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Question Paper Code: 59713A

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Fifth Semester

Biomedical Engineering

15UBM504 – PRINCIPLES OF DIGITAL SIGNAL PROCESSING

(Regulation 2015)

Duration: One hour

Maximum: 30Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. How many complex multiplications are need to be performed for each FFT algorithm? CO1- R
(a) $(N/2)\log N$ (b) $N\log_2 N$ (a) $(N/2)\log N$ (b) $N\log_2 N$
2. The Fourier transform of a discrete and a periodic sequence is _____ CO1- R
(a) Periodic (b) Continuous (c) Both (a) and (b) (d) None of the above
3. The method used to reduce the warping effect is called _____ CO2-R
(a) Frequency warping (b) Scaling (c) Pre warping (d) Deformation
4. A digital filter is a device that eliminates _____ and extracts the signal of interest from other signals CO2- R
(a) Frequency (b) Noise (c) Interference (d) Fluctuation
5. In FIR filters, which among the following parameters remains unaffected by the quantization effect? CO3- U
(a) Magnitude response (b) Phase characteristics
(c) Both (a) and (b) (d) None of the above
6. FIR digital filters are of following nature CO3- R
(a) Recursive (b) Non recursive
(c) Reversive (d) Non reversive
7. Which of the following is the rounding up value of (0.10110) CO4- U
(a) 0.110 (b) 0.101 (c) 0.111 (d) 0.100
8. Limit cycles in the recursive are directly attributable to which of the following? CO4- R
(a) Round off errors in multiplication (b) Overflow errors in addition

- (c) Both (a) and (b) (d) None of the above
9. FWT stands for CO5- U
 (a) Fast wavelet transformation (b) Fast wavelet transform
 (c) Fourier wavelet transform (d) Fourier wavelet transformation
10. FFT length in Barlett method is CO5- R
 (a) Zero (b) One (a) Zero (b) One

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Evaluate radix 2 – DIT FFT algorithm and obtain DFT of the sequence $x(n) = \{1,2,3,4,4,3,2,1\}$. CO1- App (8)
12. If $H_a(s) = \frac{1}{(s+1)(s+2)}$, find the corresponding H(z) using impulse invariant method for sampling frequency of 5 samples/Second. CO2- U (8)
13. Design an ideal high pass filter with a frequency response CO3- C (8)
 $H_d(e^{j\omega}) = 1$ for $\frac{\pi}{4} \leq |\omega| \leq \pi$
 $= 0$ for $|\omega| \leq \frac{\pi}{4}$
- Find the values of h(n) for N = 11 using hamming window. Find H(z) and determine the magnitude response.
14. Explain in detail the errors resulting from rounding and truncation. CO4- Ana (8)
15. Explain discrete wavelet transform. CO5- U (8)