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BIELE-014

B.Tech. – VIEP – ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

Term-End Examination

June, 2015

00396

BIELE-014 : MULTIRATE SYSTEMS

Time : 3 hours *Maximum Marks : 70*

Note : *Answer any **seven** questions. All questions carry equal marks. Missing data, if any, may be suitably assumed. Use of scientific calculator is permitted.*

1. Give the statement of sampling theorem. Derive the condition necessary for the existence of sampling theorem. *3+7=10*

2. What are the advantages of multirate digital signal processing ? Explain its significance in the field of signal processing. *5+5=10*

3. Give the polyphase representation of a Quadrature Mirror Filter (QMF) bank. What are the various sources of error in QMF ? Explain them in brief. *4+6=10*

4. What are the considerations taken into account while designing an alias free QMF bank ? *10*

5. What do you understand by the term "Power Symmetry" ? How is power symmety achieved in QMF bank ? Explain in brief. *3+7=10*

6. What are the various necessary and sufficient conditions for perfect reconstruction of M-channel filter bank ? *10*

7. Explain the different types of quantization effects in Linear Phase Perfect Reconstruction (LPPR) filter banks. *10*

8. Explain the steps involved in the design of a filter bank having equal pass bandwidth. *10*

9. With the help of a neatly labelled block diagram, explain the operation and design of an interpolator. *10*

10. Write short technical notes on any ***two*** of the following : *2×5=10*

    (a) Sub-Nyquist Sampling

    (b) Round-off Noise and Limit Cycle

    (c) Sub-band Coding Gain