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Total No. of Pages : 2

Seat No.	

S.E. (Electronics) (Semester-III) (Revised) Examination, May - 2017

ANALOG COMMUNICATION

Sub. Code : 63437

Day and Date : Wednesday, 17-05-2017 **Total Marks : 100**
Time : 2.00 p.m. to 5.00 p.m.

Instructions : 1) **All Questions are compulsory.**
2) **Figures to right indicate full marks.**
3) **Assume suitable data wherever necessary.**

SECTION-I

Q1) Solve any THREE. **[18]**

a) What is amplitude modulation? Explain with neat waveforms.

b) With a neat diagram pre emphasis circuit.

c) What is tracking? Explain three point tracking.

d) Explain the trapezoidal method used to measure modulation index.

e) The AM transmitter radiates 9 KW with the carrier unmodulated, and 10.125 KW when the carrier is sinusoidally modulated. Calculate the modulation index, percent of modulation. If another sine wave, corresponding to 40% modulation, is transmitted simultaneously, determine the total radiated power.

Q2) Solve any TWO. **[16]**

a) Explain the following receiver parameters in detail.

i) Sensitivity. ii) Selectivity.

iii) Fidelity. iv) Tracking.

b) Draw and explain superheterodyne receiver in brief. State its advantages.

c) With neat diagram explain FM generation method using varactor diode.

P.T.O.

Q3) Solve any TWO. **[16]**

a) With a neat diagram explain filter method for SSB transmission.

b) Develop the mathematical expression for FM signal and draw its frequency spectrum.

c) Explain working of balanced modulator with neat circuit diagram.

SECTION-II

Q4) Solve any THREE. **[18]**

a) Differentiate between natural sampling and flat-top sampling.

b) Explain the Pulse Amplitude Demodulation circuit.

c) Define antenna. Explain the basic radiation mechanism in antenna.

d) Explain the Balanced slope detector.

e) A receiver connected to an antenna whose resistance is 50 Ohm has an equivalent noise resistance of 30 Ohm. Calculate the receivers noise figure in decibles and it's equivalent noise temperature.

Q5) Solve any TWO. **[16]**

a) Discuss the ground wave propagation in detail.

b) Explain indirect method of generation of PTM signal.

c) Compare TDM and FDM.

Q6) Solve any TWO. **[16]**

a) Define the following terms related to antenna.

i) Polarization. ii) Beamwidth.

iii) Antenna gain. iv) Captured power.

b) Discuss the purpose of a limiter in the FM receiver.

c) What are different types of Noise? Explain.

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Seat No.	

S.E. (Electronics) (Part - I) (Semester - III)
Examination, May - 2017
ENGINEERING MATHEMATICS - III
Sub. Code : 63434

Day and Date : Friday, 12 - 05 - 2017 **Total Marks : 100**

Time : 2.00 p.m. to 5.00 p.m.

Instructions : 1) **All Questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Use of non-programmable calculator is allowed.**

SECTION - I

Q1) Solve any three: **[18]**

a) Solve $(D^2 - 5D + 6)y = \sin 3x$.

b) Solve $(D^2 - 3D + 2)y = e^x + x^2$.

c) Solve $(D^2 + 4)y = x \sin 3x$.

d) An e.m.f. E sinpt is applied at $t = 0$ to a circuit containing a condenser C and inductance L in series. The current x satisfies the equation $L\frac{dx}{dt}+\frac{1}{C}\int x dt = E\sin pt$ where $x=-\frac{dq}{dt}$. If $p^2=\frac{1}{LC}$ and initially the current x and charge q are zero, find the current in the circuit at time t.

Q2) Solve any four: **[16]**

a) Find the cosine of the angle between the normals to the surfaces $x^2y + z = 3$ and $x \log z - y^2 = -4$ at the point of intersection $p(-1, 2, 1)$.

b) Prove that $\nabla\left\{\nabla\cdot\frac{\bar{r}}{r}\right\}=-\frac{2}{r^3}\bar{r}$.

P.T.O.

c) If $\overline{u}=x^2yi+y^2x^3j-3x^2z^2k$ and $\phi=x^2yz$ find $\nabla\cdot(\phi\overline{u})$ at (1, 2, 1).

d) Find a, b, c if $\overline{F}=(axy+bz^3)i+(3x^2-cz)j+(3xz^2-y)k$ is irrotational.

e) Find the directional derivative of $\phi=4xz^3-3x^2y^2z$ at (2, –1, 2) in the direction from this point towards the point (4, –4, 8)

Q3) Solve any two: **[16]**

a) A random variable X has probability density function,

$$f(x)=\frac{k}{1+x^2},\ -\infty<x<\infty.$$

Determine

i) k

ii) $p(x\geq 0)$

b) In a certain factory producing cycle tyres; there is a small chance of 1 in 500 tyres to be defective. The tyres are supplied in lots of 10. Using poisson distribution calculate the approximate number of lots containing:

i) no defective

ii) one defective

iii) two defective tyres, respectively in consignment of 10,000 lots.

c) In a normal distribution 31% items are under 45 and 8% are over 64. Find its mean and standard deviation. (Given: For a normal distribution the area between $z = 0$ and $z = 0.5$ is 0.19 and that between $z = 0$ and $z = 1.4$ is 0.42)

SECTION - II

Q4) Attempt any three from the following:

a) Verify convolution theorem for the pair of functions $f_1(t) = t$, $f_2(t) = e^{at}$. **[6]**

b) Find inverse Laplace transform of $\cot^{-1}\left(\frac{S-2}{3}\right)$. **[6]**

c) Find Laplace transform of $t^4 H(t-2)$. **[6]**

d) Solve using Laplace transform

$(D + 1)^2 y = \sin t$ with $y = \frac{dy}{dt} = 1$ at $t = 0$. **[6]**

Q5) Attempt any two of the following:

a) An alternating current i after passing through the rectifier has the form.

$i = I_o \sin\theta,\ 0 < \theta < \pi$

$= 0 \quad ,\ \pi < \theta < 2\pi$

Where I_o is the maximum current and the period is 2π. Find Fourier series for i. **[8]**

b) Obtain cosine series for **[8]**

$$f(x) = \frac{1}{4} - x, \quad 0 \le x \le \frac{1}{2}$$
$$= x - \frac{3}{4}, \quad \frac{1}{2} \le x \le 1$$

and hence deduce that

$$\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \ldots\ldots\ldots\infty = \frac{\pi^2}{8}$$

c) If $f(x)=|x|$ in $[-\pi, \pi]$, find Fourier series for $f(x)$ and hence deduce that $\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+\ldots\ldots\infty=\frac{\pi^2}{8}$. **[8]**

Q6) Attempt any two of the following:

a) Find the Fourier transform of the function **[8]**

$$f(x) = 1 + x/a \qquad (-a < x < 0)$$

$$= 1 - x/a \qquad (0 < x < a)$$

$$= 0 \qquad \text{otherwise}$$

b) Find Fourier sine and cosine transform of **[8]**

i) x^{n-1},

ii) $\frac{1}{\sqrt{x}}$

c) Express the function $f(x) = 1$ for $|x| \le 1$ **[8]**
$= 0$ for $|x| > 1$

as a Fourier integral. Hence evaluate

$$\int_0^\infty \frac{\sin\lambda \cos\lambda x}{\lambda} d\lambda.$$

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Seat No.	

S.E. (Electronics Engineering) (Semester-IV) Examination, April - 2017

DATA STRUCTURE & ALGORITHM

Sub. Code : 63442

Day and Date : Saturday, 29-04-2017 **Total Marks : 100**
Time : 10.00 a.m. to 1.00 p.m.

Instructions : **1) All Questions are compulsory.**
2) Figures to the right indicate full marks.

SECTION-I

Q1) Attempt any two. **[2×8=16]**

a) Write a algorithm for binary search method with example also write a program.

b) Write a algorithm and program for matrix multiplication.

c) What is pointer? Explain how an array can be represented using pointer variable for its traversal.

Q2) Attempt any two. **[2×8=16]**

a) What is linear queue? Write a algorithm to add and remove item from linear queue.

b) Write a algorithm for transforming postfix expression into infix expression using suitable example.

c) Explain following operation on singly link list.

i) Insertion at specific location
ii) Insertion at the beginning
iii) Deletion of first node
iv) Deletion of specific node

Q3) Write short note (Any Three). **[3×6=18]**

a) Circular link list

b) Bubble Sort Algorithm

c) Advantages of link list over stack and queue

d) Stack and queue as abstract data type

P.T.O.

SECTION-II

Q4) Attempt any two. **[2×8=16]**

a) Explain In order traversal of binary tree with algorithm & example.

b) Explain BFS algorithm with example.

c) Write Warshall's algorithm with an example.

Q5) Attempt any two. **[2×8=16]**

a) Explain representation of binary tree in memory.

b) What is collision resolution? Explain collision technique for collision resolution.

c) Construct Binary Tree for following traversal order.

PreOrder : ABDEFHGIJKC

Inorder : DBHFEGJIKAC

Q6) Wrtite short note (Any Three). **[3×6=18]**

a) Linear Probing

b) Directed Graph

c) AVL Tree

d) Binary Search Tree

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Total No. of Pages : 2

Seat No.	

S.E. (Electronics) (Semester-III) (Revised) Examination, May - 2017
ELECTRONICS MEASUREMENT AND INSTRUMENTATION
Sub. Code : 63435

Day and Date : Monday, 15-05-2017 **Total Marks : 100**
Time : 2.00 p.m. to 5.00 p.m.

Instructions : **1) All Questions are compulsory.**
2) Figures to the right indicate full marks.

SECTION-I

Q1) Attempt any two of the following: **[16]**

a) State three types of systematic errors giving example of each.

b) Explain basic construction and working of a PMMC instrument.

c) Elaborate the working of Dual trace Oscilloscope.

Q2) Attempt any two of the following: **[16]**

a) Explain the operating principle of a ramp type DVM.

b) Explain the operation of harmonic distortion analyzer with neat block diagram.

c) Draw and explain pulse and square wave generator.

Q3) Write short note on any three of the following: **[18]**

a) Factors affecting on the selection of instrument for measurement.

b) Cathode ray tube.

c) RF Generators.

d) Spectrum Analyzer.

P.T.O.

SECTION-II

Q4) Attempt any two of the following: **[16]**

a) Explain Thermocouple. What is cold junction compensation?

b) Derive Bridge Balance condition for Maxwells Bridges.

c) Explain successive approximation type A/D converter.

Q5) Attempt any two of the following: **[16]**

a) Explain Capacitive transducer in detail.

b) Explain Hay's Bridge and Derive Balance condition for the Bridge.

c) Explain Dual slope integration type A/D converter. State advantages and disadvantages.

Q6) Write short notes on (Any Three). **[18]**

a) Singal channel DAS.

b) Binary weighted DAC.

c) Piezoelectric transducer.

d) Kelvins Bridge.

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Seat No.	

S.E. (Electronics Engineering) (Part - II) (Semester - IV)
(Revised) Examination, May - 2017
DIGITAL SYSTEMS & MICROPROCESSOR
Sub. Code : 63443

Day and Date : Wednesday,3-05-2017 **Total Marks :100**

Time : 10.00 a.m. to 1.00 p.m.

Instructions :
1) **Figures to right indicate full marks.**
2) **Assume suitable data wherever necessary.**
3) **Draw suitable diagrams wherever appropriate.**
4) **Use of 8085 Op-Code sheet is allowed.**

SECTION - I

Q1) Write any four. **[20]**

a) Implement following logic expression using NAND gates only.

i) f1=AB + BC

ii) f2=A (B + C)

b) Explain in detail R-S & J-K flip flops.

c) Differentiate level triggering and edge triggering of flip flop.

d) Simplify the Boolean expression using K-map.

F=A' B' C' + A' B' C' D' + A' BD + ABC' D

e) Write truth table and implement full adder using two half adders.

f) Define following terms.

i) Decoder

ii) Demux

iii) Mux

P.T.O.

Q2) Write any two. **[16]**

a) With suitable examples explain the terms.

i) Pairs, Quads, Octets.

ii) Overlapping the map.

iii) Rolling the map.

b) Design sequential logic circuit to satisfy the following state equations (use J-K F/Fs)

$A_{t+1} = A'B'CD + A'B'C + ACD + AC'D'$,

$B_{t+1} = A'C + CD' + A'BC'$, $C_{t+1} = B$, $D_{t+1} = D'$.

c) Design Mod-10 Synchronous counter using T- F/Fs.

Q3) Write any two. **[14]**

a) What is State diagram? Explain in detail state table and excitation tables with suitable example.

b) Explain 4-bit twisted ring counter with circuit diagram, truth table and waveforms (use D-F/Fs).

c) Design logic circuit to convert BCD code into a Ex-3 code.

SECTION - II

Q4) Solve Any Four of the following. **[20]**

a) Draw and explain the flag register format of 8085.

b) Explain the immediate & direct addressing modes of 8085 with suitable examples.

c) What is Interrupt Driven data transfer? Explain with suitable diagram.

d) Write a program to copy the block of data bytes (assume block lengths of 12 bytes).

e) Explain the instructions-

i) CNC

ii) LHLD

f) What is stack? Explain the stack related instructions of 8085.

Q5) Solve Any Two of the following. **[16]**

a) Draw and explain a Timing diagram of MOV A,M instruction.

b) Write a program to perform Multiplication of 8 bit numbers using rotation method.

c) Draw interfacing of 4 by 4 keyboard matrix to 8255 ports and explain it in brief.

Q6) Solve Any Two of the following. **[14]**

a) Write a program to perform BCD to binary conversion.

b) Draw a hardware of ADC 0809 interface to 8255 and explain it in brief.

c) Explain the mode-1 input operation of 8255.

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Seat No.	

S.E.(Electronics) (Semester - IV) (Old) (Prerevised)
Examination, April - 2017
SIGNALS AND SYSTEMS
Sub. Code: 43610

Day and Date : Tuesday, 25 - 04 - 2017 **Total Marks : 100**
Time :10.00 a.m. to 1.00 p.m.

Instructions : **1)** **All the questions are compulsory.**
2) **Assume suitable data where required and highlight it.**

SECTION-I

Q1) Solve any TWO: **[16]**

a) Explain basic operations on signals.

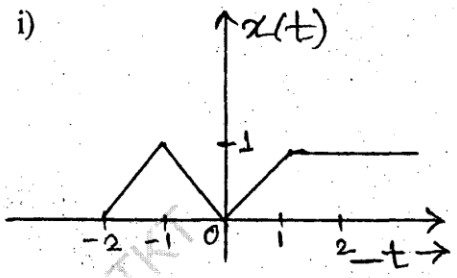
b) Determine whether or not each of the following signals is periodic. If a signal is periodic, determine its fundamental period.

i) $x(n) = \cos(2n)$

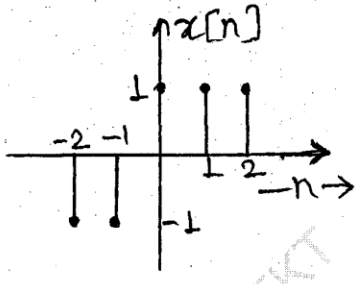
ii) $x[t] = \cos\left(\frac{\pi t}{3}\right) + \sin\left(\frac{\pi t}{4}\right)$

c) Find even and odd parts of followings.

i)



ii)



Q2) Solve any TWO: **[16]**

a) Explain interpolation techniques.

b) Explain effect of under sampling. Aliasing.

c) Check whether the following systems are dynamic, linear, causal or time invariant. $y[n] = x[n] + x[n-1]$.

Q3) Solve any TWO: **[18]**

a) Evaluate $y[n] = x[n] * h[n]$. Also plot $y[n]$.

Where $x[n] = u[n]$ and $h[n] = a^n u[n]; 0 < a < 1$

b) Evaluate $y(t) = x(t) * h(t)$, where $x(n)$ and $h(n)$ are shown in Figure Q3b.

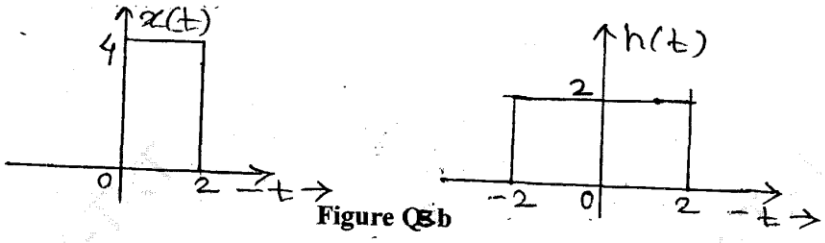


Figure Q3b

c) State and prove Commutative and Associative property of Convolution Sum.

SECTION-II

Q4) Solve any TWO: **[18]**

a) Determine and plot amplitude Fourier spectrum of time domain signal as shown in figure Q4a. Use trigonometric method.

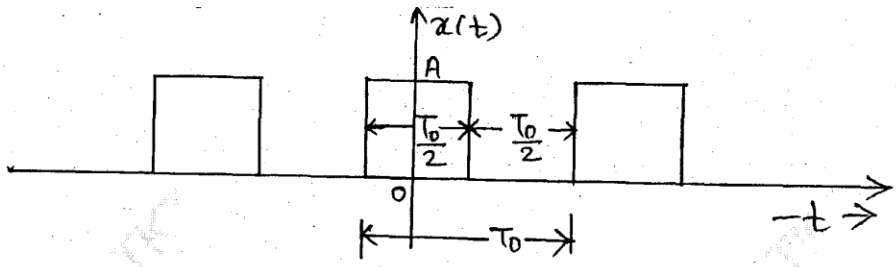


Figure Q4a

b) Determine and plot amplitude Fourier spectrum for the periodic sequence $x(t)$ shown in figure Q4b. Use exponential method.

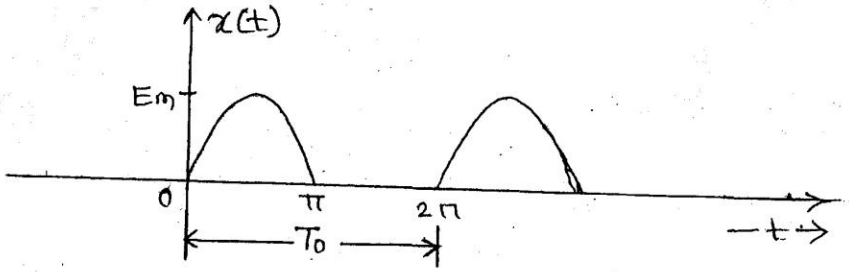


Figure Q4b

c) Evaluate the Trigonometric Fourier coefficients a_0, a_n & b_n expression.

Q5) Solve <u>any TWO:</u> **[16]**

a) Find Fourier Transform of following signals

i) $x(t) = \sin(\omega_0 t)$

ii) $x[n] = \cos \Omega_0 n; |\Omega_0| \leq \pi$

b) Find DTFT of rectangular pulse sequence shown in figure Q5b.

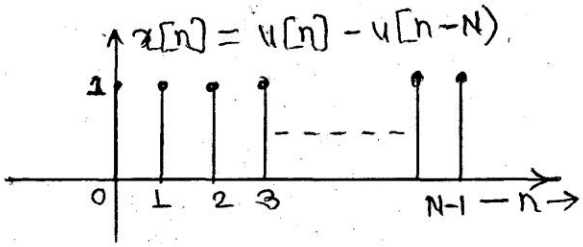


Figure Q5b

c) State property of CTFT.

Seat No.	

S.E. (Electronics Engineering) (Part - II) (Semester - IV)
(Revised) Examination, May - 2017
CONTROL SYSTEMS ENGINEERING
Sub. Code : 63444

Day and Date : Friday, 05 - 05 - 2017 **Total Marks : 100**
Time : 10.00 a.m. to 1.00 p.m.

Instructions : **1)** **Attempt all questions.**
2) **Draw neat figures wherever necessary.**
3) **Assume suitable data if required/necessary.**

SECTION - I

Q1) a) Classify following systems in open or closed loop with suitable justification. **[8]**

i) Wrist watch

ii) Water fall

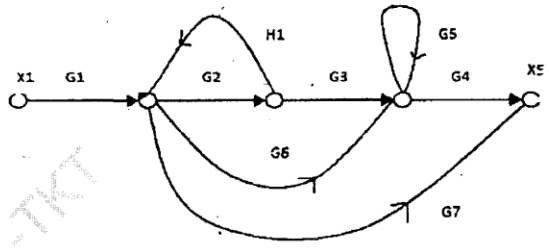
iii) Bread toaster

iv) Electric iron

OR

Explain Routh criterion for stability & Difficulties encountered while applying same. **[8]**

b) Determine the ratio of X5/X1. Use Mason's gain formula for signal flow graph. **[8]**



P.T.O.

Q2) a) What do you mean by order & type of a system. Explain in detail with examples. **[8]**

OR

Draw the response of first order system for unit step and derive expression for it. **[8]**

b) The closed loop transfer function of a unity feedback control system is given by **[8]**

$C(s)/R(s) = 10(s^2 + 4s + 5)$

Determine:

i) Damping ratio

ii) Natural un-damped frequency

iii) Peak overshoot

iv) Settling time

Q3) a) Illustrate with neat sketches how a control system is classified depending on the value of damping ratio. Conclude with the best system. **[9]**

OR

The overall transfer function of a unity feedback system is given by **[9]**

$C(s) / R(s) = 10 / (s^2 + 6s + 10)$

Find

i) The position, velocity and acceleration error constants

ii) The steady state error for the input $r(t) = 1+ 1 + t^2$

b) Write and explain the rules for sketching root locus. **[9]**

SECTION - II

Q4) Solve Any Two: **[16]**

a) Explain Correlation between time and frequency domain Analysis.

b) For the unity feedback system $G(S) = 10 / s (s + 1) (s + 5)$. Sketch the Bode plot Determine Gain Margin and Phase Margin.

c) Draw the Polar plot for $G(s) = 100 / (s + 2)$.

Q5) Solve Any Two: **[16]**

a) Explain controllability and observability of the system.

b) Comment on controllability and observability.

$$\begin{bmatrix} \dot{x}1 \\ \dot{x}2 \end{bmatrix} = \begin{bmatrix} -1 & 0 \\ 0 & -2 \end{bmatrix} \begin{bmatrix} x1 \\ x2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix}$$

$$y(t) = [1 \quad 2] \begin{bmatrix} x1 \\ x2 \end{bmatrix}.$$

c) Explain concept of state, state variable and state model.

Q6) Solve Any Three: **[18]**

a) Lead compensator.

b) PID Controller.

c) Nyquist Stability criterion.

d) Gain Margin and Phase Margin.

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Seat No.	

S.E. (Electronics) (Semester-III) (Revised) Examination, May - 2017
NETWORK ANALYSIS
Sub. Code : 63438

Day and Date : Thursday, 18-05-2017 **Total Marks : 100**
Time : 2.00 p.m. to 5.00 p.m.

Instructions :
1) **All Questions are compulsory.**
2) **Figures to right indicate full marks.**
3) **Assume suitable data if necessary.**

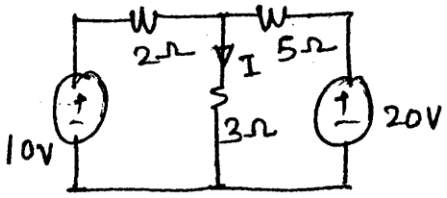
SECTION-I

Q1) Solve any three. **[3×6=18]**

a) Obtain the incidence matrix A from the following reduced incidence matrix A_1 & draw its graph.

$$A_1 = \begin{bmatrix} -1 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & -1 & 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & -1 & 1 & 0 & 0 \\ -0 & 0 & 0 & 0 & -1 & 1 & 0 \\ 0 & 0 & -1 & 0 & 0 & -1 & 1 \end{bmatrix}$$

b) Calculate the current I using Millman's theorem.



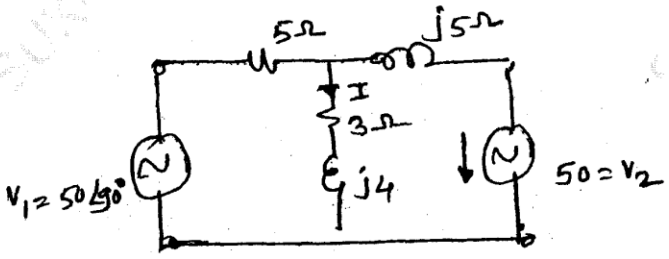
c) State maximum power transfer theorem. Also derive the expression for maximum power (P_{max}).

d) Express the element of T-network in terms of Z and ABCD parameters.

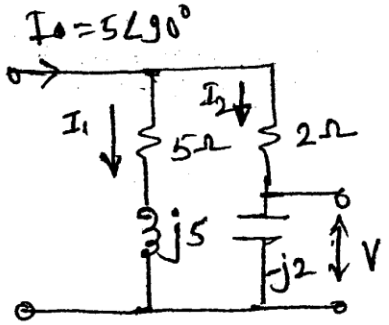
P.T.O.

Q2) Solve any two. **[2×8=16]**

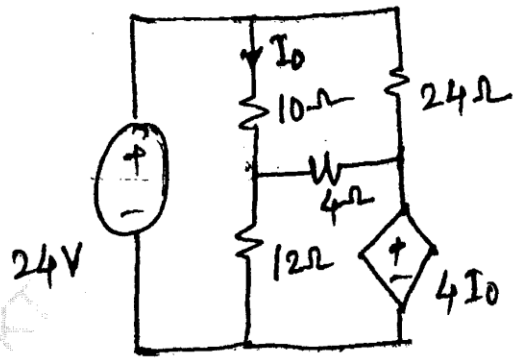
a) Apply superposition theorem to the network shown below and obtain the current in the $(3 + j4)\pi$ impedence



b) In a single current source circuit shown in figure below. Find the voltage 'V'. Interchange the current source and the resulting voltage 'v' and verify the reciprocity theorem.



c) Use Mesh analysis method to find the current I_o of the circuit shown below.

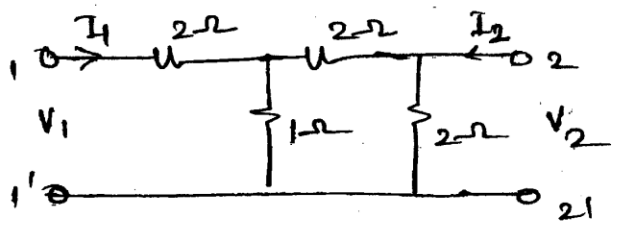


Q3) Solve any two. **[2×8=16]**

a) For the network shown below, Determine:

i) Open circuit impedence parameter & its equivalent circuit

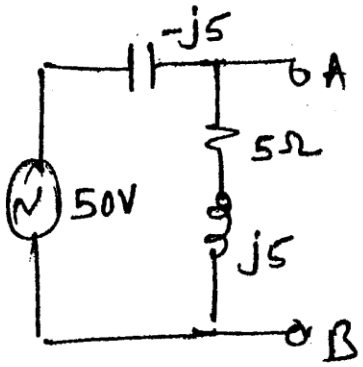
ii) Short circuit admittance parameter & its equivalent circuit



b) Derive the equation of ABCD parameters in terms of Z parameter and compute transmission parameters for the network having

$Z_{11} = 40\Omega$, $Z_{12} = 30\Omega$, $Z_{12} = Z_{21} = 20\Omega$.

c) For the circuit given below, determine the Norton's equivalent circuit with respect to terminals AB. If load resistance $Z_L = 5 - j5$ connected in between the terminal AB. Find the current th^r Z_L.



SECTION-II

Q4) Solve any two. **[2×8=16]**

a) Draw the pole-zero diagram for the given network function and obtain V(t) .

$$V(s)=\frac{4(s+2)s}{(s+1)(s+3)}$$

b) Explain the properties and necessary conditions of transfer functions.

c) Design constant k-type (T & π) HPF to have cut-off frequency of 10KHz and design impedence of 600Ω.

Q5) Solve any two. **[2×8=16]**

a) Design m-derived T-section LPF having cut-off frequence 1000Hz, design impedence 600Ω and frequency of infinite attenuation is 1050Hz.

b) Derive the relationship between bandwidth, resonant frequency and Quality factor in series RLC circuit. Also find the quality factor of a coil for the series circuit consisting of R = 10Ω, L = 0.14 & c = 10μf

c) Write note on:

i) Reactance curve in parallel resonance circuit.

ii) Quality factor (Q) and its effect on bandwidth in series resonance circuit.

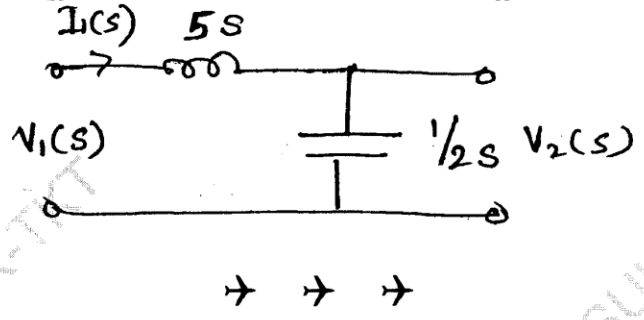
Q6) Solve any three. **[3×6=18]**

a) Derive the necessary formulae for the design of constant LPF.

b) Design a symmetrical lattice attenuator to have characteristics impedence of 800Ω Δ attenuation of 20dB.

c) Short note on: Composite filter.

d) For the network shown in figure below, determine the transfer function $G_{21}(s)$, $Z_{21}(s)$ and driving point admittance $y_{11}(s)$.



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Seat No.	

S.E. (Electronics Engg.) (Part - II) (Semester - IV)
(Revised) Examination, April - 2017
ELECTRONIC CIRCUIT ANALYSIS & DESIGN-II
Sub. Code : 63441

Day and Date : Thursday,27-04-2017 **Total Marks :100**

Time : 10.00 a.m. to 1.00 p.m.

Instructions :
1) **All Questions are compulsory.**
2) **Figures to the right indicates full marks.**
3) **Assume suitable data if necessary.**
4) **Std. Data sheet is allowed.**

SECTION - I

Q1) Attempt any Three of the following. **[18]**

a) Draw a neat circuit of Darlington amplifier. Derive an expression for current gain & Input impedance.

b) The current series feedback amplifer has the following parameters, $R_1 = 20\ K\Omega$, $R_2 = 20\ K\Omega$, $h_{ie} = 2\ k\Omega$, $R_L = 1K\Omega$, $R_E = 100\ \Omega$ and $h_{fe} = 80$ Calculate A_V, β, R_{if}, A_{vf} and loop gain in dB.

c) What is cross over distortion? Explain how the cross over distortion in Push Pull AF power amplifier is eliminated.

d) Draw a neat block schematic of Voltage Shunt Feedback. Derive an expression for Input impedance (Ri_f) and Voltage gain (Rm_f).

Q2) Attempt any two of the following. **[16]**

a) With a neat circuit diagram, explain the operation of transformer coupled class A power amplifier. Derive an expression for conversion efficiency.

b) What is negative feedback? Explain the effect of negative feedback on various characteristics of amplifier.

c) Design a two stage voltage series feedback amplifier with an overall gain of 120 And lower 3dB frequency range is 20 Hz. the output Voltage swing should be 10 V (P-P) with a load resistance of 10 KΩ. Consider Rs = 200 Ω.

P.T.O.

Q3) Attempt any Two of the following. **[16]**

a) i) An amplifier has voltage gain with feedback of 100. If the gain without feedback changes by 20% and the gain with feedback should not vary more than 2%, determine the values of open loop gain (Av) and feedback factor β.

ii) A Class A power amplifier supplies a 2 watt power to a load of 4 KΩ. The zero signal dc collector current is 35 mA and dc collector current with signal is 39 mA. Determine the second harmonic distortion.

b) With a help of Neat circuit explain the operation of transformer coupled amplifier. Derive an expression for midband voltage gain (Avm) using its equivalent circuit.

OR

b) Design a bootstrapped emitter follower circuit to provide the following specifications: Input Impedance (Ri) = 560 KΩ, Lower 3 dB frequency= 50Hz, Vo=4V(P-P), Load resistance R_L = 5.6 KΩ, Source Resistance (Rs)=560Ω.

c) Design a direct coupled amplifier which uses identical transistors with the following specifications as: $h_{fe(min)}$=100, $I_{C(max)}$=100 mA, $V_{CE(max)}$= 45 V and

The circuit parameters are: V_{CC}= 10 V, $V_{O\,P\text{-}P}$= 5 V, R_L = 4.7 KΩ, ΔI_{CQ} allowed is 2.5%, f_0=50 Hz and Stability factor (S) = 10. Calculate individual and overall gain.

SECTION - II

Q4) Attempt any Three of the following. **[18]**

a) Draw a neat circuit diagram of Schmitt trigger and explain its operation with suitable waveform.

b) Derive an expression for frequency of oscillation and minimum gain required for sustained oscillation in Hartley oscillator.

c) A fixed biased bistable multivibrator uses Si transistors with the following parameters: V_{CC}= 10V, $-V_{BB}$= -5V, R_1 = 10 KΩ, R_2 = 33 KΩ, R_C= 2.2 KΩ and h_{fe} = 50. Calculate stable state currents and voltages for VCE (Sat)=0.3V and VBE (Sat) = 0.6V.

d) Explain the operation of Step Up switch mode power supply with suitable waveforms.

Q5) Attempt any Two of the following. **[16]**

a) Explain the operation of Astable multivibrator with the help of suitable waveforms at the base and collector. Derive expression for frequency of oscillation.

b) Design a transistorized Colpitts oscillator for the following specifications: V_0 = 5 V (p-p), Output Frequency (f_0) = 2 MHz, AV = 25

Use transistor BC 147 B with: $PD_{(Max)}$=250m W, V_{CE}=45 V, $IC_{(Max)}$=200 m A,

$h_{fe\ typical}$ = 330, h_{ie} = 4.5 KΩ

c) Design a Schmitt Trigger using BJT with the following specifications: UTP = 2.5 V, LTP = 1.5 V, V_{CC} = 10 V, $I_{C(Sat)}$ = 5 mA, $V_{BE(Sat)}$ = 0.7 V, $V_{CE(Sat)}$=0.3

Q6) Attempt any Two of the following. **[16]**

a) Design a mono stable multivibrator for the following specifications: V_{CC}=10V, Period of quasi stable state (T) = 1 mS, V_{Boff} = -1V, $-V_{BB}$ = -5V. Use transistor BC 147 with: $PD_{(Max)}$=250m W, V_{CE}=45 V, $IC_{(Max)}$=100 m A,

$hf_{e(min)}$ = 115, hie = 2.7 KΩ

b) i) Explain the symmetrical triggering method in bistable multivibrator.

ii) Write a note on "Barkhausens criteria".

c) Design a Wien bridge oscillator for the frequency of 1 KHz which uses a two stage amplifier having gain more than 600 which operates on supply Voltage (V_{CC}) of 12 V and R_L = 1 KΩ.

Use transistor BC147 B with: $PD_{(Max)}$ = 0.25 w, $V_{CE(Max)}$=45 V, $I_{C(Max)}$=100 m A,

h_{fe} = 200, and h_{ie} = 4.5 KΩ, $V_{CE(Sat)}$=0.3 V.

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Seat No.	

S.E. (Electronics Engg.) (Part - II) (Semester - IV)
(Revised) Examination, April - 2017
LINEAR INTEGRATED CIRCUITS
Sub. Code : 63440

Day and Date : Tuesday,25-04-2017 **Total Marks :100**

Time : 10.00 a.m. to 1.00 p.m.

Instructions : 1) **All questions are compulsory.**
2) **Digits to the right indicate full marks.**
3) **Make suitable assumption wherever necessary.**

SECTION - I

Q1) Answer any THREE from the following: **[18]**

a) For DIBO $R_{C1} = R_{C2} = 4.7$ K Ω, $R_{in1} = R_{in2} = 0$ Ω, $V_{CC} = 12V$, $V_{EE} = -12V$, hfe = 100 $V_{BE} = 0.7$, $V_{in1} = V_{in2} = 0V$
   i) Determine the value of R_E for $I_E = 1$ mA.
   ii) The DC output voltage V_{out} at collector of any one transistor.

b) Explain the following terms:
   i) Thermal Drift.
   ii) PSRR.
   iii) Change in input offset voltage with time.
   iv) Input bias current.

c) Shows typical level shifting network. If input d.c. voltage is 6.84V and R2 is 270 Ω, design the value of R1 if output level required is zero volt.

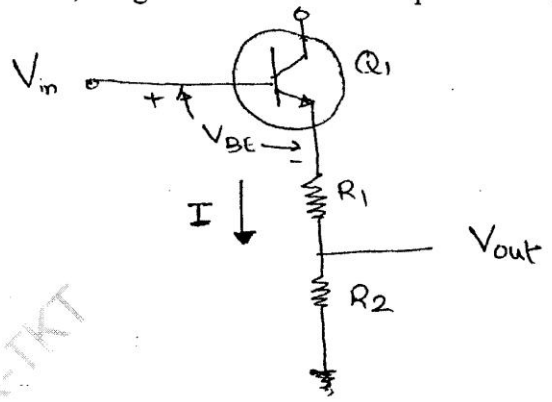

Fig. 1

P.T.O.

d) Define the term slew rate of op-amp. Explain the setup for measuring slew rate.

Q2) Attempt any TWO. **[16]**

a) With neat sketch explain the output stage in op-amp block diagram. Give the reasons for the cross over distortion in this stage. Discuss various methods to improve cross over distortion.

b) Calculate the two input bias currents for the op-amp having input offset current of 5 nA and input bias current of 30 nA.

c) For an op-amp having slew rate of 3V/μsec, what is the maximum closed loop gain that can be used when input signal varies by 0.4 V in 12 μsec?

Q3) Attempt any TWO. **[16]**

a) Explain in detail advantages and disadvantages of open loop configuration of op-amp. Also discuss the effect of negative feedback on circuit stability.

b) Derive the equation for open loop voltage gain as function of frequency.

c) For non inverting amplifier the values of RI and Rf are 1 KΩ and 10 KΩ. The various op-amp parameters are as follows:

Open loop gain = 2×10^5, input resistance = 2 MΩ, Output resistance=75Ω
Single beak frequency = 5 Hz, Supply voltage V_{CC} = 15 V, V_{EE} = -15v
Output voltage swing from = 13V to -13 V.

Calculate the closed loop gain, input resistance, output resistance and bandwidth with feedback. Also find V_{OOT}.

SECTION - II

Q4) Attempt any two. **[16]**

a) Explain the operation of Window detector with circuit diagram, state its applications.

b) What is instrumentation amplifer? Derive expression for voltage gain.

c) Draw the circuit diagram of averaging amplifer for three inputs and show that,

VO = V1 + V2 + V3/3 (use non-inverting configuration).

Q5) Attempt any two. **[16]**

a) Draw and explain 1st order low pass butterworth filter also derive the gain expression.

b) With neat waveform explain band reject filter.

c) Design a wide band pass filter with fL = 200Hz, fH = 1KHz and pass band gain of 4. Calculate the value of Q.

Q6) Attempt any two. **[18]**

a) Explain the block diagram of PLL. And also explain the operation of any two application of PLL.

b) Explain the operation of astable multivibrator using IC 555 with the help of internal block diagram. Derive an expression for fo.

c) Explain the operation of triangular wave generator with circuit diagram and waveforms. Derive an expression for output frequency (fo).

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Seat No.	

S.E. (Electronics Engg.) (Part - I) (Semester - III) Examination, May - 2017

ELECTRONIC CIRCUIT ANALYSIS AND DESIGN - I

Sub. Code : 63436

Day and Date : Tuesday, 16 - 05 - 2017 **Total Marks : 100**

Time : 2.00 p.m. to 5.00 p.m.

Instructions :
1) **All Questions are Compulsory.**
2) **Figures to the right indicates full marks.**
3) **Assume Suitable data if necessary.**
4) **Standard data sheet is allowed.**

SECTION - I

Q1) Attempt any Three of the following: **[18]**

a) What is need of filter? Derive an expression of ripple factor for capacitor filter.

b) Draw & explain different biased diode dipper circuits.

c) Design a Zener shunt voltage a regulator to provide 5V output dc voltage at load with the load current of 10 mA. The input voltage is varies in between 6V to 8V.

d) Prove that rise time of a step I/P to low pass filter is given by $t_r = 0.35/f_2$, where f_2 is the upper cut off frequency.

Q2) Attempt any Two of the following: **[16]**

a) A 50V symmetrical square wave having a period of $50\,\mu s$ is applied as input to the RC differentiator having time constant of 5ms. Sketch the output & also calculate the DC value of output.

b) Design a power supply using Full wave rectifier with LC filter to provide an output voltage of 15V at $15\,\Omega$ load having ripple factor of 0.05 with Rch = $1\,\Omega$.

c) Write a note on:
   i) Pre Regulator circuit
   ii) IC 723

P.T.O.

Q3) Attempt any Two of the following: **[16]**

a) Design a series pass regulator for the following specification:

V_i = 15 to 20 V, V_0 = 10 V, I_{Lmax} = 100mA.

b) Derive ripple factor for CLC filter with full wave rectified supply.

c) Explain:

i) Clamping circuit theorem

ii) Biased positive clamper.

SECTION - II

Q4) Attempt any Three of the following: **[18]**

a) Draw a fixed bias circuit and explain its operation.

b) Draw and explain depletion type MOSFET.

c) Calcualte the size of bypass capacitor, Ce to provide a low frequency 3 dB point at 100Hz when Re = 1KΩ, hfe = 50, hie = 1kΩ, RS = 600Ω

d) Draw and explain approximate high frequency model for determination of short circuit current gain. Hence derive f_T.

Q5) Attempt any Two of the following: **[16]**

a) Explain in detail low frequency response to a square wave and derive expression for sag in terms of input frequency and lowe cut off frequency.

b) Design a single stage RC coupled amplifier to give output of $10V_{(p-p)}$ across the load of 2KΩ. The frequency range of operation is 30Hz to 15KHz. The source resistance is 600Ω. Stability factor is 10.

c) Define stability factor. Derive an expression for stability factor of self bias circuit.

Q6) Attempt any Two of the following: **[16]**

a) A transistor has following parameters at Ic = 10mA, V_{CE} = 10V at room temperature. hfe = 100, hie = 500Ω, |Ai| = 10 at 10 MHz and Cob = 3pF.

i) rb'e

ii) rbb'

iii) f_T

iv) cb'e

v) f_β

b) What are h-parameters? Determine h parameters using characteristics of BJT connected in CE mode.

c) Draw diagram of common source FET amplifier. Derive an expression for its voltage gain at low frequency.