

มหาวิทยาลัยสงขลานครินทร์

คณะวิศวกรรมศาสตร์



สอบกลางภาค: ภาคการศึกษาที่ 1

ปีการศึกษา: 2557

วันที่สอบ: 19 October 2014

เวลาสอบ: 13.30-15.30 (2 ชั่วโมง)

รหัสวิชา: 241-462

ห้องสอบ: หัวหุ่นยนต์

ชื่อวิชา: Broadband Integrated Networks

อาจารย์ผู้สอน: อ.สินชัย กมลภิวังศ์

อ่านรายละเอียดของข้อสอบ และคำสั่งให้เข้าใจก่อนเริ่มทำข้อสอบ

ไม่อนุญาต : - หนังสือและสมุดโน้ต

- เครื่องคิดเลข

อนุญาต : - เครื่องเขียนต่างๆ เช่น ปากกา หรือดินสอ

เวลา : 2 ชั่วโมง (120 นาที)

รายละเอียดของข้อสอบ : ข้อสอบมีทั้งหมด 13 หน้า (รวมปก)

คำสั่ง :

- คำตอบทั้งหมดเขียนลงในสมุดคำถาม
- คำตอบส่วนใดอ่านไม่ออก จะถือว่าคำตอบนั้นผิด

-- ทูจริตในการสอบมีโทษขั้นต่ำปรับตกในรายวิชานี้ และพักการเรียน 1 ภาคการศึกษา --

-- โทษสูงสุดคือ ไล่ออก --

PART I

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

Answer

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1.1 What are the differences between open loop and closed loop flow control? (4 marks)

Answer:

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

Answer

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2. The figure below, Figure 1, shows CBR traffic pattern in each time slot. By using GCRA (Generic Cell Rate Algorithm), shown in Figure 2, please show that which cells are non-conforming, and conforming. Please use the following parameters: $T(PCR) = 5$ cell time, $\tau(PCR) = 2$ cell time (15 Marks)

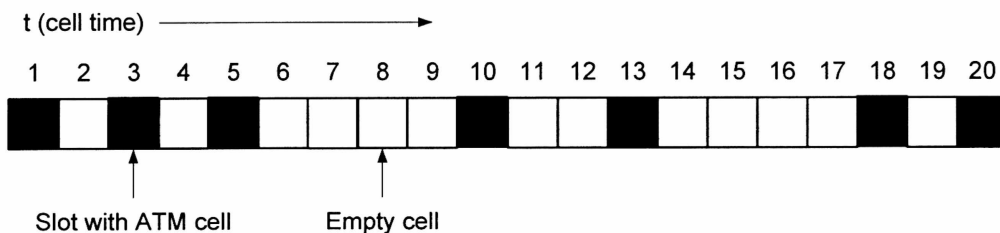


Figure 1 arrival of CBR traffic type in ATM time slots

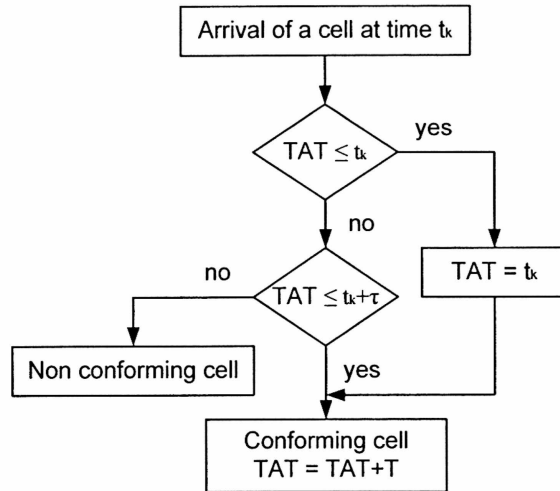


Figure 2 Generic Cell Rate Algorithms (GCRA)

Answer

- t = __: TAT = __, _____, TAT = 1+5 = 6
- t = __: TAT = __, t+ τ= __, _____, TAT = __
- t = __: TAT = __, t+ τ= __, _____, TAT = __
- t = __: TAT = __, t+ τ= __, _____, TAT = __
- t = __: TAT = __, t+ τ= __, _____, TAT = __
- t = __: TAT = __, t+ τ= __, _____, TAT = __
- t = __: TAT = __, t+ τ= __, _____, TAT = __

3. The figure below, Figure 3, shows CBR traffic pattern in each time slot. By using GCRA (Generic Cell Rate Algorithm), shown in Figure 2, please show that which cells are non-conforming, and conforming. Please use the following parameters:
 T(PCR) = 1 cell time, τ(PCR) = 0 cell time
 T(SCR) = 3 cell time, τ(SCR) = 3 cell time
 MBS = 3 cell (20 marks)

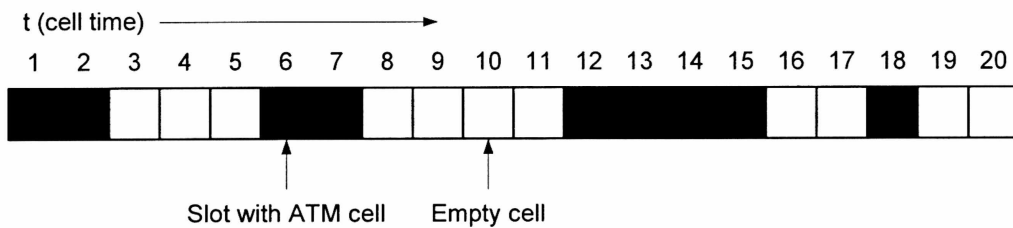


Figure 3 arrival of VBR traffic type in ATM time slots

Answer

- t = __: TAT = __, _____, TAT = __
- t = __: TAT = __, t+ τ= __, _____, TAT = __
- t = __: TAT = __, t+ τ= __, _____, TAT = __
- t = __: TAT = __, t+ τ= __, _____, TAT = __

- t = ___: TAT = __, t+ τ= __, _____, TAT = __
t = ___: TAT = __, t+ τ= __, _____, TAT = __
t = ___: TAT = __, t+ τ= __, _____, TAT = __
t = ___: TAT = __, t+ τ= __, _____, TAT = __
t = ___: TAT = __, t+ τ= __, _____, TAT = __

4. An ATM switch has N sources which each source feeds VBR traffic with the following parameters:

PCR = 6000 cell/s SCR = 3000 cell/s MBS = 100 cell

While contact parameters between sources and switch are:

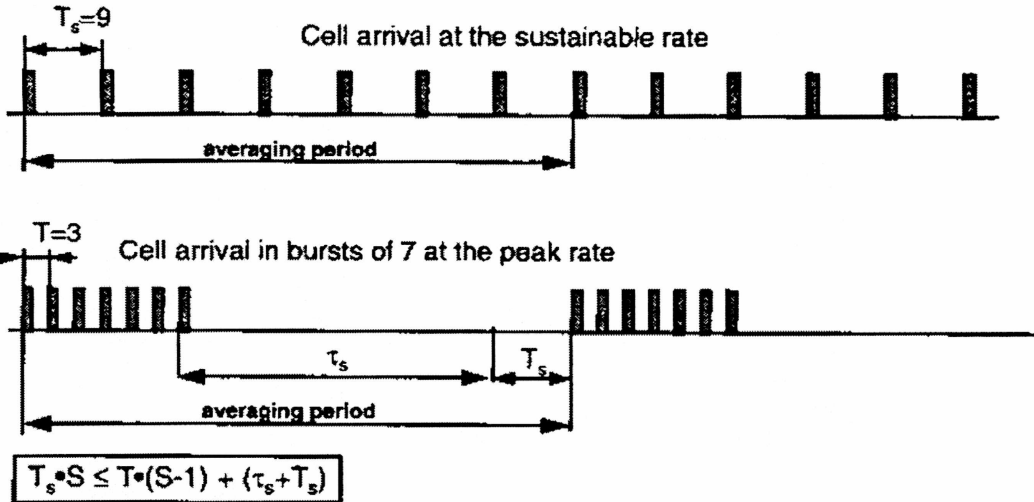
PCR = 360000 cell/s SCR = 3000 cell/s MBS = 500 cell

What are the values of N and SCR (10 marks)

Answer

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5. Use the figure below to calculate the maximum number of burst length.



Answer

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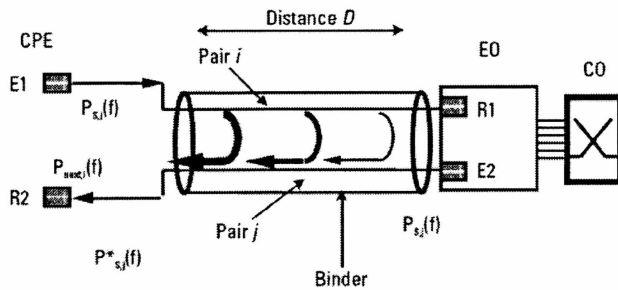
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6. The figure below shows the effect of cross talk on a pair of cable between CPE and EO.
- 1) What is type of this cross talk? (5 marks)
 - 2) How does this effect happen? (10 marks)



Answer

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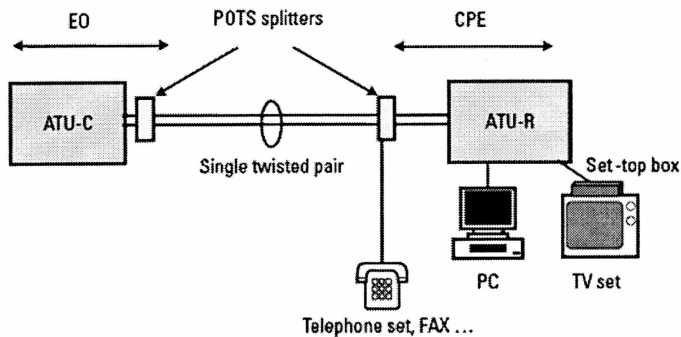
7. Please make a comparison between ADSL2, ADSL2+, VDSL, VDSL2 with the following criterion:

Data Rate, Distance, compatibility, Frequency spectrum and QoS (10 marks)

Answer

	ADSL2	ADSL2+	VDSL1	VDSL2
Frequency				
Data Rate				
Distance				
Compatibility				
QoS				

8. Please describe each component in the figure given below:



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

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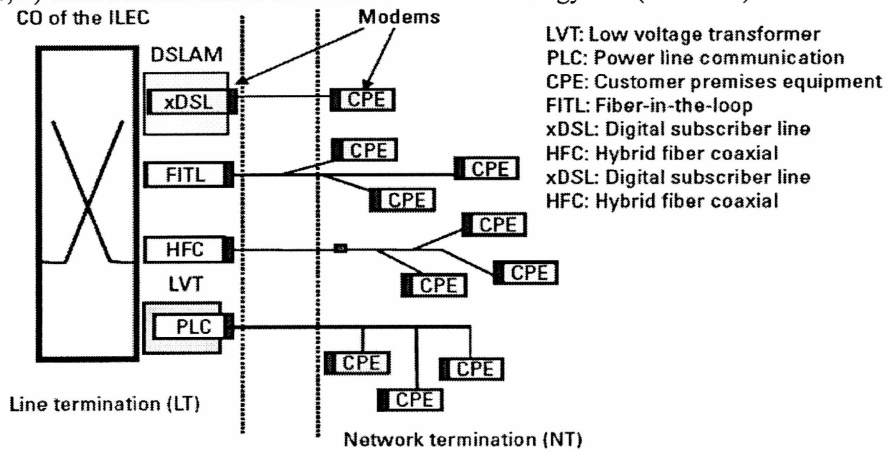
b. Why do we need POST splitters at 2 sides (EO and CPE)? (5 marks)

Answer

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

Answer

9. Below is wired alternatives for the local loop diagram, please explain 1) How each technology works, 2) what benefits and/or limitation of each technology are. (10 marks)



Answer:

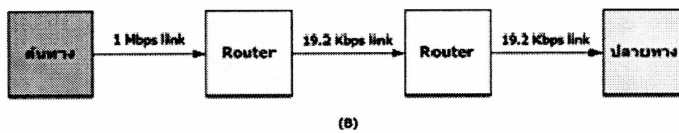
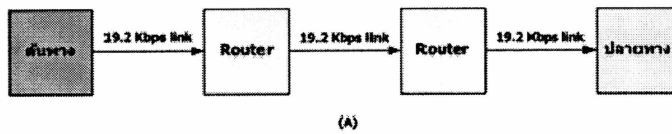
PART II:

Multiple choices: Negative marking

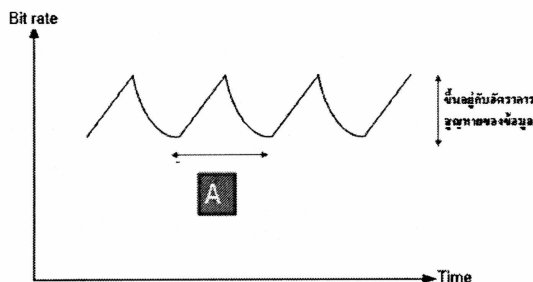
2 points are given for the right answer, -1 (minus one) point is given for the wrong answer

1. Which one is not a good property of flow control
 - a) Throughput degradation protection
 - b) Buffer overflow and underflow buffer protection
 - c) dead lock prevention
 - d) Easy to program and setup
 - e) Fairness allocation

2. 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?

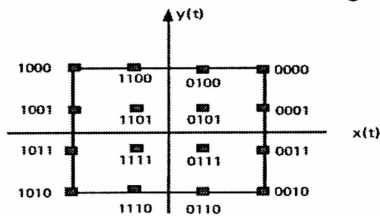


- a) Because we change a link bandwidth from 19.2 kbps to 1 Mbps
 - b) Because a router connected to 1 Mbps link drops a large number of packets
 - c) Because it it's caused by so called bandwidth miss-match
 - d) Because there are too much of re-transmitted packets. เพราะมี packet retransmit
 - e) All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

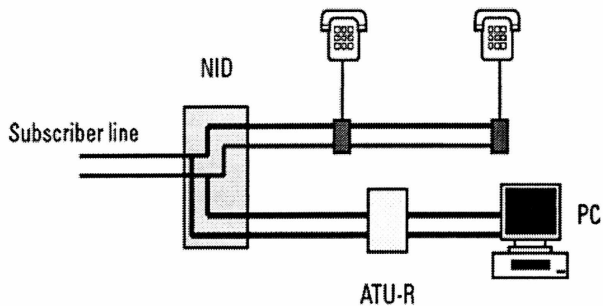


- a) Speed of switching in router
- b) RTT
- c) Queueing delay

- d) Latency time
 - e) All of above
5. Which one is incorrect for credit based flow control?
- a) It uses window flow control
 - b) It uses feedback flow control
 - c) transmission rate is given in feedback information
 - d) It is hop-by-hop flow control
 - e) No correct answer
6. Which one is the fastest analoug modem?
- a) V.21
 - b) V.22
 - c) V.34
 - d) V.34bis
 - e) V.92
7. Which one is the fastest digital modem?
- a) ADSL
 - b) SHDSL
 - c) VDSL
 - d) ADSL2
 - e) ADSL2plus
8. What do we call this coding?

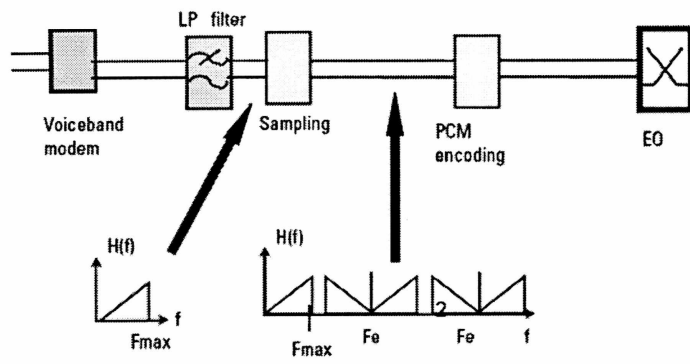


- a) 16-QAM
 - b) 16-PCM
 - c) 16-QSM
 - d) 16-ASM
 - e) No correct answer
9. The wire connection below is used for:



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

10. Please select a correct signal, which one is after voiceband modem



- a)

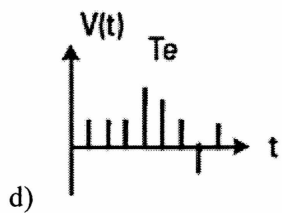
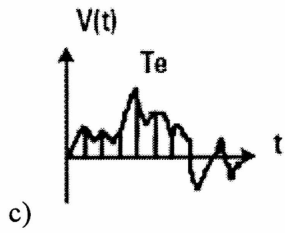
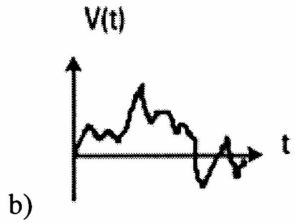
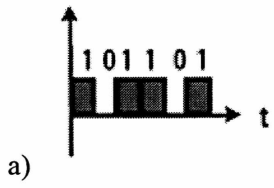
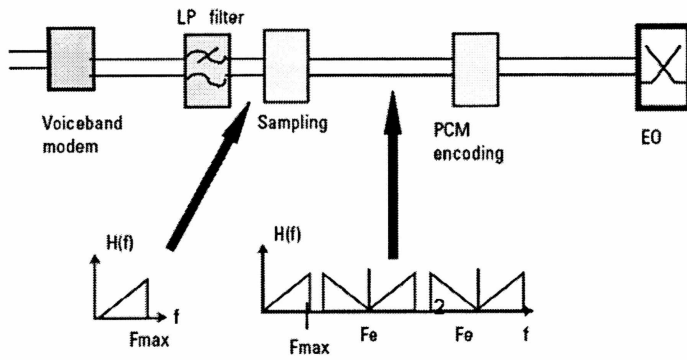
a) $V(t)$
- b)

b) $V(t)$
- c)

c) $V(t)$
- d)

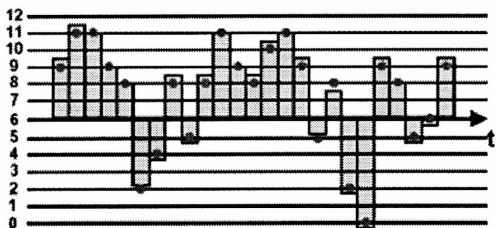
d) $V(t)$
- e) No correct answer

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



e) No correct answer

12. 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

13. 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.

14. What is an advantage of G.dmt over G.lite

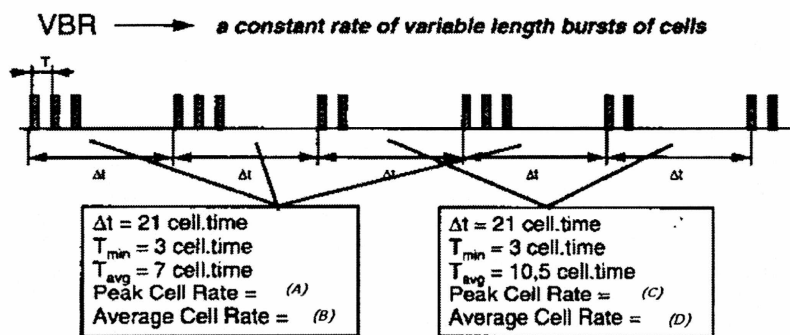
- a) Faster upstream rate
- b) Faster downstream rate
- c) bigger numbers of subcarriers
- d) Wider deploy
- e) all of above

Please indicate "T" for True and "F" for False of the below sentences:

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

PART III: Fill in the blank.

9. Below is VBR traffic, please give values of (A), (B), (C), and (D) (20 marks)



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

(D) =

In this case, if the link bandwidth is 622 Mbps,

1) What is the Peak Cell Rate (Cells per second)? _____

2) What is the T_{\min} (usec)? _____

Show your calculation here:

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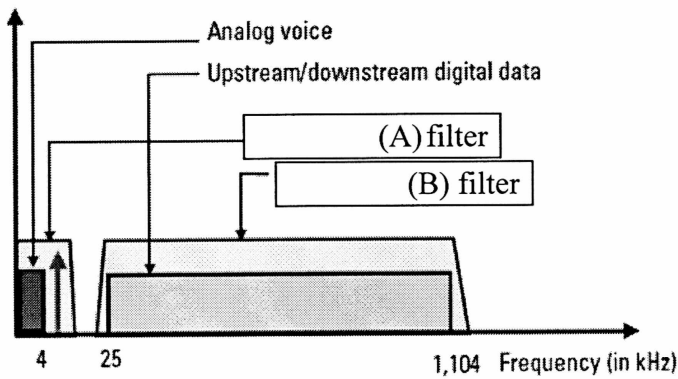
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15. Below is the frequency spectrum used for ADSL, fill in what filter is used for each frequency band. (5 marks)

Power spectral density



(A) _____

(B) _____