

**PRINCE OF SONGKLA UNIVERSITY**  
**FACULTY OF ENGINEERING**

Final Examination: Semester II

Academic Year: 2012

Date: 22 February 2013

Time: 13.30-15.30

Subject: 242-214 การสื่อสารข้อมูล (Data Communications)

Room: S817 , Robot

1. ข้อสอบมี 3 ตอน จำนวน 15 หน้า
2. ไม่อนุญาตให้นำเครื่องคิดเลขหรือเครื่องอิเล็กทรอนิกส์ทุกชนิดเข้าห้องสอบ
3. ไม่อนุญาตเอกสารหรือตำราทุกชนิด

ทุจริตในการสอบ โทษขั้นต่ำคือ ปรับตกในรายวิชาที่ทุจริต และพักการเรียน 1 ภาคการศึกษา

Student Name:

Student ID:

Part One

1	2	3	4	5	6	7	8

9	10	11	12				Total

Part Two

Part Three

**PART ONE**

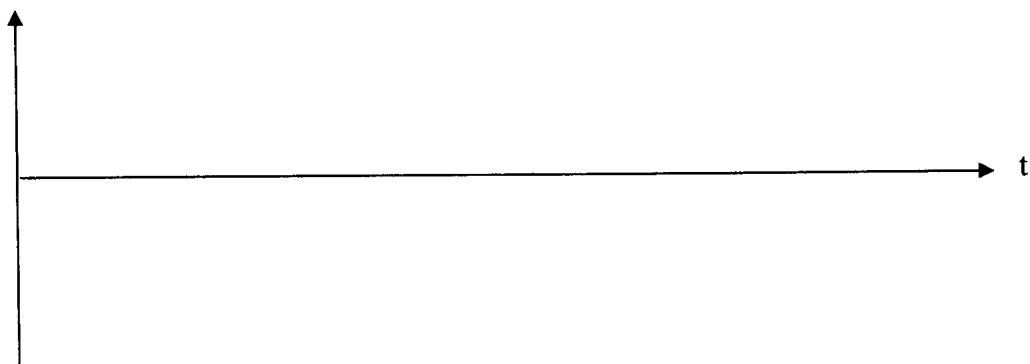
**Analoug Transmission**

1. If our data bits are 01010011, then use the following modulations: ASK, FSK, and BPSK, draw their signal diagrams.

1.1 ASK (5 marks)

Answer

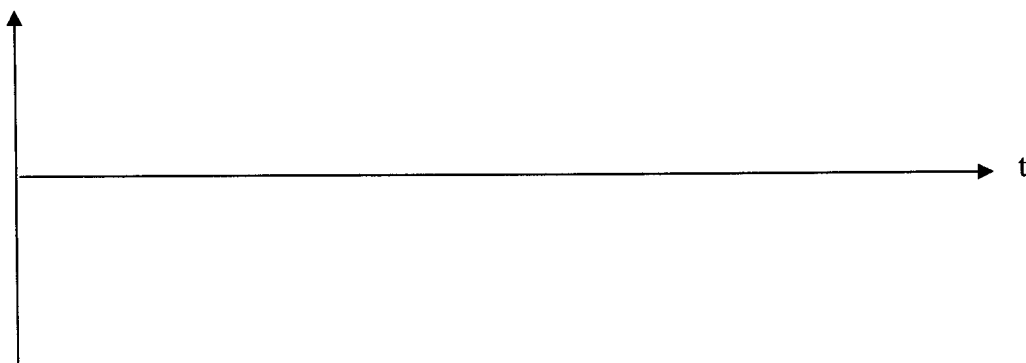
Amplitude



1.2 FSK (5 marks)

Answer

Amplitude

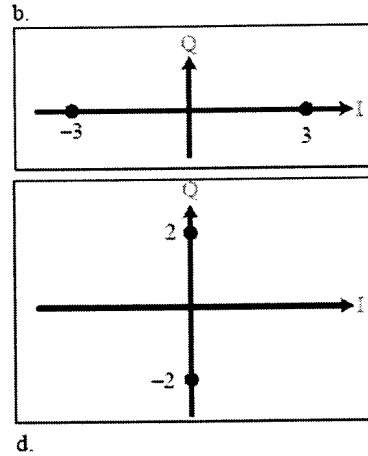
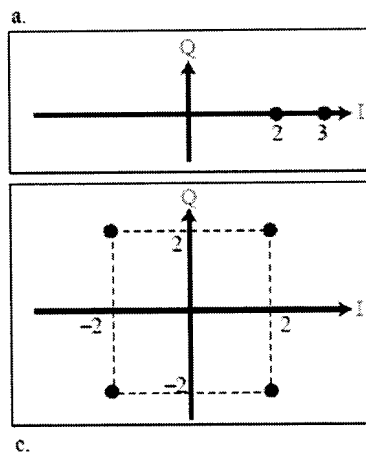


1.3 BPSK (5 marks)

Answer



3. Below pictures are constellation diagrams which help us to define the amplitude and phase of a signal. Please describe what modulation technique is used for each constellation diagram given below: (20 marks)



Answer

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**Error Detection and Correction**



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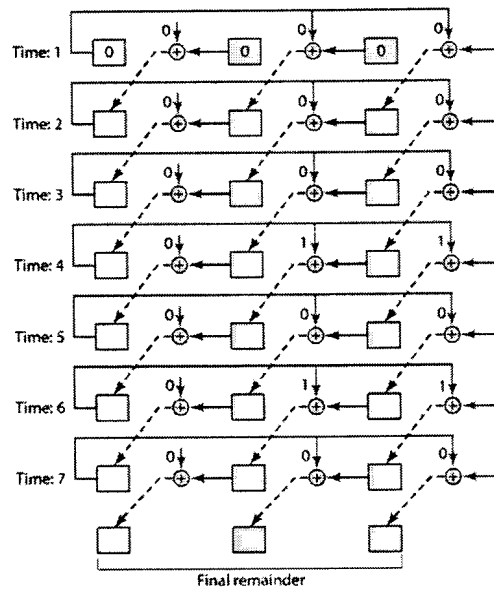
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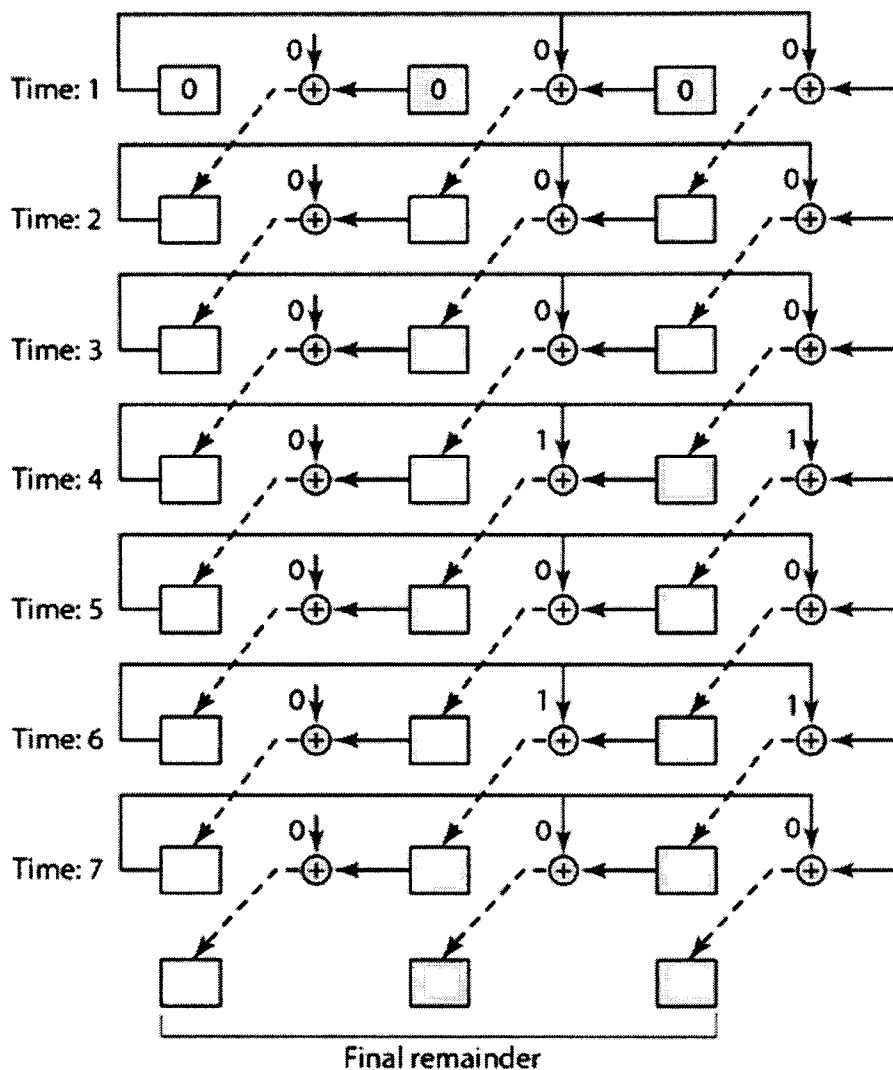
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5. The below picture shows one cyclic redundancy check using a shift register circuit. Please fill in each shift register value, and the remainder, if the codeword received is 1001000 (20 marks)



Answer



6. Suppose our data is a list of five 4-bit numbers that we want to send to a destination. If the set of numbers is (7, 11, 12, 0, 6), and if we use Internet checksum mechanism, what the sum of numbers is. Please all details how you obtain such value (10 marks).

Answer

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7. Suppose a message is sent and a single bit error occurs. What bit number is error in given below table.

7	6	5	4	3	2	1	
1	1	1	0	1	1	0	7-BIT CODEWORD
1	-	1	-	1	-	0	(EVEN PARITY)
1	1	-	-	1	1	-	(EVEN PARITY)
1	1	1	0	-	-	-	(EVEN PARITY)

Answer

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**Multiplexing**







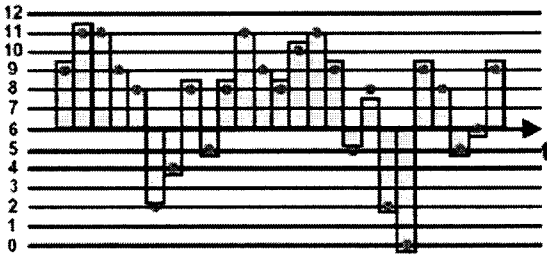




## Part Two

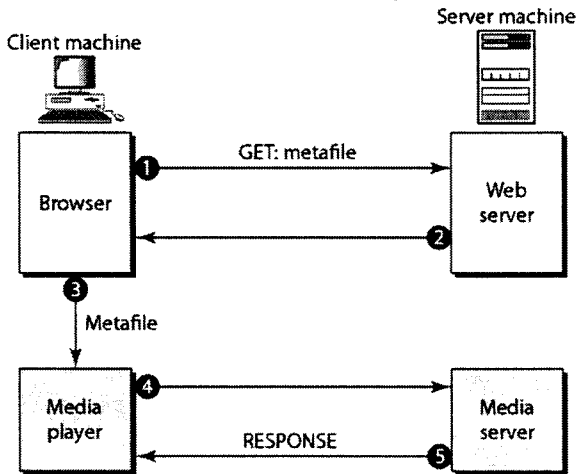
เลือกคำตอบที่ถูกต้องที่สุดเพียงข้อเดียว (เลือกมากกว่า 1 ข้อ คะแนน -1 หากคำตอบถูกได้ 2 คะแนน หากตอบผิดได้ -1 คะแนน)

1. What is this step called in voice processing?



- a) Digitization
- b) Quantization
- c) Sample and Hold
- d) Analog to digital conversion
- e) Digital to Analog conversion

2. What is the command signal in step 2?



- a) Setup
- b) Response
- c) Play
- d) Pause
- e) Get: audio/video file

3. What is the command signal in step 4

- a) Setup
- b) Response
- c) Play
- d) Pause
- e) Get: audio/video file

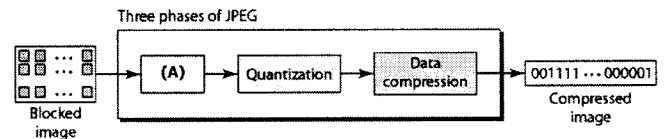
4. Which one is true for G.711 audio codec?

- a) Bit rate is 64 kbps
- b) There are 2 sub-version: u-Law and A-law
- c) Sampling rate is 8 kbps
- d) Sampling size is 8 bits
- e) All of above

5. Which one is the advantage of G.723 over G.711

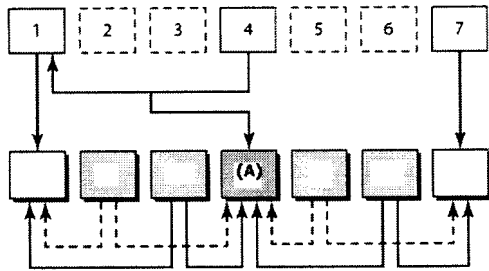
- a) Lower bit rate
- b) Sample size is bigger
- c) More delay in packetizing
- d) Need low bandwidth
- e) All of above

6. Below is a video process. What is (A)?



- a) Discrete Cosine Transform (DCT)
- b) Pulse code modulation (PCM)
- c) Video codec
- d) Analog to digital conversion
- e) No correct answer

7. Below is MPEG process. What is (A)?

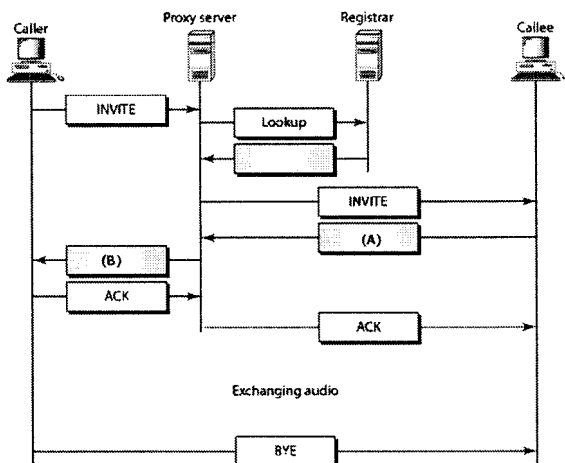


- a) I-frame
- b) B-frame
- c) P-frame

8. Which one is NOT a SIP message?

- a) Invite
- b) Response
- c) Bye
- d) Option
- e) Register

9. Below is SIP signal flow. What is signal (A) called?

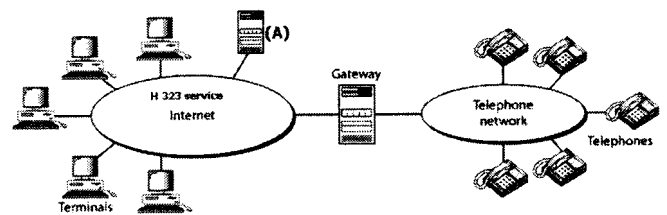


- a) Register
- b) Response
- c) OK
- d) Option
- e) Ack

10. What is signal (B) called?

- a) Register
- b) Response
- c) OK
- d) Option
- e) Ack

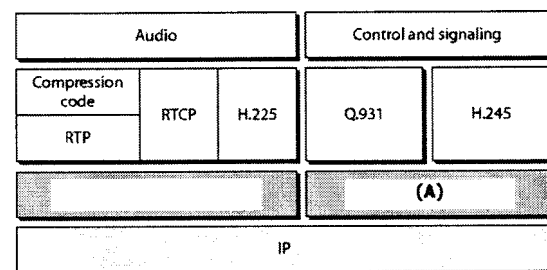
11. In H.323 service, what (A) is called?



- a) H.323 server
- b) Gatekeeper
- c) Domain Name server
- d) Registration server
- e) H.323 Gateway

12. Below is H.323 protocol usage.

What is (A) protocol?



- a) TCP
- b) UDP
- c) RTP
- d) RTSP
- e) HTTP

### **Part Three**

ให้ตอบ T หากข้อความถูกต้อง ตอบ F หากข้อความไม่ถูกต้อง ตอบถูกได้ 1 คะแนนตอบผิดได้ -1 คะแนน

1.  Streaming stored audio/video refers to the broadcasting of radio and TV programs through the Internet.
2.  Spatial samples is the digital value of sampling points in a video frame.
3.  The picture quality of video is depended on the temporal sampling rate or frame rate.
4.  P-frame contains only the changes from the preceding frame.
5.  Spread spectrum is a communication technique that spreads a narrowband communication signal over a wide range of frequencies for transmission