Reg. No. :

Question Paper Code: 91Q01

M.E. DEGREE EXAMINATION, DEC 2020

First Semester

Communication Systems

19PCM101 - ADAPTIVE SIGNAL PROCESSING

(Regulation 2019)

Duration: One hour   Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1.   A real valued signal $x(n)$ is called as anti-symmetric if _____   CO1- R

     (a) $x(n)=x(-n)$ (b) $x(n)=-x(-n)$

     (c) $x(n)=-x(n)$ (d) none of the mentioned

2.   Time scaling operation is also known as _____   CO1- R

     (a) Down-sampling   (b) Up-sampling

     (c) Sampling   (d) None of the mentioned

3.   In polyphase filters, the subfilters which share a common delay   CO2- R
     line results in the reduction of the storage requirement by factor

     (a) 1   (b) 2   (c) 3   (d) 4

4.   A band limited signal with a maximum frequency of 5 KHz to be   CO2- R
     sampled. According to the sampling theorem, the sampling
     frequency which is not valid is:

     (a) 5 KHz   (b) 12 KHz   (c) 15 KHz   (d) 20 KHz

5.   How is the sampling rate conversion achieved by factor I/D?   CO3- R

     (a) By increase in the sampling rate with (I)

     (b) filtering the sequence to remove unwanted images of spectra of original signal

     (c) By decimation of filtered signal with factor D

     (d) All of the above

6. What is the transform that is suitable for evaluating the z-   CO3- R
   transform of a set of data on a variety of contours in the z-plane?

   (a) Goertzel Algorithm   (b) Fast Fourier transform

    (c) Chirp-z transform   (d) None of the mentioned

7. A bandpass sampling extends from 4-6 kHz. What is the smallest sampling   CO4- R
   frequency required to retain all the information in the signal.

   (a) 1 kHz   (b) 2 kHz   (c) 3 kHz   (d) 4 kHz

8. What is the process of converting a signal from a given rate to a   CO4- R
   different rate?

   (a) Sampling   (b) Normalizing

   (c) Sampling rate conversion   (d) None of the mentioned

9. In which of the following, sampling rate conversion are used?   CO5- R

   (a) Narrow band filters   (b) Digital filter banks

   (c) Quadrature mirror filters   (d) All of the mentioned

10. If F_x and F_y are the sampling rates of the input and output signals   CO5- R
    respectively, then what is the value of F_y/F_x?

    (a) D/I   (b) I/D   (c) I.D   (d) None of the mentioned

<div align="center">PART – B (3 x 8= 24 Marks)</div>

<div align="center">(Answer any three of the following questions)</div>

11. Explain in detail about discrete Kalman filter and its   CO1- U   (8)
    applications

12. Explain the method of subband coding of speech signals.   CO2- U   (8)

13. Give complete discussion on how LMS algorithm is converging   CO3- U   (8)
    with necessary derivation of equations and diagrams.

14. Describe the MA model and ARMA model for power spectrum   CO4- U   (8)
    estimation. Justify its uses.   .

15. Give some applications of DSP in design of phase shifters   CO5- U   (8)

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