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BIELE-014

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

00253

Term-End Examination

December, 2016

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 and stated.*

1. State 'Sampling Theorem'. With the help of suitable examples, differentiate between up sampling and down sampling. *3+7=10*

2. List the various identities involved during multirate operations. Mathematically prove all the identities by choosing appropriate examples. *10*

3. What are 'Quadrature Mirror Filter (QMF)' banks ? Explain their application in the field of multirate signal processing with mathematical expressions. *3+7=10*

4. Explain the mathematical procedure involved in the design of an alias-free QMF bank. *10*

5. Mathematically explain the difference between filter banks with equal and unequal pass bandwidth. *10*

6. Explain the following errors created by a system of filter banks : *5+5=10*
   (a) Aliasing and imaging
   (b) Amplitude and phase distortion

7. What are the various lattice structures available for Linear Phase Perfect Reconstruction (LPPR) Filter banks ? Explain the procedure involved in their implementation. *10*

8. Differentiate between the following terms : *5+5=10*
   (a) Round-off noise and Limit cycles
   (b) Dynamic range and Scaling

9. Write short technical notes on any ***two*** of the following : *5+5=10*
   (a) Sub-Nyquist Sampling
   (b) Power Symmetry in QMF Bank
   (c) Sub-band Coding Gain
   (d) Coefficient Sensitivity Effects