Hall Ticket Number :										

R-14

Code: 4G331

II B.Tech. I Semester Supplementary Examinations May 2019

Electronic 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) Draw the small signal hybrid equivalent model of a transistor. Derive the expressions for A_I, Z_i, Av and Y_o. 8M

   b) A CE amplifier is drawn by a voltage source of internal resistance R_s = 800 Ω and the load impedance is a resistance R_L = 1000 Ω. The h-parameters are h_{fe} = 50, h_{ie} = 1 kΩ, h_{oe} = 25 μA/V and hre = 2 x 10^{-4}. Calculate A_i, A_v, Z_i and Z_o using exact analysis. 6M

OR

2. Draw the circuit diagram of two stage RC coupled transistors amplifiers. Explain the operation and calculate the mid frequency range and low frequency range. 14M

UNIT–II

3. Determine high frequency parameters of Hybrid – π model in terms of low frequency parameters. 14M

OR

4. a) Define Gain Bandwidth product and derive the relation between f_T and f_β. 7M

   b) Derive the expression for CE Short circuit current gain with the help of necessary circuit diagrams and approximations. 7M

UNIT–III

5. a) Derive the expression for feedback gain, input resistance and output resistance for voltage series feedback amplifier. 8M

   b) A voltage series negative feedback amplifier has a voltage gain without feedback of A=50, input resistance R_i= 2KΩ, output resistance R_o= 15KΩ and feedback ratio of 0.01. Calculate the voltage gain, input resistance and output resistance of the amplifier with feedback? 6M

OR

6. a) Prove that negative feedback increases the bandwidth and decreases the distortion. 7M

   b) An amplifier has a gain of 400, f_1=50Hz,f_2=200KHz and a distortion of 10% without feedback. Determine the amplifier voltage gain f_{1f}, f_{2f} and D_f when a negative feedback is applied with feedback ratio of 0.01. 7M

UNIT–IV

7. a) With a neat circuit diagram, explain the generalized analysis of LC oscillator. 8M

   b) Colpitt's oscillator is designed with C_2=100 pF, C_1= 7500pF and a variable inductance. Determine the range of inductance values, if the frequency of oscillation is varied between 950 KHz and 2050 KHz. 6M

OR

8. a) Classify various types of oscillators. Explain in brief. 6M

   b) Show that the gain of Wein-bridge oscillator using BJT amplifier is at least 3 for oscillations to occur. 8M

UNIT–V

9. a) Show the conversion efficiency of transformer coupled class A amplifier is 50%. 8M

   b) Explain the operation of Class B push pull amplifier. 6M

OR

10. Describe the operation of a single tuned capacitive coupled amplifier and derive the expression for bandwidth. 14M

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Hall Ticket Number :										

R-14

Code: 4G235

II B.Tech. I Semester Supplementary Examinations May 2019

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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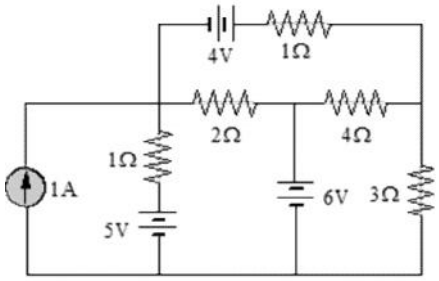
UNIT–I

1. Determine the current through 3 ohms resistor using node voltage analysis



OR

2. Explain about Star &Delta transformations with equations.

UNIT–II

3. a) Explain the advantages of AC supply

   b) A series circuit consisting of a resistor of 10 ohms and an inductance of 100mH is connected across a 200V, 50Hz, single phase ac supply. Determine the current drawn, real power and reactive power

OR

4. a) Define Cycle, Time Period, Frequency, Peak to Peak value & Amplitude with wave forms.

   b) A voltage wave is represented by v=200sin314t. Find i)Maximum value ii)RMS value iii) Average Value iv) Frequency v) Time period vi)instantaneous value after 0.05 sec.

UNIT–III

5. A steel ring of 180cm mean diameter has a cross-sectional area of 250mm^2. Flux developed in the ring is 250μWb when a 4000 turns coil carries certain current. Calculate i) MMF required ii) Reluctance iii) current in the coil. Assume relative permeability of steel is 1100.

OR

6. a) Derive the expression for resonant frequency of a parallel resonant circuit.

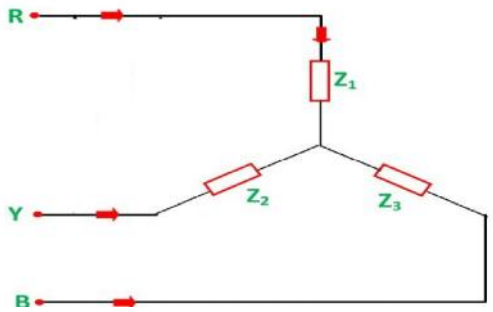
   b) A series RLC circuit has R=1000Ω, L=100mH and C=10μF. If a voltage of 100V is applied across the series combination. Calculate i) Resonant frequency ii) Q-factor and iii) Half power frequencies.

UNIT–IV

7. Obtain the relationship between line and phase voltages and currents in Delta connection with phasor diagram.

OR

8. A three phase balanced system supplies 100V, 50Hz to star connected load whose phase impedances are (6+j8)ohm. Determine the line currents and voltages and also draw the phasor diagram.



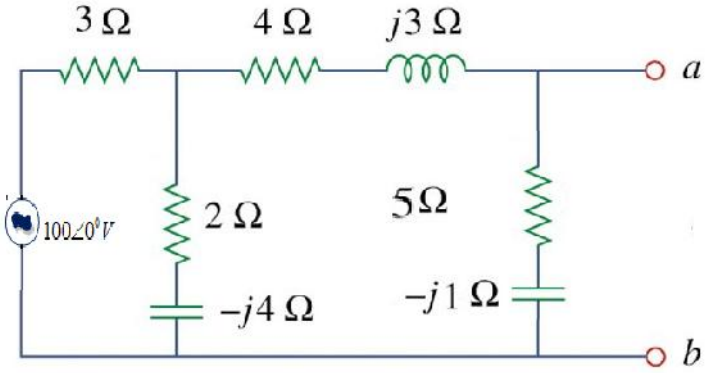
UNIT–V

9. a) State and explain Superposition theorem with an example

   b) State and explain Millman's theorem.

OR

10. Find the load impedance Z_L across ab for maximum power transfer to the load. Also find the max. power delivered to the load impedance for the network shown below



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Hall Ticket Number :										

R-14

Code: 4G333

II B.Tech. I Semester Supplementary Examinations May 2019

Signal 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) Obtain the condition under which two signals $f_1(t)$ and $f_2(t)$ are said to be orthogonal to each other. Hence prove that Sin nw_ot and Cos mw_ot are orthogonal to each other for all integer values of m,n 7M

   b) Derive the necessary expression to represent the function f(t) using Trigonometric Fourier Series 7M

OR

2. a) Compute the Fourier Transform of i) f(t) = (1/2) - n u(-n-1) ii) f(t) = sin (n π/2)+cos (n) 8M

   b) State and prove sampling theorem for band limited signals using graphical approach. And What is aliasing? Explain its effect on sampling. 6M

UNIT–II

3. a) Find the Fourier transform of a gate pulse of unit height, unit width and centered at t=0. 7M

   b) Determine the Fourier Transform for double exponential pulse whose function is given by y (t) = $e^{-2|t|}$ Also draw its magnitude and phase spectra 7M

OR

4. a) Find the Fourier Transform of (i) Triangular pulse with period T = 8Sec and amplitude A = 10V. (ii) One cycle of sine wave 8M

   b) What is aliasing? Explain its effect on sampling. 6M

UNIT–III

5. a) What are the requirements of a system to allow the distortion less transmission of a signal? 7M

   b) What is the impulse response of two LTI systems connected in parallel? State the convolution Integral for CT LTI systems? 7M

OR

6. a) A stable LTI system is characterized by the differential equation $d^2y(t)/dt^2+6\ dy(t)/dt+8\ y(t)=2\ x(t)$ Find the frequency response & Impulse response using Fourier transform. What is the response of this system if $x(t) = t\ e^{-2t}\ u(t)$ 8M

   b) Find the impulse response of series RL circuit. What is an LTI system? Explain its properties 6M

UNIT–IV

7. a) Find the convolution of the following signals using graphical analysis: $x(t) = e^{-2t}\ u(t)$ and h(t) = u(t + 2). 7M

   b) Show that the auto-correlation function at the origin is equal to the energy of the function. 7M

OR

8. a) Show that the cross correlation of f(t) with $\delta(t - t_0)$ is equal to $f(t - t_0)$. Where $\delta(t-t_0)$ is delayed unit impulse function. 7M

   b) Prove that auto correlation function and energy/power spectral density function forms Fourier Transform pair. 7M

UNIT–V

9. a) Find the Inverse Z transform of

$$X(z) = \frac{z+2}{4z^2 - 2z + 3} \; |Z| < \sqrt{3/4}$$

7M

   b) Find inverse Z-transform of

$$X(Z) = (1 - 1/3z^{-1})(1 - 1/6z^{-1}) \; ROC: |Z| > 1/3$$

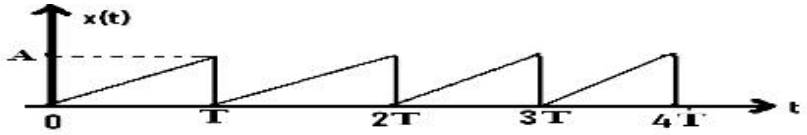
7M

OR

10 a) Determine the inverse Laplace of the following functions

$i)\ 1/s(s+1)(s+3)$ $\quad ii)\ 3s^2 + 8s + 6/(s+8)(s^2 + 6s + 1)$ 8M

   b) Find out the Laplace transform of the signal shown in below figure.



6M

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