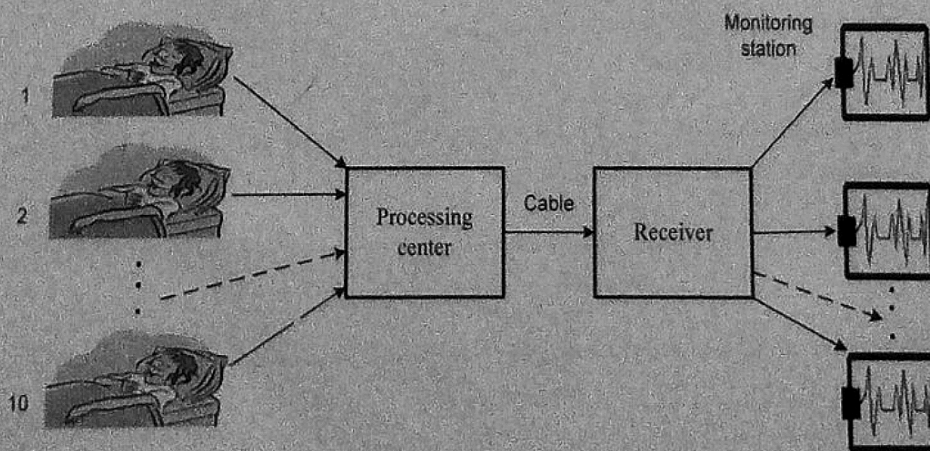


Final exam

- Q.1) a) Why PPM is superior to PDM for message transmission?  
b) What are the possible techniques that are used to generate digital pulses to represent analogue message signal?  
c) Discuss the trade off in PCM system.  
d) Explain why PSK system must be coherent.  
e) Why the PAM signal recovery by using sample-and-hold circuit is better than signal recovery by using Low-Pass Filtering. (7 points)

Q.2) It is desired to set up a central station for simultaneous monitoring of the electrocardiograms (ECGs) of 10 hospital patients. The data from the rooms of the 10 patients are brought to a processing center over wires and are sampled, quantized, binary coded, and time-division multiplexed (PCM). The multiplexed data are now transmitted to the monitoring station as shown in the figure below. The ECG signal bandwidth is 100 Hz. The maximum acceptable error in sample amplitude is 0.25% of the peak signal amplitude. The sampling rate must be at least twice the Nyquist rate. Determine the minimum cable bandwidth needed to transmit these data. (10 points)



March 05, 2020

**Q.3)** N analogue signals are bandlimited to 3KHz are to be sent as TDM – PCM with data bit rate of 1008 Kbps, find N, and design the parameters if the signals are quantized into 128 levels. (4 points)

.....

**Q.4)** We have an available band width of 100 KHz which spans from 200 to 300 KHz. What should be carrier frequency and the bit rate if we modulated our data by using FSK with  $d = 1$ . (8 points)

.....

**Q.5)** Compare between the following:

- (a) PWM and PPM
  - (b) PSK and DPSK
  - (c) PCM and DPCM
  - (d) Granular error and slope overload error
  - e) Flat-top sampling and natural sampling. f) Bit rate and Baud rate. (6 points)
- .....

**Q.6)** Explain by using block diagram, How to generate 4 QAM and compare it with 16 QAM scheme. Draw the constellation diagram for each. (5 points)

.....