 50 bits
Bandwidth = 100 mbps
$\because$ In 1 sec. $\rightarrow 10^8$ bits
$\therefore$ 50 μsec $\rightarrow 50\times10^{-6} \times 10^8$ bits
Number of bits in 1 RTT = 5000 bits

$$\text{Number of frames in 1RTT} = \frac{5000}{50} = 100$$

$$\text{Link utilization in stop \& wait} = \frac{1}{100}\times 100 = 1\%$$

3. (18)

The packets will be sent as-

1 2 3 4 [5] 5 6 7 8 [9] 9 10
Lost Lost

11 12 [13] 13 14 15
Lost

The lost packets are – 5, 9 and 13
The total number of packets those will be by sent the sender are = 15 + 3 = 18

4. (1101)

Given:
Transmission rate at sender side = 10 kbps
Frame size = 1000 bytes
Ack size = 10 bytes
Transmission rate at receiver side = 10 kbps
Ony-way propagation delay = 50 msec.

$$\text{Transmission time } (t_{frame}) = \frac{1000 \text{ bytes}}{10\times10^3 \text{ bits/sec.}} = \frac{1000 \times 8 \text{ bits}}{10\times10^3 \text{ bits/sec.}} = 800 \text{ msec.}$$

$$\text{Transmission time}(t_{ack}) = \frac{10 \text{ bytes}}{10 \text{ k bits /sec}} = \frac{10\times8 \text{ bits}}{10\times10^3 \text{ bits /sec}} = 8\times10^{-3} \text{ sec.} = 8 \text{ msec.}$$

Total cycle time $= t_{frame} + t_{ack} + 2\times$ Propagation time
$= 800 + 8 + 2 \times 50$
$= 808 + 100$
$= 908$ msec.

$$\text{Sender throughput} = \frac{\text{Frame size}}{\text{Totol cycle time}} = \frac{1000 \text{ bytes}}{908 \text{ msec.}}$$
$= 1.10132\times10^3$ bytes/sec.
$= 1101.32$ bytes/sec.

5. (b)

The mean number of transmissions of a frame will be $\frac{1}{1-N}$ if the probability of frame being lost is N.

6. (c)

Stop and wait protocol offers the flow control and the sender and receiver window size is 1 stop and wait protocol is half duplex.

7. (80)

Given
Bandwidth = 8Kbps
Propagation delay (tp) = 40 msec.
Efficiency $\geq$ 50%

$$\text{Efficiency} \geq \frac{1}{2}$$

$$\frac{t_{frame}}{t_{frame} + 2\times tp} \geq \frac{1}{2} \left(t_{frame} = \text{transmission time of frame}\right)$$

$$\frac{1}{1 + 2\times\frac{tp}{t_{frame}}} \geq \frac{1}{2}$$

$$2 \geq 1 + 2\times\frac{tp}{t_{frame}}$$

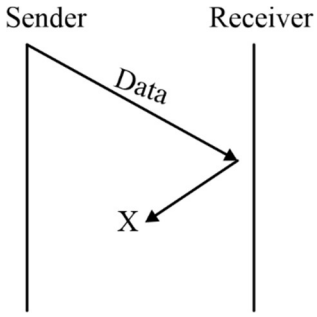
$$\frac{2\times tp}{t_{frame}} \leq 1$$

$$t_{frame} \geq 2\times tp$$

$$\frac{L \text{ bits}}{\text{Bandwidth}} \geq 2\times tp$$

L bits $\geq 2 \times tp \times$ bandwidth
$\geq 2 \times 40 \times 10^{-3}$ sec. $\times 8 \times 10^3$ bits /sec.
L $\geq 2 \times 40 \times 8$ bits
L ≥ 80 bytes

8. (b)



Sender is waiting for acknowledgement that is being lost. Sender will keep on waiting for the acknowledgement.