Hall Ticket Number :										

R-14

Code: 4G331

II B.Tech. I Semester Supplementary Examinations May 2018

Electronic Circuits

(Electronics & Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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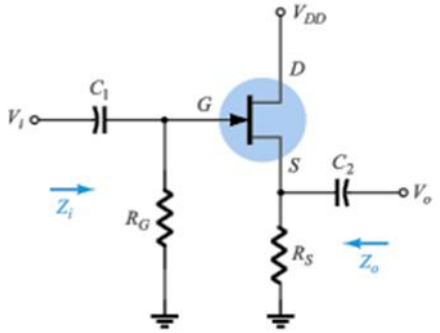
UNIT–I

1. a) Using the *small signal analysis of JFET*, obtain the expressions for input impedance, output impedance and voltage gain of the circuit given below.

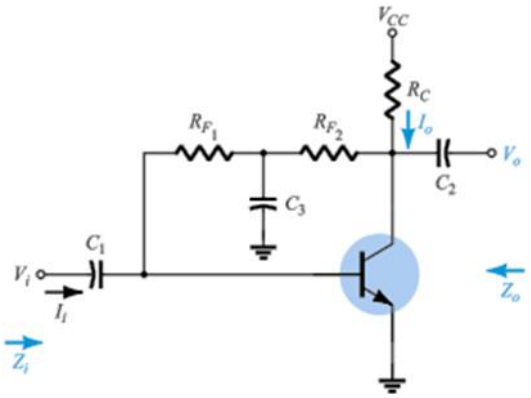


9M

b) Explain with an example, the application of unity gain source follower as an impedance matching circuit. 5M

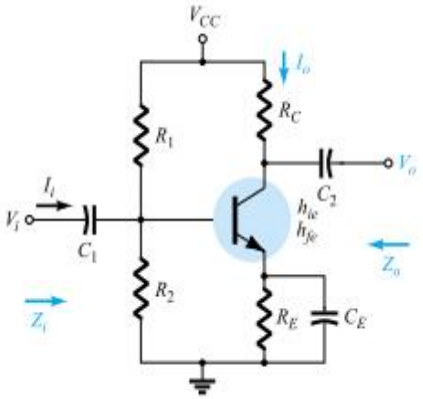
OR

2. a) Collector DC feedback configuration is given below. Using r_e model obtain the expressions for input impedance, output impedance and voltage gain of the circuit given above.



7M

b) Using the *h – parameter* model of the transistor, obtain the expressions for input impedance, output impedance and voltage gain of the circuit given below.



7M

UNIT–II

3. a) Obtain the expression for short circuit current gain of CE amplifier 9M

   b) Explain the significance of Gain Bandwidth product. 5M

OR

4. a) What is Emitter follower? Why it is called so? Explain the application of Emitter follower as impedance matching Circuit. 7M

   b) With a circuit diagram, explain the behavior of Emitter follower at High frequencies. 7M

UNIT–III

5. a) Compare the input impedance, output impedance and gain of Voltage series and voltage shunt negative feedback amplifiers. 10M

   b) Prove that negative feedback increases the bandwidth. 4M

OR

6. a) Prove that negative feedback helps in stabilization of gain. 4M

   b) Compare the input impedance, out impedance and gain of Current series and current shunt negative feedback amplifiers. 10M

UNIT–IV

7. a) With a circuit diagram explain the working of crystal oscillator. What is the advantage of using crystal oscillator? 7M

   b) Explain with a circuit diagram the working of Colpitts Oscillator. 7M

OR

8. a) Explain the Barkhausen criteria for oscillations. 5M

   b) Derive the expression for frequency of oscillation of Weinbridge oscillator. 9M

UNIT–V

9. a) Derive the efficiency of Class B Amplifier. 7M

   b) Explain crossover distortion in Class B power amplifier. 7M

OR

10. a) What is the significance of Q factor in a tuned amplifier? 6M

    b) Compare the operation of capacitive coupled and inductive coupled amplifiers. 8M

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Hall Ticket Number :										

R-14

Code: 4G235

II B.Tech. I Semester Supplementary Examinations May 2018

Electrical Circuit Theory

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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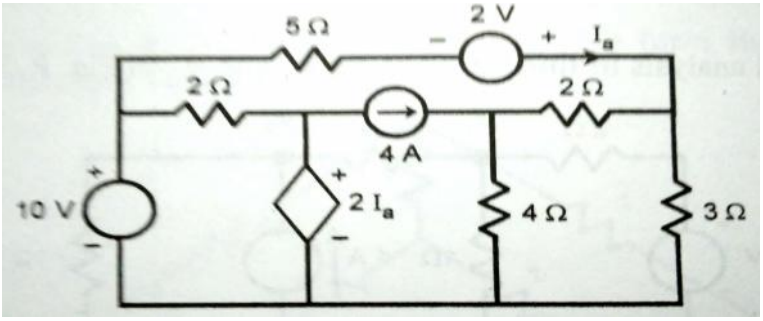
UNIT–I

1. a) A current $i=10\ e^{-t}$ is applied to
   a) a 3Ω resistor
   b) a 2H inductor and
   c) a 0.1 F capacitor

   What are the respective voltages?

   Write down the expressions for power in each case? 6M

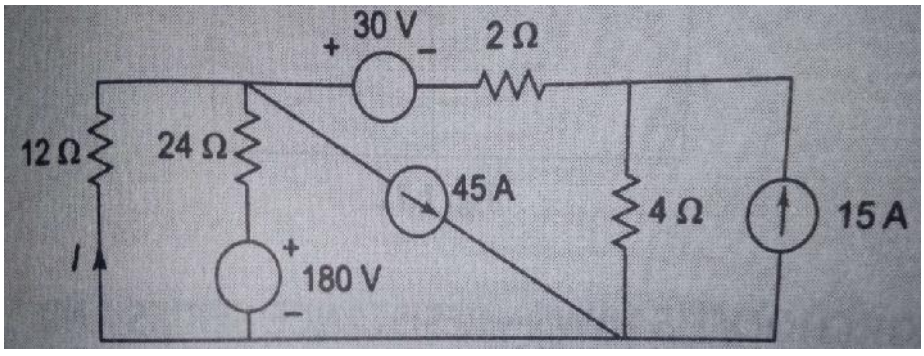
   b) Use nodal analysis to find the power delivered by the 4 A current source shown in figure :



8M

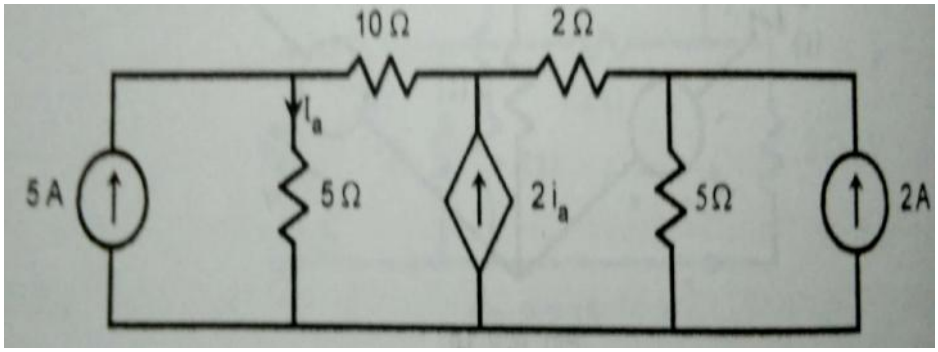
OR

2. a) Reduce the network shown in Fig. to a single loop network by successive source transformation, to obtain the current in the 12ohms resistor.



6M

   b) Use mesh analysis to find the current I_a shown in figure:

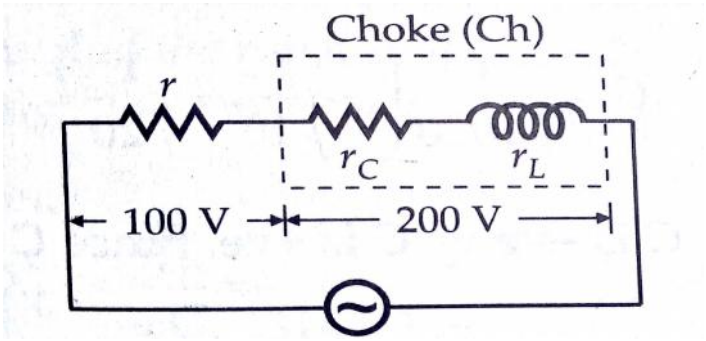


8M

UNIT–II

3. a) The voltage of a circuit is v=200 sin(ωt+30^0), the current is i= 50 sin(ωt+60^0). Calculate the average power, reactive volt amps and apparent power. 6M

   b) In below fig "r" is a pure resistance and "CH" the choke coil, connected in series. Power dissipated in 'r' being 250W and that in choke 50w, find the value of the reactance in the choke and the value of the supply voltage.



8M

OR

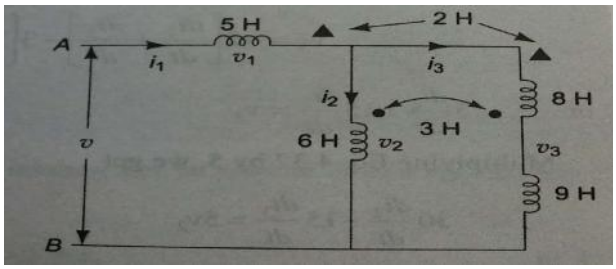
4. a) Add the following currents:

   i_1=5 sinωt
   i_2=10 cos(ωt+30^0)
   i_3= -5 sin(ωt-30^0) 6M

   b) A resistor and a capacitor are in series with a variable inductor. When the circuit is connected to a 200volt 1 phase 50Hz a.c supply, a maximum current of 0.314 amps was obtained by varying the inductance. The voltage across the capacitance was then 300volts. Calculate the circuit constants. 8M

UNIT–III

5. a) Calculate the effective inductance of the circuit shown in Fig. across AB.



8M

   b) Write the analogy between magnetic and electric circuit. 6M

OR

6. a) A constant voltage at a frequency of 1MHz is applied to an inductor in series with a variable capacitor when the capacitor is set to 500PF, the current has the max. value, while it is reduced to one half when capacitance 600PF, find (i) resistance (ii) inductance (iii) Q factor of inductor. 8M

   b) Compare series and parallel resonant circuits. 6M

UNIT–IV

7. a) Explain the relation between line and phase voltages and currents in a star connection. 6M

   b) A delta connected load with impedance Z_{AB}= 10∠30^o Ohms, Z_{BC}= 25∠0^o Ohms, Z_{CA}= 20∠-30^o Ohms is connected to a three phase three wire 500Volts system. If the phase sequence is ABC, calculate the line currents and total power. 8M

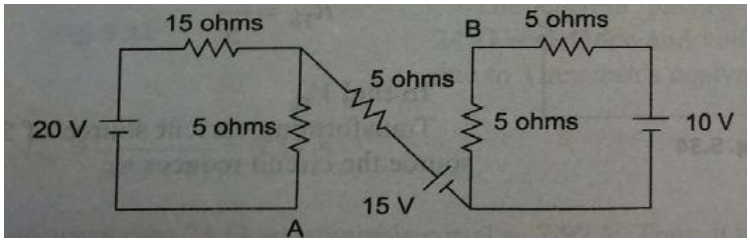
OR

8. a) Three inductors each of resistances 2 Ohms and an inductive reactance of 8 Ohms are connected in star and supplied from a three phase 230 V, 50 Hz supply. What are the line and phase currents and voltages? Also calculate the power input and power factor. 6M

   b) The power delivered to a balanced delta connected load by a 400 Volt, 3 phase supply is measured by two wattmeter method. If the readings of the two watt meters are 2000 and -1500 watts respectively, calculate the magnitude of the impedance in each arm of the delta load and its resistive component. 8M

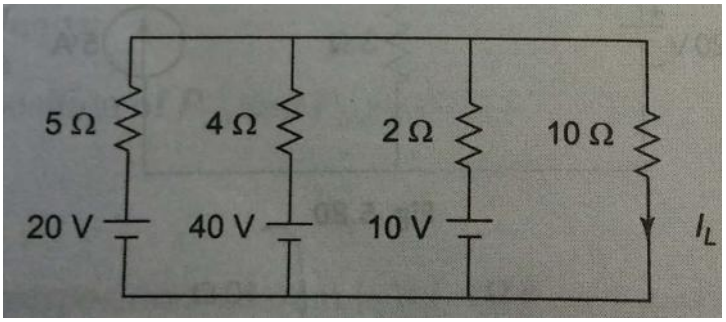
UNIT–V

9. a) Determine the Thevenin's equivalent across the terminals A and B as shown in Fig.



8M

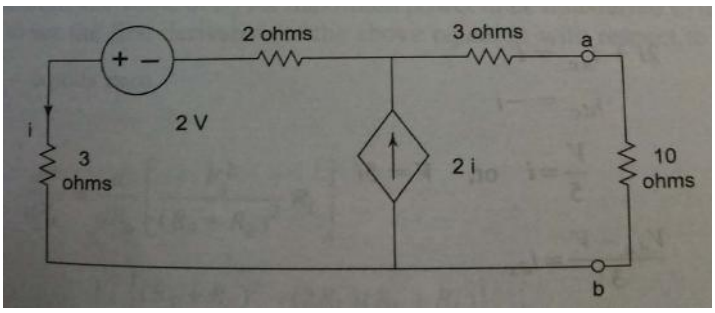
   b) Find the current I_L. Use Millman's theorem.



6M

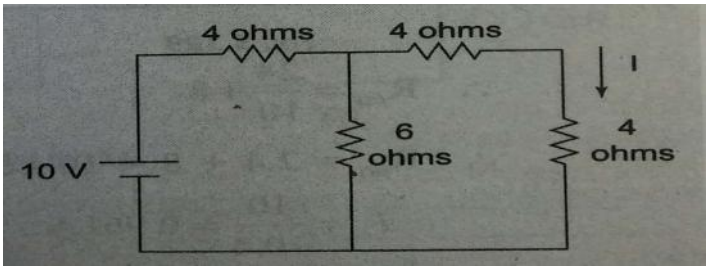
OR

10. a) Find the Norton's equivalent across the terminals ab as shown in Fig. Hence find current through 10 ohms.



8M

   b) Verify reciprocity theorem for the network shown in Fig.



6M

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Hall Ticket Number :										

R-14

Code: 4G332

II B.Tech. I Semester Supplementary Examinations May 2018

Pulse and Digital Circuits

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Prove that for any periodic input waveform the average level of the steady state output signal from the RC high pass circuit is always Zero. 7M

   b) Draw the RC low pass circuit. With necessary waveforms and expressions explain its working for a step voltage input 7M

OR

2. a) Which linear circuit is required to obtain the output for the given input shown in Figure 1. Explain its operation with necessary equations?

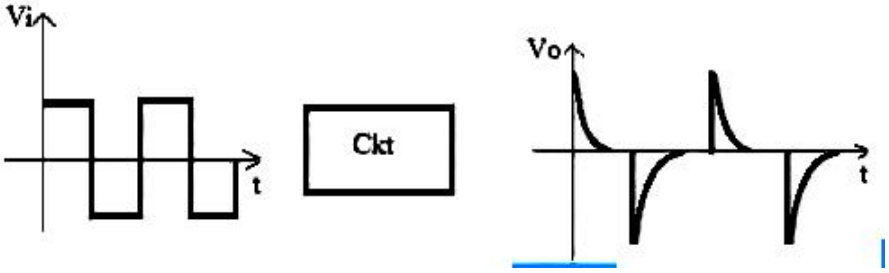

Figure 1 7M

   b) A constant voltage of 100V is applied to a series RLC circuit with L=10H, R=20Ω and C=5F. The initial current in the circuit is zero but there is an initial voltage of 50V on the capacitor in a direction which opposes the applied source. Find the expression for the current in the circuit and derive the expressions used.

7M

UNIT–II

3. a) Classify different types of clipper circuits and explain their operation with neat diagrams 8M

   b) Explain the operation of two level slicer 6M

OR

4. a) A square wave input as shown in Figure 2 is applied to a negative clamper circuit. Sketch the steady-state output waveform and derive the necessary expressions.

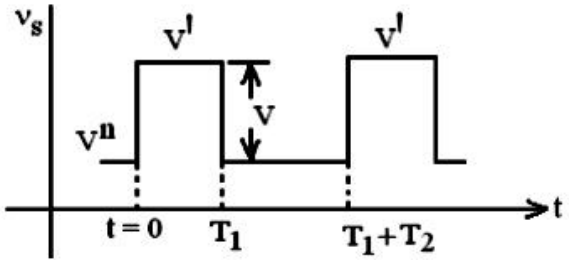

Figure 2 8M

   b) Explain negative peak clipper with and without reference voltage 6M

UNIT–III

5. a) Draw and explain the circuit of transistorized Bootstrap sweep generator. Derive an expression for retrace interval, T_r 7M

   b) Draw the circuit of simple current time-base generator and explain its operation with the help of neat waveforms and necessary equations. 7M

OR

6. a) Explain the principle of "synchronization" and "synchronization with frequency division" 7M

   b) Explain the method of pulse synchronization of relaxation devices, with examples. 7M

UNIT–IV

7. a) What do you mean by collector catching diodes? Explain the need of these diodes in a bistable multivibrator. 6M

   b) For the given circuit shown in figure 3 find UTP & LTP. What is this circuit called? Data given h_{fe} (min) = 40, V_{CE} (sat) = 0.1 V, V_{BE} (sat)=0.7 V, V_γ = 0.5V, V_{BE} (active) = 0.6V.

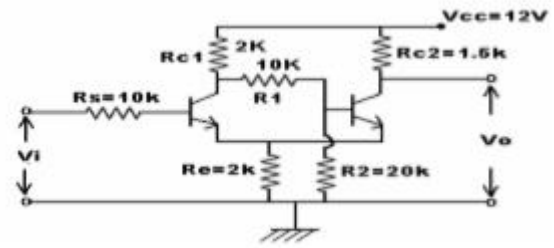

Figure 3 8M

OR

8. a) Draw and explain the circuit of Astable Multivibrator with necessary waveforms and derive the expression for its frequency of oscillations. 8M

   b) With reference to multivibrators, explain: i) stable-state ii) loop-gain iii) quasi stable-state 6M

UNIT–V

9. a) Realize a three-input NAND GATE using Transistor- Transistor Logic. Explain its operation with Totem-pole load. 7M

   b) Compare the RTL and DTL logic families in terms of Fan out, propagation delay, power dissipated per gate and noise immunity. 7M

OR

10. a) Draw the circuit of two-diode bi-directional sampling gate. Explain its operation & derive expressions for gain and minimum control voltage in the circuit. 8M

    b) Explain how to cancel the pedestal in a sampling gate with suitable circuit diagram. 6M

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Hall Ticket Number :										

R-14

Code: 4G333

II B.Tech. I Semester Supplementary Examinations May 2018

Signals and Systems

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

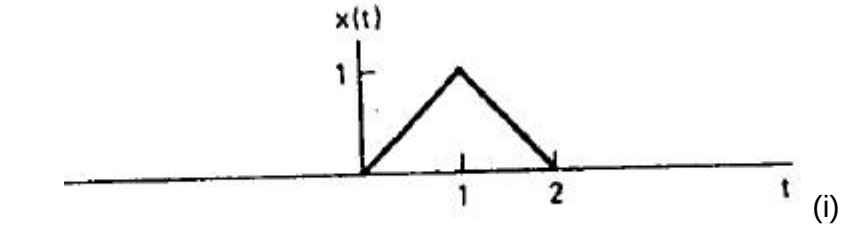
1. a) Categorize each of the following signals as an energy or power signals, and find the energy or power of the signal.

i. $x[n] = \begin{cases} n, & 0 \le n \le 5 \\ 10 - n, & 5 \le n \le 10 \\ 0, & otherwise \end{cases}$

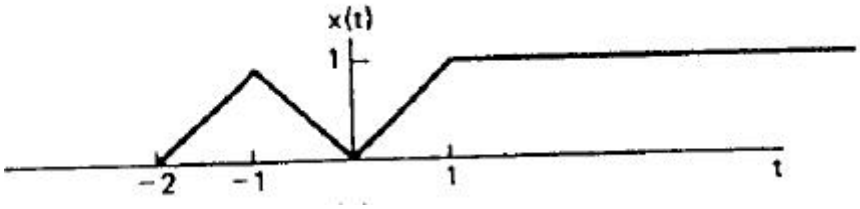
ii. $x(t) = \begin{cases} 5\cos(\pi t), & -0.5 \le t \le 0.5 \\ 0, & otherwise \end{cases}$

iii. $x(t) = 5\cos(\pi t) + 5\sin(5\pi t), \quad -\infty < t < \infty$ 7M

b) Determine and sketch the even and odd parts of the signals depicted in the Fig. 1 (i) and (ii). Label your sketches carefully.



(i)



(ii)

Fig. 1 7M

OR

2. a) Find the Trigonometric Fourier series for the triangular periodic signal *x*(*t*) shown in Fig.2, and sketch the amplitude and phase spectra for *x*(*t*).

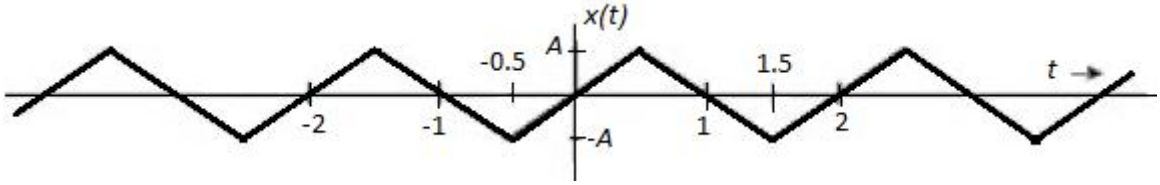


Fig. 2

9M

b) Determine whether or not each of the following signals is periodic. If a signal is periodic, determine its fundamental period.

i. $x(t) = 2\cos\left(3t + \frac{\pi}{4}\right)$

ii. $x(t) = e^{j(\pi t - 1)}$

5M

UNIT–II

3. a) State and prove time convolution property of Fourier Transform. 4M

   b) Obtain the Fourier transform of the trapezoidal pulse shown in the following Fig. 3.

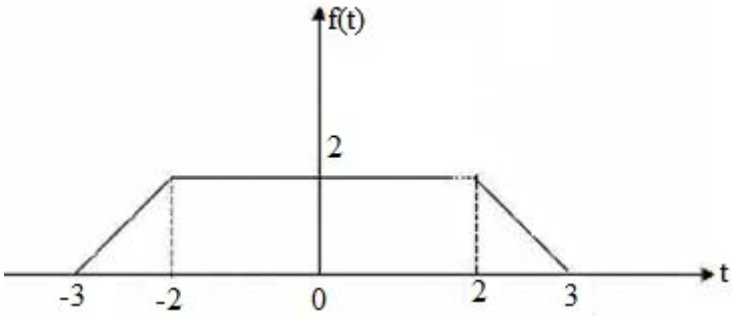


Fig. 3 10M

OR

4. a) Find the Fourier transform of the following signals:

   $i. x(t) = A\ sin\omega_o t$

   $ii. x(t) = A\ cos\ \omega_o t$

   Also, Draw the spectrums of those. 7M

   b) Define Hilbert transform in both time domain and frequency domain. Also, list its properties. 7M

UNIT–III

5. a) Obtain the conditions for the distortion-less transmission through a system. Also, elaborate meaning of those with examples. 7M

   b) Derive the relation between bandwidth and rise time of a system. 7M

OR

6. a) Explain the characteristics of an ideal LPF, HPF and BPF. Also, explain why these cannot be realized. 10M

   b) Define Impulse Response and Transfer function. Also, give the relation between the two. 4M

UNIT–IV

7. a) Define Nyquist Rate and then find the Nyquist Rate for the following signals:
   i) Rect (300t) ii) 10 Cos 300πt. 5M

   b) Find the graphical convolution between the signals $[u(t) + u(t-\tau)]$ and $e^{-t}u(t)$. 9M

OR

8. a) State and prove properties of Auto-correlation and Cross-correlation. 7M

   b) Explain how a signal is reconstructed from its Samples with corresponding equations and waveforms. 7M

UNIT–V

9. a) Find the Laplace transform and ROC of signal $x(t) = e^{-at}cos\omega_o t\, u(t)$. 6M

   b) Find the Inverse Z-transform of $x(z) = \frac{1}{(1+z)} + \frac{2z}{(z-0.2)}$ for different possible ROCs. 8M

OR

10. a) State and prove any FOUR properties of Z-transform. 8M

    b) Find Z – transform, ROC and pole – zero locations of $x[n] = (\frac{1}{4})^n u[n] + (\frac{1}{3})^n u[-n-1]$. 6M

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