TE sem- VI - Old - Electrical 26/5/17

Q.P. Code :13751

[Time: Three Hours] **[Marks:100]**

Please check whether you have got the right question paper.

N.B: 1. Question.No.1 is compulsory.
2. Attempt any five in all.
3. Assume suitable data, wherever necessary.

Q.1. a. Prove convolution Property of $\mathcal{Z}$ – Transform 6

b. Determine the periodicity of the following signals if they are periodic:- 8

i) $x(t) = 5\cos 4\pi t + 3\sin 8\pi t$.

ii) $X(n) = (\sqrt{j})^n + (-\sqrt{j})^n$

c. Find x(n) considering all possible region of convergence $x(z) = \frac{10Z}{(Z-1)(Z-2)}$ 6

Q.2. a. Find inverse z trasfrom of the following :-

$x(z) = \frac{Z}{3z^2-4z+1}$ For following ROC conditions:-

i) $1z|>|$

ii) $|z| < \frac{1}{3}$

iii) $\frac{1}{3} < |z| < 1$

b. Define radix 2 – DITFFT algorithm and draw diagram of N = 4. 10

Q.3. a. Draw pole –zero plot and identify the filter based on its pass band by analytical method:- 10

$H(z) = \frac{1}{1+0.8z^{-1}}$

b. State and prove any four properties of DFT 10

Q.4. a. Find DTFT of $x(n) = (\frac{1}{2})^n u(n)$ and sketch its magnitude and phase plot. 10

b. Find impulse response and stop response of the system:- 10

$y(n)+3y(n-1)=x(n)$ given $y(-1) = 1$

Q.5. a. Sketch the signals using step and ramp signal:- 10

i) $x(t) = 2u(t)+r(t-2) -2r(t-3)+r(t-4)-2\ u\ (t-6)$

ii) $x(t) = 2\ \delta(n) +3\delta\ (n-2)$

b. Check whether the following systems systems are static/dynamic causal/Anticausal stable/ unstable and Time-invariant/time variant. 10

i) $y(n) = X^2(n)$

ii) $y(n)= X(n^2)$

Q.6. a. Find z-transfarm of the following sequence:-

i) $x(n) = u(n-6) - u\ (n-10)$ 10

ii) $x(n) = \left[\left(\frac{1}{2}\right)^n - \left(\frac{1}{2}\right)^n\right]u(n)$

b. Find DFT of the following using DIT-FFT 10

$x(n) = \{1,2,1,2,0,2,1,2\}$

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Q.7. Write short notes on any two of the following :- 20

i. DSP processors.

ii. Linear convolution and circular convolution with examples.

iii. Different types of signals & systems.
