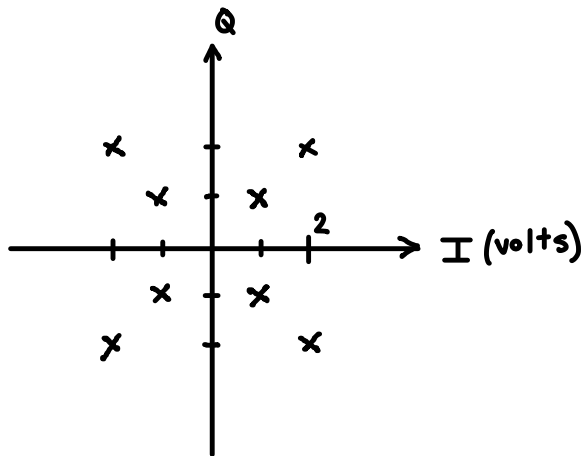


## Assignment 5

Due Thursday, December 19.

### Question 1

The following diagram shows the constellation of a hypothetical modulation scheme. Does this modulation scheme vary the amplitude of the carrier, the phase or both? How many different symbols are defined? How many bits are transmitted per symbol? What is the minimum distance between any two valid symbols (in volts)? Define a gray-coded mapping of bits for each point in the constellation.



### Question 2

You need to choose a multiple-access techniques for two networks that use a shared-medium network. One network carries access requests from card readers at electronic door locks. The other network carries uncompressed digitized video from surveillance cameras. Is the data from each application CBR, VBR or bursty? Which multiple-access technique, FDMA, TDMA and/or CSMA, would be appropriate for each application? Briefly justify your answer.

### Question 3

Consult the V.34 standard document available on the course web page (T-REC-V.34-1998 under

Datasheets and standards section).

What is the generator polynomial used by the scrambler of the calling (originating) ITU-T V.34 modem? How many shift register bits are required to implement this scrambler? By what factor does this scrambler increase the BER?

### Question 4

Consider a code with the following codewords:

```
000000
011100
100100
111000
```

What are the values of  $k$  and  $n$ ? What is the minimum Hamming distance of this code? How many errors is it guaranteed to correct? Detect?

### Question 5

A learning router it reset. It sees frames with the following source and destination addresses arrive at the ports shown in the following table. The table shows only the LS byte of the addresses in hexadecimal.

source	destination	incoming port
83	a6	1
a6	93	2
32	a6	3

Frames with destination addresses 93, 32 and 83 arrive at the bridge. What port(s) will they be sent out on?

### Question 6

Look up [RFC 1149](#). What is the significance of the publication date?

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## Question 7

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Use the `nslookup` command, available through the command line on most operating systems, to look up the IP address for the host names `www.google.com` and `learn.bcit.ca`. What is unusual about the google result?

Use the `ping` utility to measure the delay to a google server. Include a screen capture with your results.

Assuming `google.com`'s servers are initializing their IP header TTL field to 64, how many hops did the ping response take before reaching you? Repeat the ping request using the option that sets the ICMP echo request TTL field (`-i` for the Windows, `-t` for the Unix, `-m` for MacOS) to values that are two less and two more than the number of hops computed above. What happens? Why?