

**Code: 1G372**

IV B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

**Digital Signal Processing**

( Common to EEE &amp; ECE )

Max. Marks: 70

Time: 3 Hours

Answer any **five** questionsAll Questions carry equal marks ( **14 Marks each** )

\*\*\*\*\*

1. a) What are the major classifications of signals? Illustrate each with suitable examples. 4M  
b) Determine the unit step response of an LTI system characterized by the following difference equation  $y(n) - 5y(n-1) + 6y(n-2) = x(n)$ , where  $x(n)$  is the input and  $y(n)$  is the output. 10M
2. a) Find the amplitude and phase spectrum of a time shifted impulse signal  $f(n) = 10 u(n-2)$  4M  
b) Determine the 4-point DFT of the of the sequence  $x(n) = \cos \frac{nf}{4}$  10M
3. a) State and prove the circular convolution property of DFT for two finite sequences. 4M  
b) Compute 8 point DFT of the sequence  $x(n)=[ 1,2,3,4,4,3,2,1 ]$  using DIT-FFT algorithm 10M
4. a) With reference to z transform, state initial and final value theorems. 4M  
b) Obtain direct and cascade realization of FIR linear phase filter with system function 
$$H(z) = \left(1 + \frac{1}{2}z^{-1} + z^{-2}\right) \left(1 + \frac{1}{4}z^{-1} + z^{-2}\right)$$
 10M
5. a) Use bilinear transform to design a 1<sup>st</sup> order Butterworth LPF with 3dB cut-off frequency of 0.2 radian 7M  
b) Realize the system with transfer function,  $H(z) = \frac{(1-z^{-1})^3}{(1-0.5z^{-1})(1-0.125z^{-1})}$  in parallel form 7M
6. a) Discuss how the frequency response of FIR filter get affected using (i) Rectangular, (ii) Hanning, (iii) Bartlett, (iv) Hamming, and (v) Kaiser windowing? 6M  
b) The desired frequency response of LPF is 
$$H_d(w) = \begin{cases} e^{-j3w}, & -\frac{3f}{4} \leq w \leq +\frac{3f}{4} \\ 0, & \frac{3f}{4} \leq |w| \leq f \end{cases}$$
  
Determine  $H(w)$  for order,  $M=7$  using rectangular window? 8M
7. a) Express the polyphase FIR filter implementation of decimator and interpolator by a factor of 2. 7M  
b) A one stage decimator is characterized by the following: Decimation factor=3, Anti-aliasing filter coefficients;  $h(0)=h(4)= -0.08$ ,  $h(1)=h(3)=0.3$ ,  $h(2)=0.8$ . Given the data,  $x(n)=[5, -2, -3, 10, 6, 4, -2]$ , calculate the list of the filtered output  $w(n)$  and the output of the decimator  $y(m)$ . 7M
8. a) What is subband coding? Draw the analysis and synthesis method of subband coding of a signal? 7M  
b) What is digital transmultiplexer? With suitable diagram explain the conversion of FDM-TDM and vice versa using transmultiplexers? 7M

\*\*\*

Hall Ticket Number :										
----------------------	--	--	--	--	--	--	--	--	--	--

<b>R-11 / R-13</b>
--------------------

**Code: 1G47C**

IV B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

**Soft Computing Techniques**

( Electrical and Electronics Engineering )

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions  
All Questions carry equal marks ( **14 Marks each** )  
\*\*\*\*\*

- 1. a) Explain about different architectures of Neural networks with neat diagrams? 7M  
b) Write short notes on supervised and reinforcement learning methods? 7M
- 2. a) Derive the convergence theorem for perceptron learning rule? 7M  
b) Explain Hebbian learning Algorithm in detail? 7M
- 3. a) Explain the delta rule used to adjust the weights of ADALINE network? 7M  
b) What are the deficiencies of back propagation algorithm? 7M
- 4. a) What are Bidirectional Associative Memory (BAM) networks? Explain the training algorithm? 7M  
b) Describe Hopfield network as associative memory? 7M
- 5. a) What are the operations on fuzzy sets? Explain with examples? 7M  
b) Given  $A = \{(x1,0.1), (x2,0.5), (x3,0.3)\}$  and  $B = \{(y1,0.3), (y2,0.4)\}$  be the two fuzzy sets on the universe of discourse  $X = \{x1, x2, x3\}$  and  $Y = \{y1, y2\}$  respectively. Find the Cartesian product of A and B? 7M
- 6. a) What are various defuzzification methods? Explain? 7M  
b) Explain briefly about rule base and decision making system? 7M
- 7. a) Compare and contrast Genetic algorithm with other Optimization Techniques? 7M  
b) How is crossover operation performed? Give examples to illustrate various crossover techniques? 7M
- 8. a) Discuss briefly how load flow studies can be done using ANN? 7M  
b) Discuss briefly about fuzzy logic based unit commitment problems? 7M

\*\*\*

Code: 1G272

IV B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

**Switch Gear and Protection**

( Electrical and Electronics Engineering )

Max. Marks: 70

Time: 3 Hours

Answer any **five** questionsAll Questions carry equal marks ( **14 Marks each** )

\*\*\*\*\*

1. a) Explain the phenomenon of current chopping in a circuit breaker. What is the effect of current chopping on the circuit breaker as well as on the system? 7M
- b) A circuit interrupts the magnetizing current of a 100MVA transformer at 220kV. The magnetizing current is 5% of the full load current. Determine the maximum voltage which may appear across the Gap of the breaker when the magnetizing current is interrupted at 53% of its peak value. The stray capacitance is 2500 microfarad. The inductance is 30H. 7M
2. a) With a neat diagram, discuss the constructional details and operational features of a typical minimum oil circuit breaker. Also state its advantages and disadvantages over others 8M
- b) Describe the construction, principle of operation and applications of Air-blast circuit breaker. 6M
3. a) What is meant by percent bias? How is it achieved in differential relay? Under what circumstances is a percentage differential relay preferred over the differential relay? 7M
- b) What is meant by directional feature of a directional over current relay? Describe the construction ,principle of operation and application of a directional over current relay 7M
4. a) What is a static relay? What are the merits and demerits of static relays over electromagnetic relays ?Give the applications of static relay 8M
- b) Give the block diagram for a microprocessor based IDMT relay along with its flow chart. 6M
5. a) An alternator rated at 10kV protected by balanced circulating current system has its neutral grounded through a resistance of 10 ohms. The protective relay is set to operate when there is an out of balance current of 1.8 amp in the pilot wires, which are connected in the secondary windings of 1000/5 ratio current transformers. Determine (i) the percent winding which remains unprotected ,(ii) the minimum value of the earthing resistance required to protect 80% of the winding 7M
- b) Describe with a neat diagram, a circulating current protection scheme for a 3-phase, 1 MVA, 11kV/400 volts delta-star transformer. If the current transformers have a nominal secondary current of 5 amps, calculate their ratios. 7M

6. a) What is meant by 3-zone protection? Give such scheme of protection for medium transmission lines. Draw the schematic diagram 7M
- b) The CT ratio for all the CTs in the busbar differential scheme has to be the same and is decided by the feeder carrying the maximum current. Explain 7M
7. a) Discuss the effects of ungrounded neutral on system performance 6M
- b) What are the various methods of neutral grounding? Explain the method of Peterson coil grounding. 8M
8. a) What are the causes of over voltages arising on a power system? Why is it necessary to protect the line and other equipment of the power system against over voltages? 8M
- b) What are BILS? Explain their significance in power system studies with respect to insulation coordination 6M

\*\*\*