ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II BTech (ECE) I Semester
BTECE301: DIGITAL LOGIC DESIGN
MODEL QUESTION PAPER

Time :3hrs **Max.Marks:75**

SECTION –A (4 X 15=60Marks.)
Answer All The Questions

1. A) Define NOR Gate briefly [7M]

B) Implement the following Boolean expression
i)AB+AB|C+AB|C| ii)(A+B).(A+B|).(A|+B).(A|+B|) [8M]

OR

C) Define AND Gate briefly [7M]

D) Find the error and correct the following codes :
i) 1011011 ii) 0000111 iii) 1110111 iv) 1100110 [8M]

2.
A) Convert SOP Expression into Canonical SOP form Y=A|C+AB+BC [7M]

B) Verify the following using 4 variable K-map Σm(0,2,3,7,11,13,14,15) [8M]
.

OR

c) Convert POS Expression into canonical POS form Y=(A+B).(B+C).(A+C) . [7M]

d) Verify the following 4 variable K- map using Don't care condition in SOP form
F(A,B,C,D) = πm (1,11,12,15) + d (3,13) [8M]

3. a) Implement 4x1 Mux with logic diagram [7M]

b) Implement the following Boolean Expression Using 4:1 Mux F(A,B,C.D) =Σm (1,4,5,7,9,12,13) [8M]

OR

c) Define Multiplexer? Write its Advantages? [7M]
d) Implement the following expression using Demultiplexer F(A,B,C) = Σm (0,2,4,6) [8M]

4. a) What are the steps to Produce for design of clocked sequential circuits [7M]
b) Define Flip- flop and write the difference between latches and Flip-flop. [8M]

OR

c) Define Shift register? What are the types of Shift registers? Explain them. [7M]
d) Draw the Logic Diagram of Synchronous 3-bit UP/DOWN Counter. [8M]

Section – B

Answer any FIVE of the following: 5 * 3 =15 Marks

a. Convert the decimal into floating point representation. i) (1460.125)10 ii) (346.25)10 iii) (49)10 iv) (19.5)10 v) (125.5)10

b. Find the following equations from decimal to binary i) (160)10 ii) (325)10 iii) (436.25)10 iv) (453)10 v) (576)10

c. Find the following using 3 variable K-map ABC + A|BC| + ABC| + AB|C.

d. If F(A,B,C) = Σm (2,3,4,5) + d(6,7). Find SOP and POS expressions

e. Define Combinational circuits ? and write its design procedure.

f. Implement F(A,B) = Σm (1,2) using 4:1 Mux.

g. What are the types of Flip- flops. Define them?

h. Define Ripple counter? What are the types of counters?

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II B.TECH – I SEMESTER
BTECE302: SIGNALS AND SYSTEMS
MODEL QUESTION PAPER

Time: 3hrs. **Max. Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. **a)** Define orthogonal signals space and bring out clearly its applications in representing signals. **(8M)**

b) Show that $x(t)=A\, e^{-\alpha(t)}\, u(t)$, $\alpha>0$ is an energy signal or not. **(7M)**

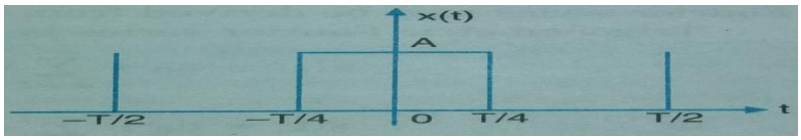
OR

b) Determine the power and RMS value of the signals.
i) $x(t)=5\cos(50t+\pi/3)$ ii) $x(t)=10\cos 5t \cos 10t$. **(7M)**

c) Find the even and odd components of the following signals
(i) $x(t)=\cos t + \sin t + \cos t \sin t$. (ii) $x(n)=\{-2,1,\underline{2},-1,3\}$. **(8M)**

2. **a)** Derive the complex Fourier exponential series representation. **(8M)**

b) show the periodic rectangular waveform. Obtain its Fourier series representation **(7M)**



OR

c) Explain and derive the Fourier transform of some standard signals **(7M)**

d) Explain the importance of sampling theorem. What is aliasing and how is it avoided. **(8M)**

3. **a)** Determine whether or not the system is time-invariant.
(i) $y(t)=t\,x(t)$ (ii) $y(t)=x(t)\cos 50\pi t$ (iii) $y(n)=x(2n)$ **(8M)**

b) Explain causality and physical reliability of a system. **(7M)**

OR

b) Explain in detail about the properties of convolution. **(8M)**

c) Find the autocorrelation of the signal $x(t)=A\sin(\Omega_0 t+\Theta)$, where $\Omega_0=2\pi/T$. **(7M)**

4. **a)** state and prove the fallowing properties of Z-Transform
(i) Linearity (ii) Time shifting (iii) Differentiation. **(8M)**

b) Determine the Z-Transform of the signals
(i) $x(n)=\{1,2,0,2\}$ (ii) $x(n)=\{1,2,-1,2,9\}$. **(7M)**

Or

b) Explain the concept of ROC in Z-Transforms and list any 2 properties of the same. **(10M)**

c) Find the inverse of Z-Transform of $X(Z)=Z/(3Z^2-4Z+1)$. **(5M)**

Section-B (5 X 3 =15 Marks)

5. Answer any FIVE of the following:

a) Define signal and systems. List the classification of signals.

b) Define orthogonal functions give some examples of orthogonal function.

c) Differentiate between Fourier series and Fourier transforms.

d)Write shorts notes on derichlets condition.

e) Find the Laplace transforms of the signals $x(t)=e^{-at}\,u(t)$.

f) List the properties of cross correlation function.

g)Explain the time reversal property for Z-Trans form.

h) Explain the two sided Z-Transform.

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ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II BTech (ECE) I Semester
BTECE303:OBJECT ORIENTED PROGRAMMING USING C++
MODEL QUESTION PAPER

Time: 3hrs. **Max. Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. **a)** Briefly Explain Basics concepts of Object Oriented Programming Language **(15M)**

Or

b) Define Function. Explain function overloading with example program. **(15M)**

2. **a)** What is Class? Explain data hiding in Classes **(15M)**

Or

b) Define Constructor and explain various types of constructors in C++ with example program. **(15M)**

3. **a)** Explain different forms of Inheritance. Illustrate each type with an example **(15M)**

Or

b) What is Virtual Function? Why it is important to make a class virtual **(15M)**

4. **a)** What is file mode? Describe the various file mode options available in C++. **(7M)**

b) Explain the various unformatted I/O Operations and Formatted Console I/O Operators **(8M)**

Or

c) What is Template? Explain the various templates with example **(8M)**

d) Write a function template for finding the minimum value contained in an array **(7M)**

SECTION - B (5×3=15M)
Answer any FIVE Questions

5. **Write short notes on**

a) Applications of OOP
b) Scope Resolution Operator
c) Friend Function
d) Operator Overloading
e) Virtual Base Class
f) Pure Virtual Function
g) Command Line Arguments
h) Overloading of Template Functions

ADIKAVI NANNAYA UNIVERSITY
[BTECE-304]
B.Tech. (ECE)
THIRD SEMESTER
NETWORK ANALYSIS
(W.E.F. 2017-2018 Admitted Batch)

Time: 3Hours **Max. Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) Find the equivalent Star Circuit for the Given Delta Circuit as shown in Figure 1. (7M)

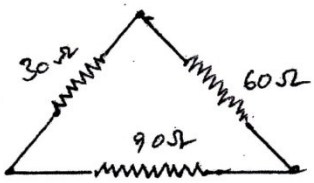
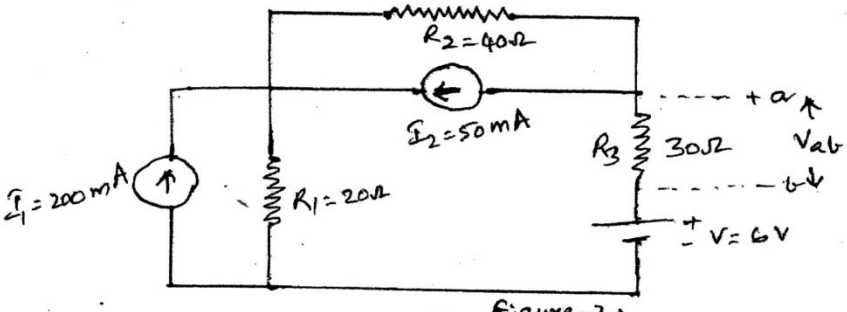


figure-1.

(b) Using Nodal Analysis find the Voltage V_{ab} of the circuit shown in Figure 2. (8M)



(Or) figure-2.

(c) With the help of an example explain clearly source transformation technique? (7M)

(d) For the circuit shown in Figure 3 (i) Find R_{eq} (ii) Find i_1 and (iii) Find v_3 (8M)

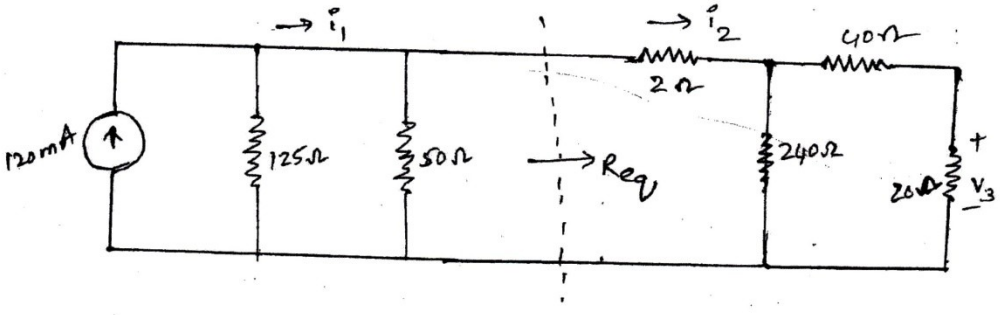


Figure-3

2. (a) Write the correct set of equations for the circuit shown in Figure 4. **(7M)**

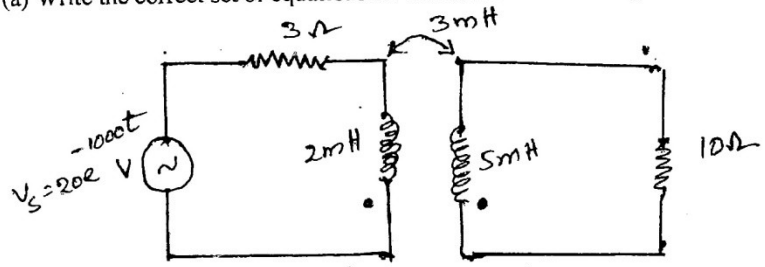


figure-4

(b) Three inductors are connected in series as shown in Figure 5, where L_1 and L_2 are magnetically coupled and L_3 is not coupled to any. Find (i) Effective inductance of each coil and (ii) Total inductance of the series connection. **(8M)**

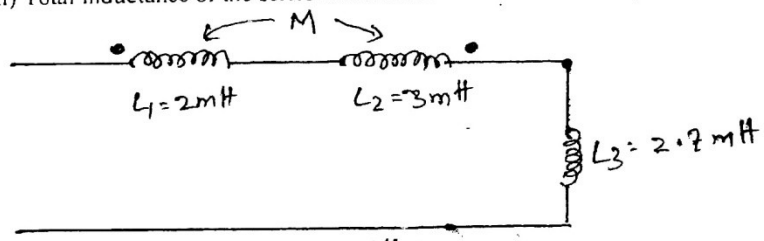


figure-5

(Or)

(c) For the Shown in Figure 6, let $L_1 = 0.4$ H, $L_2 = 2.5$ H and $k = 0.6$ and $i_1 = i_2 = 20 \cos(500t - 20^0)$ mA. Find the fallowing at $t = 0$, (i) i_2 and (ii) v_1 **(8M)**

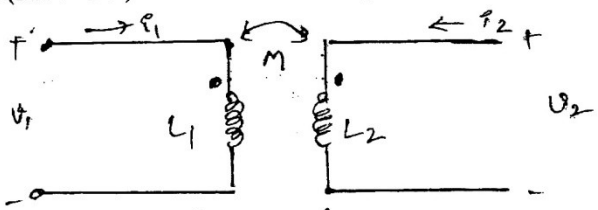


figure-6

(d) Determine the RMS value of the saw tooth waveform as shown in Figure 7. **(7M)**

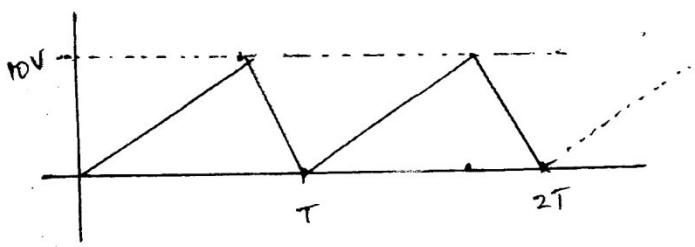


figure-7

3. (a) For the Circuit shown in Figure 8, (i) Determine the resonance frequency and equivalent resistance at resonance and (ii) If the resistance in RC branch is increased, what is the maximum value for which the resistance is possible. **(7M)**

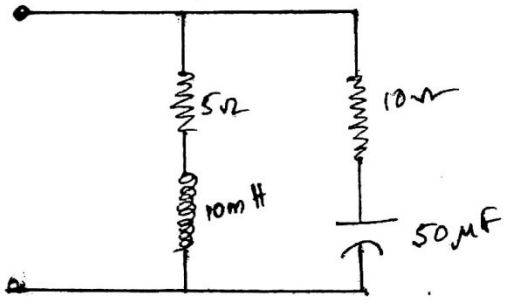


figure - 8

(b) Define the terms Q-factor, band width and resonant frequency? Derive the relationship for these quantities? **(8M)**

(Or)

(c) Obtain the Current Locus for the circuit shown in Figure 9. **(7M)**

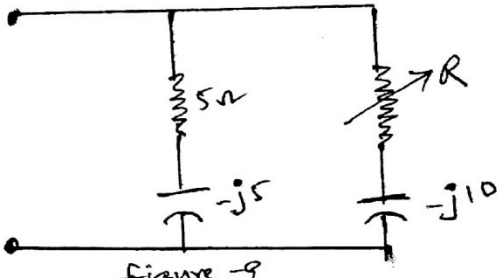


figure -9

(d) For the Circuit shown in Figure 10, find (i) resonant frequency and (ii) V_1 at resonant frequency. **(8M)**

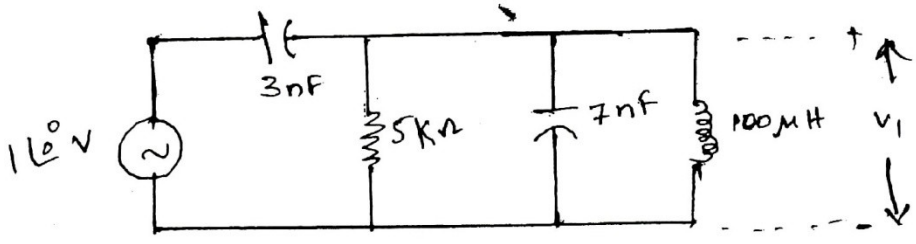


figure -10

4. (a) Using Thevenin's theorem, determine the current flowing through 1 ohm resistor for the circuit shown in Figure 11. **(7M)**

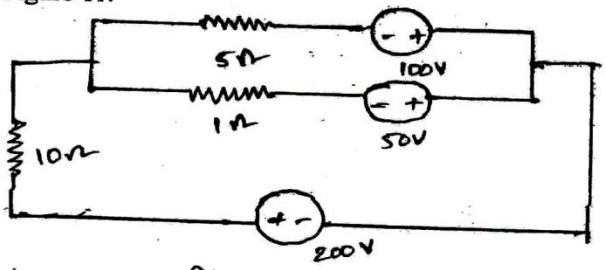


figure-11

(b) Derive the relation for the maximum power transfer for the circuit shown in Figure 12. **(8M)**

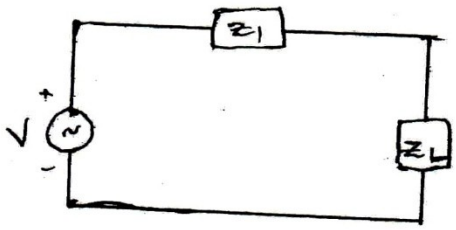


figure-12

(Or)

(c) For the given graph shown in Figure 13, write cut set schedule and obtain the relation between tree branch voltages and branch voltages. **(7M)**

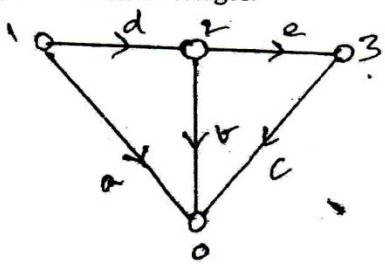


figure-13

(d) Determine the basic Tie set matrix for the graph shown in Figure 14, taking edges 1,2 3 and 4 as links. **(8M)**

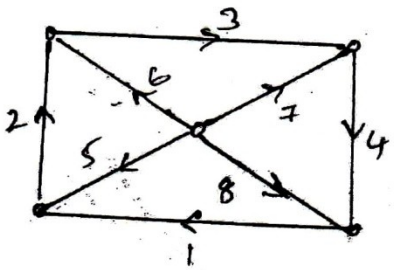


figure-14

SECTION – B (5X3 =15M)

Answer any FIVE Questions

5. a) What are the different types of circuit elements and give the current-voltage relation for each one?

   b) For the series RLC circuit with R= 100 ohms, L= 0.5 H and C= 0.4 microF, find the resonance frequency and bandwidth.

   c) Draw the dual for the network shown in Figure 15.

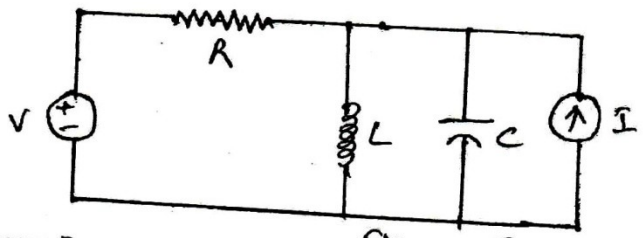


Figure-15

   d) Define the terms Power factor, Reactance, Reactive power and Apperent power for a general AC circuit?

   e) Prove that M = k*(Sqrt(L_1L_2)), where M is the mutual inductance and k is the coefficient of coupling between coils L_1 and L_2.

   f) A series RL circuit has a constant voltage V applied at time t=0. At what time does V_R=V_L.

   g) Define node, path, branch, loop, mesh and planar circuit?

   h) What are the limitations of Thevenin's theorem?

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II BTech (ECE) I Semester
BTECE305:ELECTRONIC CIRCUIT ANALYSIS
MODEL QUESTION PAPER

Time :3hrs **Max.Marks:75**

SECTION –A (4 X 15=60Marks.)
Answer All The Questions

1. a) Give the complete low frequency small signal analysis of CB Amplifier [8M]
b) State and prove Miller's theorem. [7M]

OR

c) A transistor with h_{fe} = 60, h_{ie} = 1.15 K, h_{oe}= 26 micro amps/ Volt and h_{re}= $2.4x10^{-4}$ is connected in CE configuration. Find its Input impedance,Voltage gain, Current gain and output impedance. [7M]
d) Derive expression for CE Short Circuit Current Gain with neat circuit. [8M]

2. Draw the circuit diagram and equivalent circuit of a Common Source amplifier. Derive expressions for A_V , A_I , R_{IN} and R_{OUT} without source and load resistances. [7M]
b) Perform the high frequency analysis of a common drain amplifier. [8M].

OR

c) Explain various high frequency parameters of a BJT and derive the relation between them. [7M]
d) What is square law distortion? what is its effect in FET amplifiers? Compare important characteristics of CD, CS, and CG FET amplifiers. [8M]

3. What is crossover distortion? How do we eliminate this distortion? What are the advantages of class B over class A power amplifier? [8M]
b) Describe the heat sinks for tuned power amplifiers? [7M]

OR

c) Explain the operation of class B push-Pull power amplifier. [7M]
d) Classify tuned amplifiers and Derive an expression for bandwidth of a capacitive coupled tuned amplifier. [8M]

4. a)State and explain barkhausen criterion. [7M]
b)Draw the circuit diagram of a current series feedback amplifier, Derive expressions of input & output impedances, Gain, feedback factor [8M]

OR

c)Explain the concept of feedback with block diagram. What are the advantages and disadvantages of negative feedback? [8M]
d)Derive the expression frequency of oscillation and condition for sustained oscillations of a BJT based RC Phase shift oscillator [7M]

SECTION –A (5 X 3=15Marks.)

a. Mention various hybrid π capacitances of a BJT.
b. Define gain bandwidth product of an amplifier.
c. Derive CMRR.
d. Define Q factor of tuned amplifier
e. What are the limitations of Single tuned amplifier?
f. Enumerate the steps in the analysis of negative feedback amplifiers.
g. Compare Frequency stability of crystal oscillator, RC and LC oscillators
h. Why RC oscillators are not used at high frequencies.

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ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM

II BTech (ECE) I Semester

BTECE306: RANDOM VARIABLES AND STOCHASTIC PROCESSES

MODEL QUESTION PAPER

Time :3hrs **Max.Marks:75**

SECTION –A (4 X 15=60Marks.)

Answer All The Questions

1. a) State and prove the properties of probability density function [7M]
   b) Discuss the characteristics of Binomial, Rayleigh random variables using relevant expressions and sketches of their distribution and density functions. [8M]

OR

   c) Explain Gaussian random variable with neat sketches? [7M]
   d) A random variable X has FX(x) = (1- (1/4) e-cx)u(x). Find the value of 'c' and P[2<X10]. [8M]

2. a) What is meant by expectation? State and prove its properties. [7M]
   b) Let Y=2X+3, If the random variable is uniformly distributed over [-1, 2], determine fy(y). [8M].

OR

   c) State and prove properties of moment generating function. [8M]
   d) Write notes on monotonic transformations for a continuous random variable. [7M]

3. a) Define joint distribution function of random variables and write its properties [7M]
   b) State central limit theorem for the following cases: [8M]
   i) Equal distributions ii) Unequal distributions Determine $\mathbf{f_Z}(Z)$ in terms of $\mathbf{f_X}(X)$ and $\mathbf{f_Y}(Y)$, if Z=X+Y

OR

   c) Write short notes on jointly Gaussian random variables [7M]
   d) Let Z is the sum of two independent random variables X and Y. Find the PDF of Z [8M]

4. Define autocorrelation function of a random process and write its properties [8M]
   a) If X(t) is a stationary process, find the power spectrum of Y(t)= A_0+ B_0 X(t)in term of the power spectrum of X(t) if A_0 and B_0 are real constants [7M]

OR

   b) What is random process? Explain Gaussian random process [7M]
   c) Explain with the help of relevant expressions about WSS and SSS of a random process [8M]

Section – B(5 X 3 =15 Marks)
Answer any FIVE of the following:

a. Give example for continuous random variable and discrete random variable.

b. Show that the first central moment is zero.?

c. If K is a constant, then for a random variable X, prove that Var(KX)=K Var(X).

d. What is Transformation? Classify the different types Transformation of Random Variable

e. Define marginal probability density functions?

f. State the conditions for a WSS random process.

g. When a random process is called SSS process? Explain

h. Differentiate between Random Processes and Random variables with an example

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ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II BTech (ECE) I Semester
BTECE305:ELECTRONIC CIRCUIT ANALYSIS
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