Registration No : | | | | | | | | | | |

Total Number of Pages : 02 **B.Tech.**
PET6I101

6th Semester Regular Examination 2017-18
DIGITAL COMMUNICATION
BRANCH : ECE, ETC
Time : 3 Hours
Max Marks : 100
Q.CODE : C155

Answer Part-A which is compulsory and any four from Part-B.
The figures in the right hand margin indicate marks.

Part – A (Answer all the questions)

Q1 **Answer the following questions: *multiple type or dash fill up type :*** **(2 x 10)**

a) ISI may be removed by using
i. Differential coding
ii. Manchester coding
iii. Polar NRZ
iv. None of the above

b) The characteristics of compressor in μ-law companding are
i. Continuous in nature
ii. Logarithmic in nature
iii. Linear in nature
iv. Discrete in nature

c) The____ and _____ are the two noise effects in Delta modulation.

d) Scrambling of data is
i. Removing long strings of 1's and 0's
ii. Exchanging of data
iii. Transmission of digital data
iv. All of the above

e) Matched filters are used
i. For maximizing signal to noise ratio
ii. For signal detection
iii. In radar
iv. All of the above

f) Indicate which of the following pulse modulation system is analog.
i. PCM ii. Differential PCM
ii. PWM iv. Delta modulation

g) The probability error of DPSK is _____ than that of BPSK. The band width of BFSK is _____ than BPSK.
i. Higher, Higher ii. Lower, Lower
iii. Lower, Higher iv. Higher, Lower

h) MSK is similar to
i. Continuous phase FSK ii. BPSK
iii. BFSK iv. QPSK

i) Regenerative repeaters are used for
i. Eliminating noise
ii. Construction of signals
iii. Transmission over long distances
iv. All of the above

j) The biggest disadvantages of PCM is
   i. Its inability to handle analog signal
   ii. The high error rate which its quantizing noise introduces
   iii. Its incompatibility with TDM
   iv. The large bandwidths that is required for it.

Q2 **Answer the following questions: *Short answer type :*** **(2 x 10)**

a) States important properties of line codes.
b) What is the advantage of gray coding of the QPSK system? What is the advantage of differential encoding of the input to the QPSK system?
c) What is meant by aliasing effect? Explain.
d) What is the advantage of delta modulation over pulse modulation schemes?
e) What is the difference between coherent and non-coherent binary modulation schemes?
f) If the data transmission rate is R of a communication system, how much bandwidth is required if QPSK modulation is used?
g) What is meant by "Adaptive" in adaptive delta modulation?
h) What is pulse-shaping? Give one example of pulse-shaping filter function.
i) What do you mean by source coding and channel coding?
j) What do you mean by quantization?

Part – B (Answer any four questions)

Q3 **a)** With the help of neat block diagram explain the principle of adaptive delta modulation. Compare delta modulation with adaptive delta modulation. **(10)**
b) What is Nyquist criterion of zero ISI? Explain. **(5)**

Q4 **a)** Determine the bandwidth required for M-ary FSK system. Draw the geometrical representation of M-ary FSK signals and find out distance between the signals. **(10)**
b) What is eye pattern? How is eye pattern obtained on CRO? **(5)**

Q5 **a)** Give a block schematic for generation and reception of M-ary PSK. **(10)**
b) In a binary PCM system, the output signal-to-quantizing-noise ratio is to be held to a minimum value of 40 dB. Determine the number of required levels and find the corresponding output signal to quantizing noise ratio. **(5)**

Q6 **a)** Explain working principle of the T1 digital system. How frame synchronization is achieved in this system? **(10)**
b) What do you mean by an optimum filter? Derive its transfer function. **(5)**

Q7 **a)** Write short notes on Multiplexer and Regenerative Repeater. **(10)**
b) Why timing extraction is required in a digital communication system? Explain any scheme for this. **(5)**

Q8 **a)** Draw the signal space representation of QPSK and BPSK signals. Show that for the same data rate and same bit energy they have the same BER probability on the same AWGN channel, although one of the signals occupy half the bandwidth. **(10)**
b) What is matched filter? Find out its probability of error **(5)**

Q9 **a)** What is ISI? Explain the causes of ISI. Enumerate methods to take care of it. Is it detrimental to a communication system's performance? **(10)**
b) Given a sine wave of frequency f_m and amplitude A_m applied to a delta modulator having step size Δ. Show that the slope overload distortion will occur if $A_m > \frac{\Delta}{2\pi f_m T_s}$ Where T_s is the sampling period. **(5)**