BHCA $\Rightarrow$ no. of calls in 1 hour

x calls = 1 hour

1 call = $\frac{1 \text{ hour}}{x}$ $\Rightarrow$ Call Processing Time

t_p $\Rightarrow$ time taken to process 1 call

x time = 1 call

1 hour = $\frac{1 \text{ hour}}{x}$ $\Rightarrow$ no. of calls

Tute-1- Harr

① $\boxed{CCR =}$ Call completion Rate $= \boxed{\dfrac{\text{no. of succesfull calls}}{\text{total calls}}} = \dfrac{\text{sufcesful traffic}}{\text{total traffic}}$

② $\boxed{BHCA =}$ call attempts in busy hours (1hr by default)

③ $\boxed{BHCR}$ Busy Hours Calling Rate = no. of succesfull calls made by each sub $= \boxed{\dfrac{\text{no. of succesfull calls}}{\text{subscribers}}}$

④ $\boxed{\text{Traffic} = \dfrac{\text{occupied/busy time of server}}{\text{total time}}}$

⑤ Harr :

(i) $\boxed{BHCA = \dfrac{1\,hr}{t_p}} \Rightarrow \boxed{t_p = \dfrac{1\,hour}{BHCA}}$

(ii) $\boxed{BHCA = \dfrac{BHCR \times Subs}{CCR}}$

(iii) ~~OCR~~ offered / total traffic $= \dfrac{\text{no. of call} \times \text{call duration}}{\text{observation time}}$

$= \text{call rate} \times \text{call duration}$

unit $\Rightarrow$ E

(iv) $\boxed{GOS = \dfrac{\text{loss trafic}}{\text{offered trafic}} = \dfrac{\text{loss}}{\text{offer}}}$ $\Rightarrow$ probability of loss

1. Sequential Write/Random Read: X x Y —> Consider X for Adress Lines and Data Memory. For Control Memory, consider Y
2. Sequential Read/Random Write: X x Y —> Consider Y for Address Lines and Data Memory. Control Memory, consider X
3. Diagram: given x....y —> inlets.....outlets

If Read —> first wale bahar

If Write —> second wale bahar

Edited 8:45 AM

TELECOMMUNICATION NETWORKS

MODERATE ASSIGNMENT

NAME : ANUNAY DWIVEDI

ROLL : 9922102048

BATCH : E2

① Total no. of subscriber = 1000

Peak hour = 40 % of 1000

= 400

External Traffic = $\frac{400}{5} = 80$

② $SAR = \frac{\sqrt{N}}{3}$

(a) $N = 228$, $SAR = \frac{\sqrt{228}}{3} = 3.72$

(b) $N = 32768$, $SAR = \frac{\sqrt{32768}}{3} = 60.34$

③ $M = N = 512$, $p = q = 16$, $\alpha = 0.7$

$\cancel{p = \frac{\alpha}{s(1-\ldots}}$ $P_B = \frac{(M-s)(N-s)\alpha}{MN}$

(a) $s = 16 \Rightarrow P_B = \frac{172262}{262144} = 0.657$

(b) $s = 24 \Rightarrow P_B = \frac{166366}{262144} = 0.635$

(c) $s = 31$, $P_B = \frac{161211}{262144} = 0.615$

Error $= \frac{0.615 - 0.61}{0.61} \times 100 = 0.82\%$

④ Inlet utilization = 0.1

$P_B = 0.002 = \frac{(M-S)(N-S)\alpha}{MN}$

$S = N - \sqrt{N \ln(2/P_B)}$

(a) $N = 128$

$S = 128 - \sqrt{128 \ln(500)}$

$= 100$

(b) $N = 2048$

$S = 2048 - \sqrt{2048 \ln(500)}$

$= 1935$

(c) $N = 8192$

$S = 8192 - \sqrt{8192 \ln(500)}$

$= 7967$

Tute - 3 - 4 - Hark

① Binary encoding : (i) Dataword
(ii) Divisor
(iii) Aug. dataword = Dataword + (no. of divisor bits - 1) 0's
(iv) Divide
(v) error ⇒ make any "1" to "0"

② Polynomial encoding : (i) dataword
(ii) divisor
(iii) Aug dataword = dataword × (divisor's max power term)
(iv) Divide
(v) error ⇒ add any term a/c'ly

③ Flag : 0 111 1110 ⇒ zero triple one triple one zero

④ Bit Stuffing : add '0' after consecutive '1' that appears 5 times
↳ add flag before & after the final code

⑤ $\boxed{\text{Transmission Time} = \frac{\text{Frame Size}}{\text{Frame Rate}} = \frac{L}{R}}$ → bits, → kbps = msec

⑥ $\boxed{\text{Total Time} = \text{Transmission Time} + 2(\text{Propagation Time})}$ unit msec

⑦ $\boxed{\text{Data Link Utilization} = \frac{T_{frame}}{T_{frame} + 2T_p} = \frac{\frac{L}{R}}{\frac{L}{R} + 2T_p}}$
U ⇒

⑧ $\boxed{U\ (\text{w/o error}) = \frac{1}{1+2A}}$ where $\boxed{A = \frac{t_p}{t_f}}$

⑨ If "w" is given ⇒ $\boxed{U = \frac{W}{1+2A}}$ unit %

⑩ If error "p" is given ⇒ $\boxed{U = \frac{1-P}{1+2A}}$ unit %

⑪ if "w" is given ⇒ $\boxed{U = \frac{W(1-P)}{1+2A}}$ unit %

7. Lecture_OSI Mode ×
8. Lecture_Data Link ×
9. Lecture_Data Link ×
10. Lecture_performa ×
Telecomms ×
+

chatgpt.com/c/67adfdf7-4914-800d-9d84-aea8bb7e8a15

A Finish update

ChatGPT

Explore GPTs

Today

Telecomms

Internship Form Help

Yesterday

DHD

Previous 7 Days

Literature

Photovoltaic

VLSI

GitHub

Upgrade plan
More access to the best models

ChatGPT

Share A

🌟 Key Difference:

Feature	Stop-and-Wait	Sliding Window
Frames sent at a time	1 frame at a time	Multiple frames at a time
Efficiency	Low	High
Waiting time	Idle time while waiting for ACK	Continuous frame transmission
Ideal for	Small-distance networks	Long-distance, high-speed networks

Ask anything

+ Search Reason ...

ChatGPT can make mistakes. Check important info.

?

POSSESION OF MOBILES IN EXAM IS UFM PRACTICE

Name Anuray Dwivedi   Enrollment No. 9922102048

Jaypee Institute of Information Technology, Noida
Test-2 Examination, 2025
B.Tech. VI Semester

Course Title: Telecommunication Networks | **Maximum Time: 1 Hr**
Course Code: 15B11EC611 | **Maximum Marks: 20**

CO1	**To understand the basic concepts of Telecommunication network model, Traffic engineering and switching technology. Also, to understand various mechanisms involved in OSI model, TCP/IP and LAN access protocols, ATM and ISDN.**	**Understanding Level (C2)**
CO2	**To apply the concepts of traffic engineering, switching technologies and various network protocols for serving network related problems.**	**Applying Level (C3)**
CO3	**To analyze the link utilization and data packet generated after incorporation of data link error control and flow control mechanisms.**	**Analyzing Level (C4)**
CO4	**To apply the concept of subnetting for creating and assigning address blocks in a network. Applying various routing algorithms to create routing table for communication between two nodes.**	**Evaluating Level (C5)**

NOTE – Attempt all the questions.

Q.1. (a) Derive the utilization factor for Stop-and-Wait ARQ. Demonstrate it with diagram. **[3]**
[CO4 - Analyzing Level]

(b) A channel has a data rate of 3 Kbps and propagation delay of 10 msec. For what range of frame sizes does Stop-and-Wait give an efficiency of at least 70%. **[3]** [CO4 - Analyzing Level]

Q.2. Explain the methods of flow control with appropriate diagrams. **[3]** [CO4 - Analyzing Level]

Q.3. The following character encoding is used in a data link protocol:

A : 01100111

B : 11100010

FLAG : 01111110

ESC : 11100001

Show the bit sequence transmitted (in binary after bit stuffing for the four characters frame:A B ESC FLAG. **[3]**
[CO4 - Analyzing Level]

Q.4. Given the data word 1010111011 and the divisor 1001:

(a) Show the generation of the code word at the sender's side.

(b) Show how to determine an error at the receiver's side (if error is introduced in the 2nd bit from LSB of the transmitted code). **[2.5 + 2.5]** [CO4 - Analyzing Level]

Q.5. State differences between Virtual circuits and Datagram networks. **[3]** [CO3 - Applying Level]

Date ....

Tute-5-Max

$s = \frac{d}{t} \Rightarrow t = \frac{d}{s}$

① General Shiz:

(i) N = no. of stations

(ii) Frame Size = ~~no of frames~~ no. of bits in one frame

(iii) Frame Rate = no. of frames/sec being sent

(iv) Bandwidth = kbps or Mbps = speed of data transfer

(v) Throughput = successfully delivered kbps

(vi) Frame time = Time taken for frames to be sent in sec or μsec

(vii) G = Channel Load

② Pure ALOHA:

$$\boxed{S_{max} = 18.4\% = 0.184 = Ge^{-2G}}$$ = Throughput

③ Slotted ALOHA:

$$\boxed{S_{max} = 36.8\% = 0.368 = Ge^{-G}}$$ =

④ $$\boxed{\text{Data speed} = \frac{\text{frame size}}{\text{frame time}}}$$

⑤ $$\boxed{\text{Load} = G = \text{frame rate} \times \text{time for one frame}}$$ → $\left(\frac{\text{frame size}}{\text{bandwidth}}\right)$

⑥ $$\boxed{\text{Amount of frames transferred} = \underbrace{S}_{\text{throughput}} \times \text{frame rate}}$$

Date ....

Tute-5

① Given: N stations, bandwidth = 5 kbps, pure = 18.6% = 0.186

frame size = 1000 bit every 100 sec

To find: N

Sol^n: 1 frame every 100 sec from 1 station

amount of data = $\frac{1000}{100}$ = 10 bps —— ①

from all frames

pure ALOHA = 0.186

Speed = 5 × 0.186

$$\boxed{N = \frac{5 \times 0.186}{10} = 1030}$$

② Given: N = 10000, Slotted = 36.8% To find: G = channel Load

One station = 18 req / hour

time = 125 usec / slot

Sol^n: Amount of req = $10000 \times \frac{18}{60 \times 60}$ = 50 req / sec —— ①

$$\boxed{\text{Load} = 125 \times 10^{-6} \times 50 = 0.625\ \%}$$

③ Given: Slotted ALOHA = Smax = 36.8%, frame size = 200 bit

bandwidth = 200 kbps

Sol^n:

$$\boxed{S = G e^{-G}}$$ where: G = load

(a) $\boxed{G = \text{frame rate} \times \text{time}}$ = 1000×10^{-3} = 1

$\boxed{S = e^{-1} = 0.367}$ = 36.7%

$\boxed{\text{amount of frames} = S \times 1000 = 368}$

(b) $G = 500 \times 10^{-3}$

$S = 0.5 e^{-0.5} = 0.303 = 30.3\%$

$\boxed{\text{amount} = 0.303 \times 500 = 152}$

(c) $G = 250 \times 10^{-3} = 0.25$

$S = 0.25 e^{-0.25} = 0.19$

$\boxed{\text{amt} = 0.19 \times 250 = 49}$

④ N = 100, ban = 1 Mbps, fs = 1000

fr = 10 f / sec

$\boxed{S = G e^{-G}}$

$G = 10 \times 10^{-3} \times 100 = 1$

$\boxed{S = e^{-2} = 13.53\%}$

Spiral

Telecoms T3

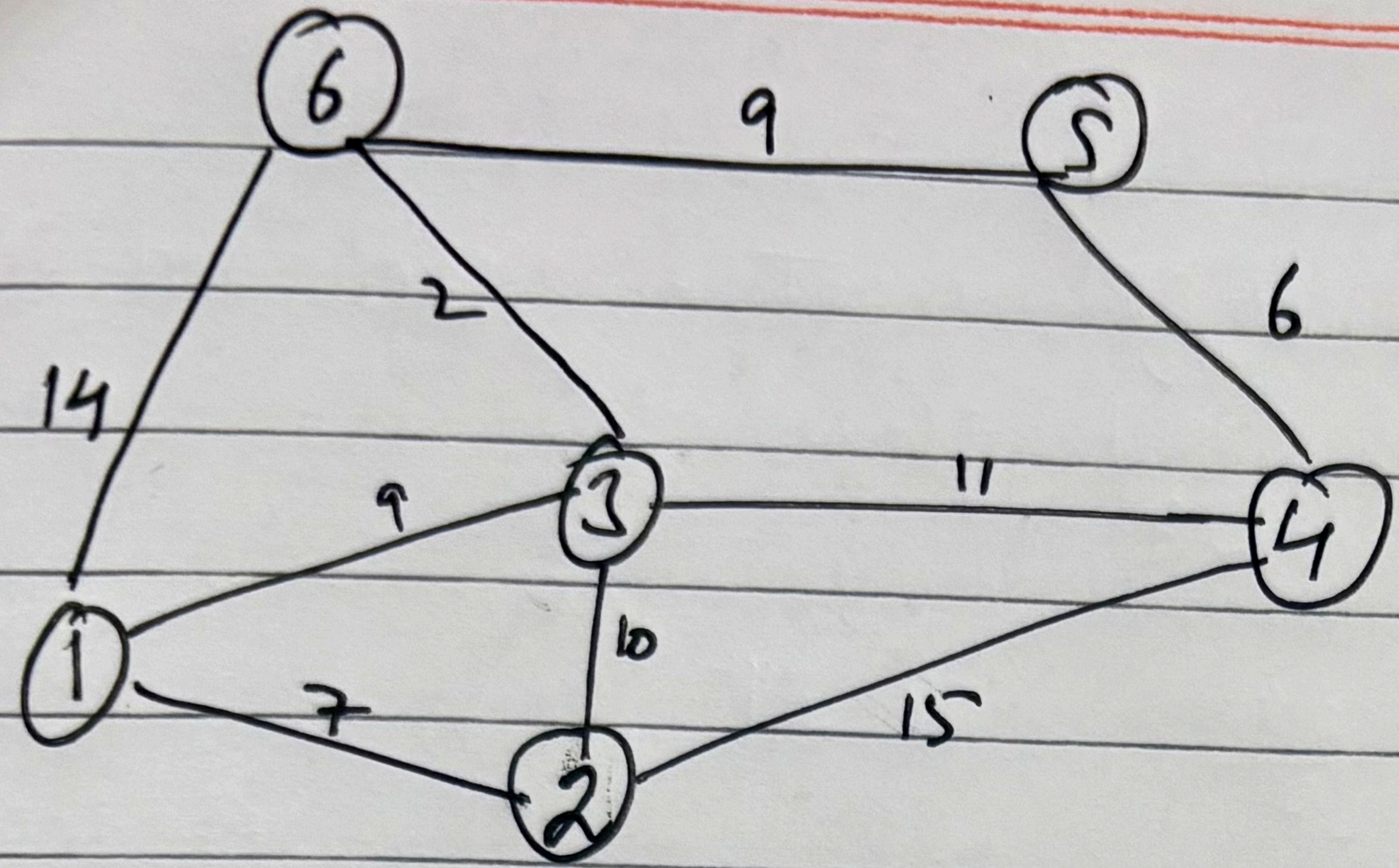
1. T1 ⇒ 5 marks (switching, ARQ) only theory
2. T2 ⇒ 5 marks (
3. T3 ⇒ IPv4, IPv6, routing algo, ALOHA and all
   ↳ CSMA, congestion

   TCP, Quality of Service (3 marks) → not told but in syllabus

   logical addressing

4. Tute: 4, 5, 6 ⇒ numericals

2



(i) Select root node
(ii) Calculate all direct distances
(iii) Select min and don't chage it
(iv) Look through all possible paths

Source (1)	2	3	4	5	6
	∞	∞	∞	∞	∞
	7	9	∞	∞	14
1,2	7	9	22	∞	14
1,2,3	7	9	20	∞	11
1,2,3,6	7	9	20	23	11
1,2,3,6,4	7	9	20	20	11