B.Tech Even Semester Examination, May, 2025

Electronics & Communication Engineering

(8th Semester)

Course No: ECC-801B

(Wavelets)

Full Marks: 50

Pass Marks: 25

Time: 2 hours

Note:

1. Attempt any five questions.
2. Begin each answer in a new page
3. Answer parts of a question at a place
4. Assume reasonable data wherever required
5. The figure in the right margin indicates full marks for the question
6. All the mathematical symbols and abbreviations have their usual meanings.

1. (a) What is wavelet? What are the different types of wavelets, explain in detail. 6

   (b) The sampled voltages obtained by scanning the intensity distribution of photographic images are [4,4,5,3,2,0,2,2]. Find the coefficient of Haar wavelet transform. 4

2. (a) Explain the properties of wavelets. 4

   (b) Explain Tiling of time scale plane for Continuous Wavelet Transform. 6

3. (a) What is uncertainty principle? How it is related to continuous wavelet transform? 7

   (b) Define decimator? Design a decimator of a decimation factor 2. 3

Turn Over

4. (a) Compute DWT through sub-band coding. 5

   (b) Explain spectral domain analysis of a two channel perfect reconstruction filter bank. 5

5. (a) Explain Bi-orthogonal two channel filter bank approach in detail. 5

   (b) Explain Half band approach in detail. 5

6. (a) What are conditions required a function to be a scaling function in Multi Resolution Analysis. 4

   (b) Draw and explain system for approximation and prediction residual pyramids. 3 + 3

7. (a) What is Wavelet Packet? Draw a three-scale wavelet packet analysis tree. 6

   (b) Explain how a Discrete Wavelet Transform is used for image compression. 4

8. Explain following application of wavelet in detail.

   a) Digital Communication and Multicarrier Modulation using wavelets.

   b) Edge detector. 5x2=10

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