

มหาวิทยาลัยสงขลานครินทร์

คณะวิศวกรรมศาสตร์



สอบกลางภาค: ภาคการศึกษาที่ 1	ปีการศึกษา: 2556
วันที่สอบ: 4 สิงหาคม 2556	เวลาสอบ: 13.30 – 15.30 (120 นาที)
รหัสวิชา: 241-462	ห้องสอบ: S817
ชื่อวิชา: Broadband Integrated Networks	อาจารย์ผู้สอน: รศ. ดร. สิ้นชัย กมลภิวังศ์ ดร. วโรคม วีระพันธ์

อ่านรายละเอียดของข้อสอบ และคำสั่งให้เข้าใจก่อนเริ่มทำข้อสอบ

ไม่อนุญาต : - หนังสือและสมุดโน้ต
- เครื่องคิดเลข

อนุญาต : - เครื่องเขียนต่าง ๆ เช่น ปากกา หรือดินสอ

เวลา : 2 ชั่วโมง (120 นาที)

รายละเอียดของข้อสอบ : ข้อสอบมีทั้งหมด 19 หน้า (รวมปก)

คำสั่ง :

- ข้อสอบมีทั้งหมด 19 หน้า ให้ทำทุกข้อ
- คำตอบทั้งหมดจะต้องเขียนลงในสมุดคำตอบ
- คำตอบส่วนใดอ่านไม่ออก จะถือว่าคำตอบนั้นผิด

-- ทูจริตในการสอบมีโทษขั้นต่ำปรับตกในรายวิชานี้ และพักการเรียน 1 ภาคการศึกษา --

-- โทษสูงสุดคือ ไล่ออก --

ชื่อ-นามสกุล _____ รหัสนักศึกษา _____

PART I

1.1 What are the main differences between “Space Switching” and “time Switching” (4 marks)

Answer:

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.....
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.....

1.2 What are the differences between open loop and closed loop flow controls? (4 marks)

Answer:

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.....
.....
.....
.....
.....

1.3 What are the differences between preventive flow control and reactive flow controls? (4 marks)

Answer:

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.....
.....
.....
.....
.....

2. Switch architecture: 3-stage delta network (15 marks)

Cell A and cell B enter to ATM switch as shown in the below picture. ATM switch architecture is a 3 Stages of Delta Network. Routing table is ATM switch is assigned below:

Answer:

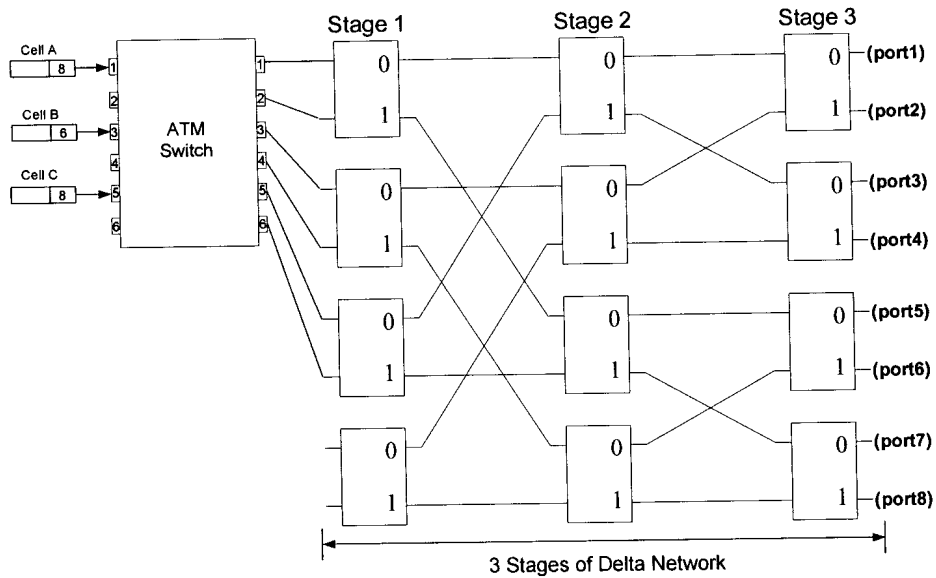


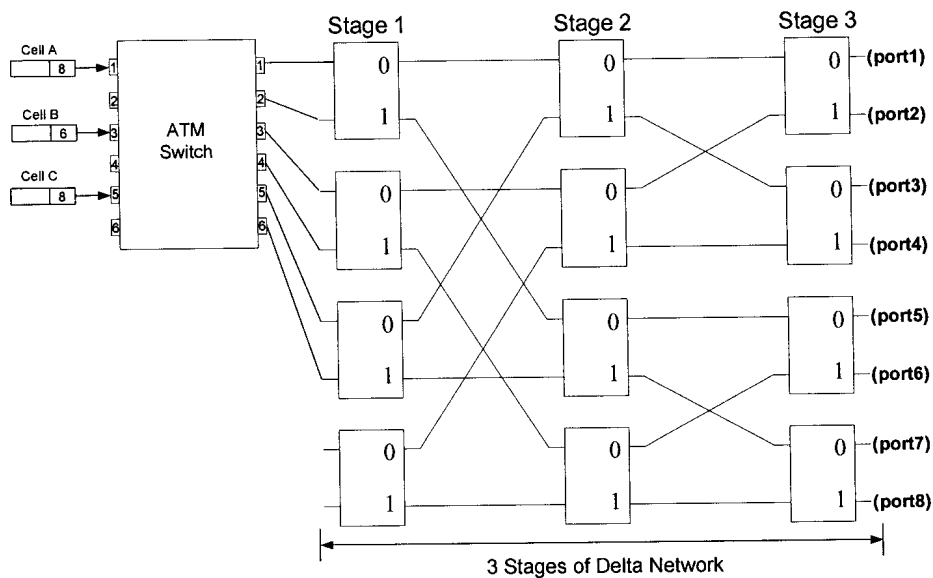
Figure 1 for question no. 2

Port In	VCI In	VCI Out	Port Out	internal header
1	6	10	1	0,1,1
1	8	15	2	1,1,1
3	6	18	3	1,0,1
3	8	20	4	0,1,0
5	6	22	5	0,0,1
5	8	18	6	1,0,0

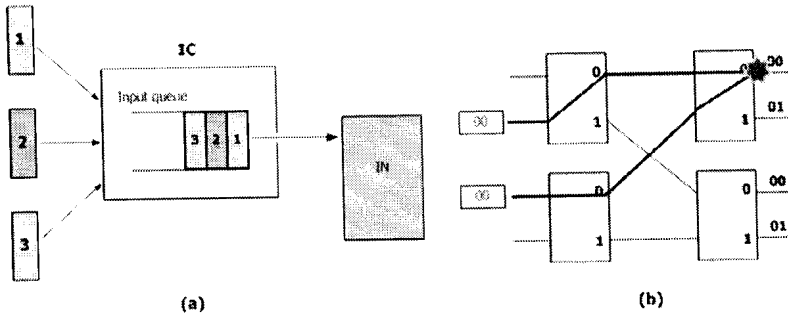
Table 1 Cell routing table in ATM Switch

2.1 What are the output ports of cell A, B and C?

Answer:



7. Below figure shows 'Head of line' blocking problem. Please give 2 solutions to solve this problem (10 marks)



Answer:

.....

.....

.....

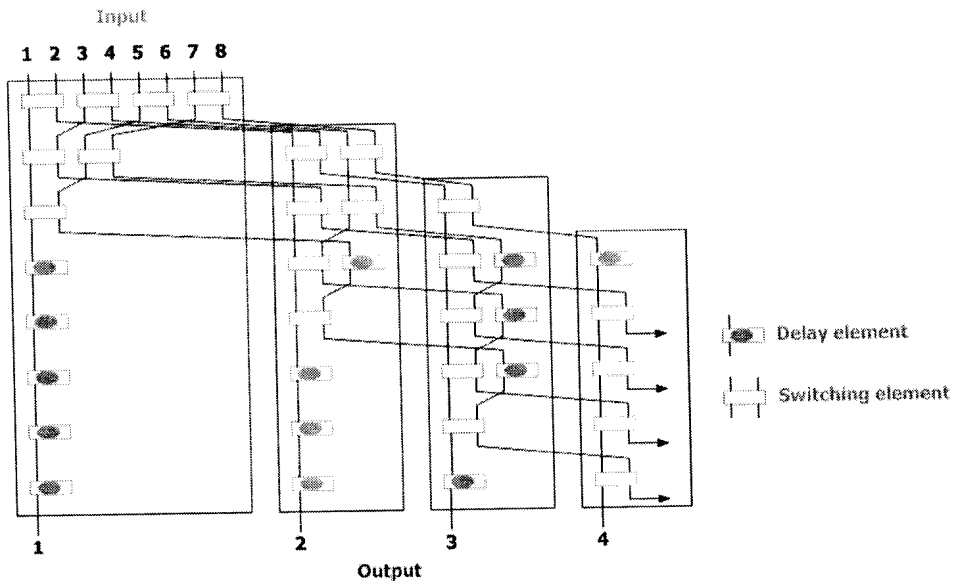
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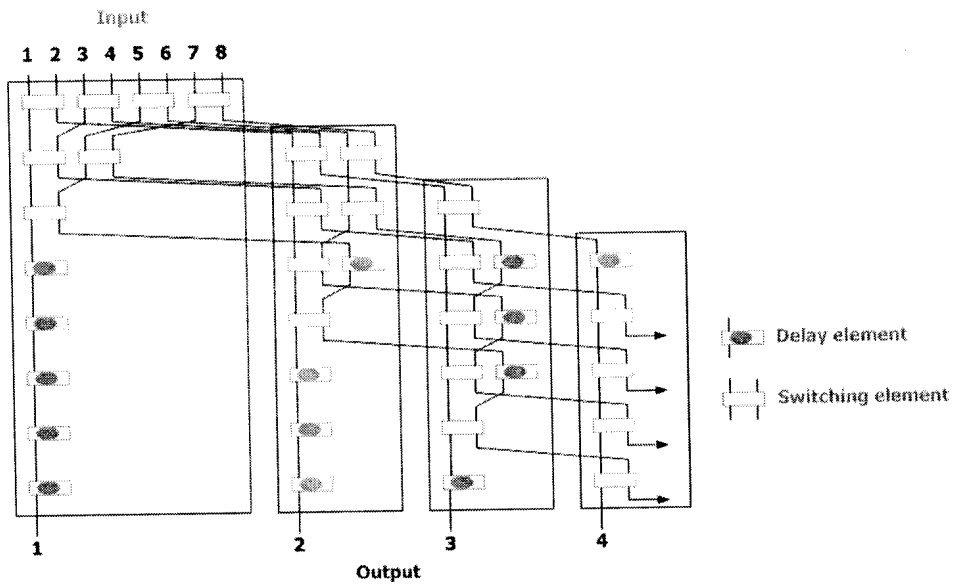
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ชื่อ-นามสกุล _____ รหัสนักศึกษา _____

8. Below is a 8x4 concentrator switch. Please draw a routing line if input port is 2 and output port is 4 (10 marks)

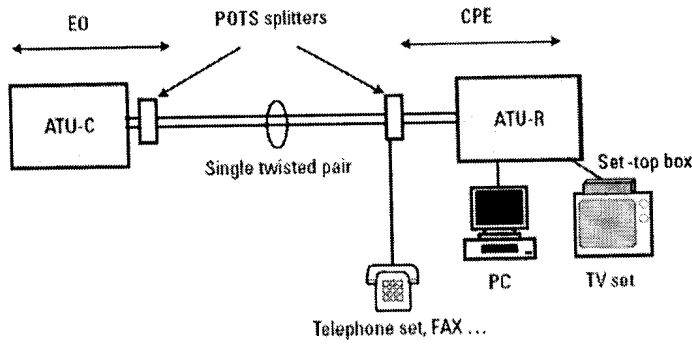


Answer:



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9. Please describe each component is the figure given below (15 marks):



a. What are the meaning of “EO” and “CPE”? What do they differ to each other? (5 marks)

Answer:

.....

.....

.....

.....

b. Why do we need POST splters at 2 sides (EO and CPE)? (5 marks)

Answer:

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.....

.....

.....

c. What are ATU-C and ATU-R? (5 marks)

Answer:

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PART II

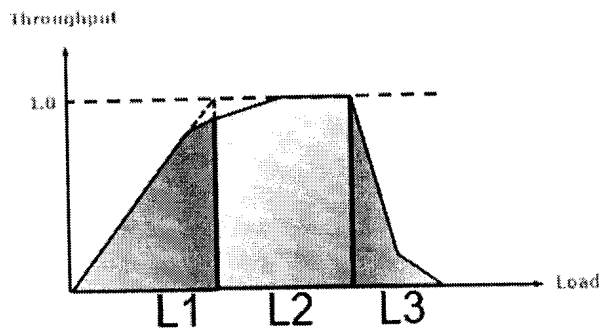
Multiple choices: Negative marking. 2 points are given for the right answer, -1 (minus one) point is given for the wrong answer. (32 marks)

Please choose the correct answer corresponding to questions below (Question1-16):

	a	b	c	d	e
1					
2					
3					
4					
5					
6					
7					
8					

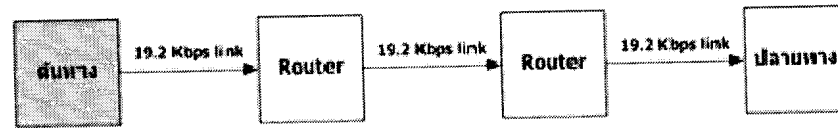
	a	b	c	d	e
9					
10					
11					
12					
13					
14					
15					
16					

- Which one is not a good property of flow control
 - Throughput degradation protection
 - Buffer overflow and underflow buffer protection
 - dead lock prevention
 - Easy to program and setup
 - Fairness allocation
- What do we call Flow control in region L1?

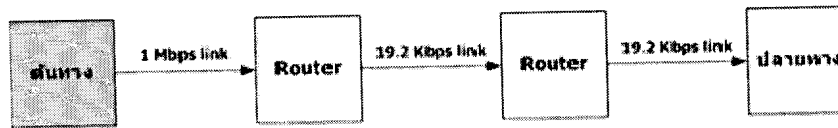


- Reactive flow control
- Preventive flow control
- Close-loop flow control
- Feedback flow control
- No correction answer

3. Below is a sample of buffer overflow and underflow scenario. It shows that by increasing a link bandwidth cannot solve buffer overflow problem. In (A) a file transmitted in this scenario may need 5 minutes. While in (B) the same file transmitted in this scenario may need an hours. What is the main reason?

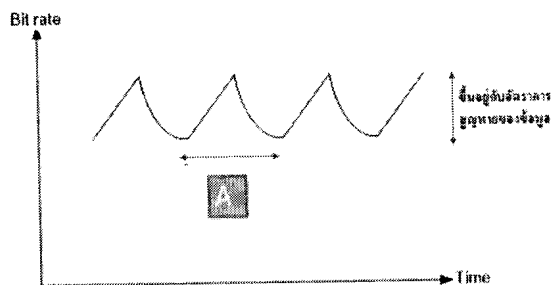


(A)



(B)

- Because we change a link bandwidth from 19.2 kbps to 1 Mbps
 - Because a router connected to 1 Mbps link drops a large number of packets
 - Because it it's caused by so called bandwidth miss-match
 - Because there are too much of re-transmitted packets
 - All of above
4. Which service shall not use CBR (Constant Bit Rate) service class?
- High definition TV
 - Voice traffic
 - Circuit switch
 - POST/ISDN
 - No correct answer
5. What factor does it cases a length of A?



- Speed of switching in router
 - RTT
 - Queuing delay
 - Latency time
 - All of above
6. Which one is incorrect for credit based flow control?
- It uses window flow control
 - It uses feedback flow control
 - transmission rate is given in feedback information
 - It is hop-by-hop flow control
 - No correct answer

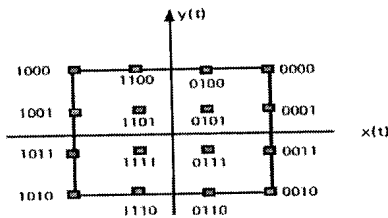
7. Which one is the fastest analog modem?

- a) V.21
- b) V.22
- c) V.34
- d) V.34bis
- e) V.92

8. Which one is the fastest digital modem?

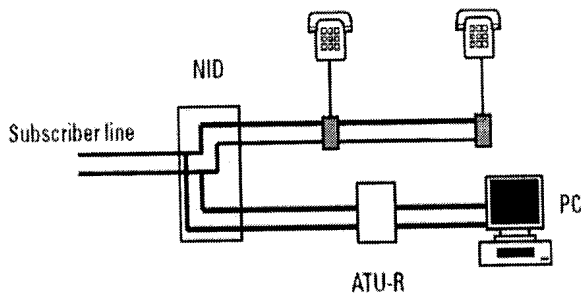
- a) ADSL
- b) SHDSL
- c) VDSL
- d) ADSL2
- e) ADSL2plus

9. What do we call this coding?



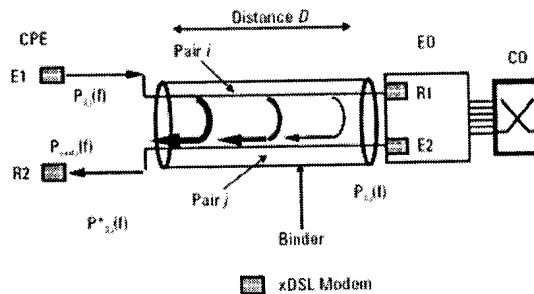
- a) 16-QAM
- b) 16-PCM
- c) 16-QSM
- d) 16-ASM
- e) No correct answer

10. The wire connection below is used for:



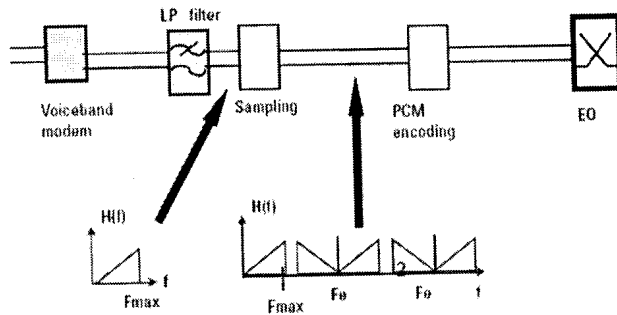
- a) ADSL
- b) G. Lite
- c) VDSL
- d) HDSL
- e) ADSL-2

11. Below picture show a cross-talk of



- a) Near-end-crosstalk (NEXT)
- b) Far-end-crosstalk (FEXT)
- c) Self-near-end-crosstalk (SNEXT).
- d) Impedance matching cross-talk
- e) No correct answer

12. Please select a correct signal, which one is after voice band modem



- a)

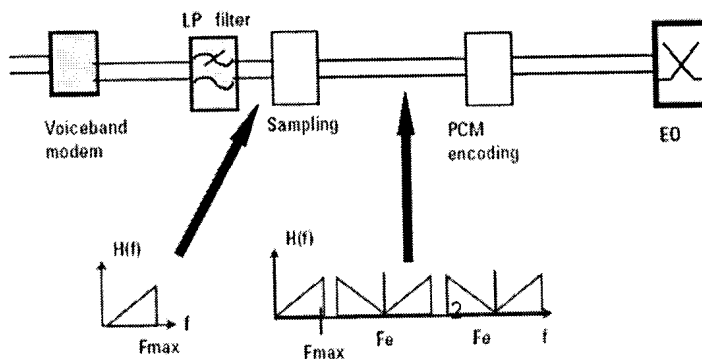
V(t)
- b)

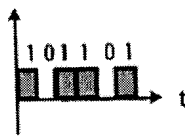

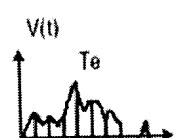
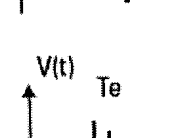
V(t)
- c)

V(t)
- d)

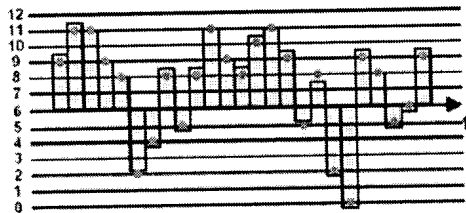
V(t)
- e) No correct answer

13. Please select a correct signal, which one is after PCM encoding



- a) 
- b) 
- c) 
- d) 
- e) No correct answer

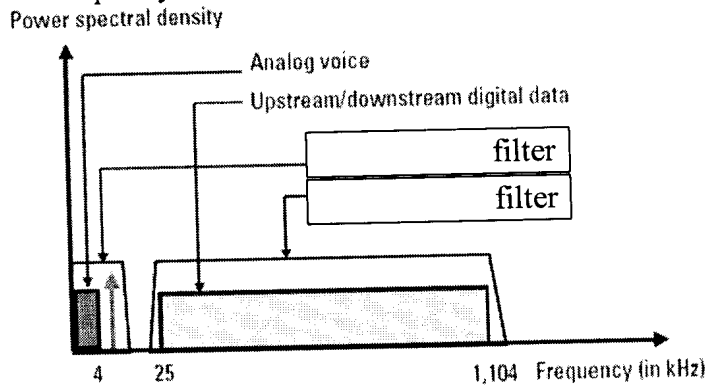
14. What do we call of this process below?



- a) Analogue to digital conversion
- b) Digital to analogue conversion
- c) Sampling and hold
- d) Quantisation
- e) PCM
15. What is the benefit of using ADSL?
- a) Most DSL systems allow voice transmission simultaneously with data traffic.
- b) DSL helps carriers reduce congestion on their voice-switching systems.
- c) the most relevant feature of DSL to most consumers is that it is fast, much faster than an analog modem.
- d) The data traffic is directed to a packet-based data network.
- e) All of above.
16. What is an advantage of G.dmt over G.lite
- a) Faster upstream rate
- b) Faster downstream rate
- c) bigger numbers of subcarriers
- d) Wider deploy
- e) all of above

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17. Below is the frequency spectrum used for ADSL, fill in what filter is used for each frequency band. (4 marks)



18. Please indicate "T" for True and "F" for False of the below sentences: 2-points are given for the right answer, -1 (minus one) point is given for the wrong answer. (16 marks)

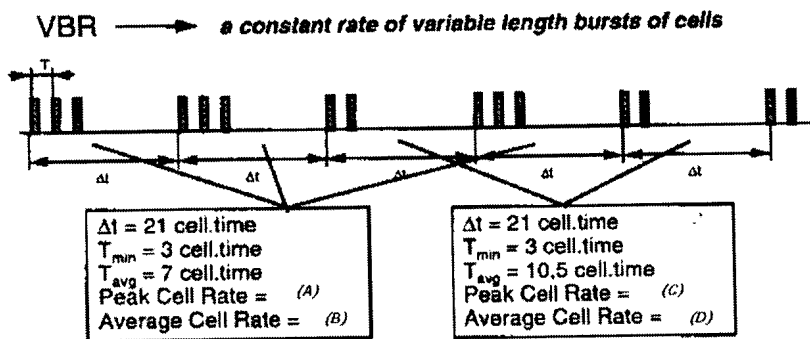
1. ___ VDSL uses higher frequency than ADSL2plus
2. ___ VDSL can be used in both asymmetrical and symmetrical modes
3. ___ VDSL distance is longer than ADSL
4. ___ G.Lite does not need POST splitter
5. ___ HDSL is faster than ADSL.
6. ___ T1 bandwidth is bigger than E1
7. ___ The main drawback of a point-to-multipoint network configuration is the necessity of a MAC protocol to manage upstream transmission
8. ___ Echo can be caused by 2-wire to 4-wire conversion in PSTN

19. Fill in the blank. (8 marks)

a) Below is the calculation of CAC for VBR Traffic, please give the values of MBS in step 4, and Required buffer in step 6. (4 marks)

- | | |
|--|--|
| 1. Assume that all connections are compliant with GCRA(1/PCR _i , 0) and GCRA(1/SCR _i , τ _p). | 1. GCRA(1,0) and GCRA(3,8) |
| 2. Determine N, the maximum number of sources $N \times SCR_i \leq PCR_o$. | 2. PCR _o = 1, SCR _i = 1/3, N=3 |
| 3. Find out the worst case for one source with $MBS = \text{integer}((1 + (\tau_p / (1/SCR_i - 1/PCR_i)))$ | 3. MBS = int(1+8/(3-1)) = 5 |
| 4. Assume that all sources are synchronised and transmit their worst case traffic. | 4. <input type="text"/> |
| 5. Find the buffer size to avoid any overflow $Req_Buf = (N - PCR_o/PCR_i) \times MBS$ | 5. Req_Buf = (3 - 1/1) x 5 = 10 |
| 6. Compute the maximum delay $D \leq Req_Buf / PCR_o$ | 6. <input type="text"/> |

b) Below is VBR traffic, please give values of (A), (B), (C), and (D) (4 marks)



- (A) =
 (B) =
 (C) =
 (D) =