Dept

SF-175

Total No. of Pages : 2

Seat No.	

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

LINEAR INTEGRATED CIRCUITS

Sub. Code : 63440

Day and Date : Wednesday, 01 - 11 - 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 if necessary.

SECTION - I

Q1) Write short notes on any three of the following : **[3 × 6 = 18]**

a) Derive and explain virtual ground concept.

b) Draw a neat block schematic of operational amplifier. Explain function of each block.

c) Draw a high frequency equivalent circuit of Op-amp. Derive expression for open loop voltage gain as a function of frequency.

d) Explain the following terms with respect to Op-amp :

i) CMRR.

ii) Input Offset Voltage.

iii) Input Bias Current.

Q2) Write short notes on any two of the following : **[2 × 8 = 16]**

a) Explain frequency response of op-amp in open loop and closed loop configuration.

b) Why the need of constant current source? Explain the principle of operation of current mirror circuit?

c) The 741C op-amp having the following parameters is connected as a non-inverting amplifier with R_1 = 1KΩ and R_f = 10 KΩ; A = 200,000, Ri = 2MΩ, Ro = 75Ω, f_0 = 5 MHz, Supply voltages = +/–15V, Output voltage swing = +/–13V. Compute the values of A_f, R_{if}, R_{of}, f_F.

P.T.O.

Q3) Write short notes on any two of the following : **[2 × 8 = 16]**

a) Derive expression for total output offset voltage of op-amp.

b) Draw an AC equivalent circuit of DIBO differential amplifier. Derive an expression for voltage gain.

c) With neat circuit diagram explain offset null techniques for op-amp configurations.

SECTION - II

Q4) Write short notes on any three of the following : **[3 × 6 = 18]**

a) Draw and explain Window Detector.

b) Write short note on Narrow band pass filter.

c) Draw and explain Sample and Hold circuit.

d) Draw a neat circuit of Schimit trigger using op-amp. Explain its operation with a suitable waveforms.

Q5) Write short notes on any two of the following : **[2 × 8 = 16]**

a) With help of neat circuit diagram explain the operation of Wein Bridge oscillator. Derive an expression for output frequency.

b) With the help of neat circuit diagram explain the operation of Differentiator using op-amp. Draw its frequency response.

c) What is second order High pass filter? Explain its operation and draw its frequency response.

Q6) Write short notes on any two of the following : **[2 × 8 = 16]**

a) With the help of neat circuit diagram explain V-F Converter.

b) Draw a neat circuit diagram and explain the operation of Monostable Multivibrator using IC 555.

c) Design a second order low pass filter for non inverting amplifier with C1=C2=0.0047 μF and A_f = 1.5 at a high cut off frequency of 1 KHz.

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Total No. of Pages : 3

Seat No.	

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

NETWORK ANALYSIS

Sub. Code : 63438

Day and Date : Thursday, 23 - 11 - 2017 **Total Marks : 100**

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

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

SECTION - I

Q1) Attempt any two : **[16]**

a) Draw the oriented graph of the circuit given in figure 1. Form the Insidence Matrix for the given circuit.

b) Find the current flowing through the 10Ω resistance using Node Voltage Analysis technique in figure 1.

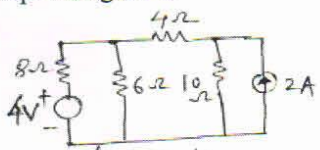


figure 1.

c) Derive equations for Star to Delta Transformation and Delta to Star Transformation in case of a resistive circuit.

Q2) Attempt any two : **[16]**

a) Find the power dissipated across the 10Ω resistance in the circuit in figure 2.

b) Find the current flowing through the 10Ω resistance using Millman's Theorem for the given circuit in figure 2.

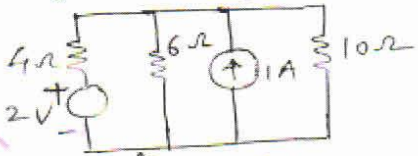


figure 2.

c) Derive the condition for Maximum Power Transfer in a resistive circuit.

P.T.O.

Q3) Write short notes on any three : **[18]**

a) Find the equivalent parameters in case of two, two port networks connected in Series-Parallel.

b) Derive the Z parameters in terms of ABCD parameters.

c) Derive the Z parameters of a symmetrical T network.

d) Find the Y parameters for the circuit given in figure 3.

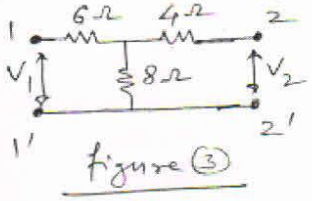


figure (3)

SECTION - II

Q4) Solve any two : **[2 × 8 = 16]**

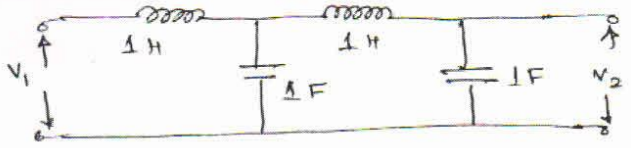
a) For series RLC circuit derive equations for half power frequencies in term of circuit elements.

b) Explain the restriction on poles and zeros for transfer functions.

c) Design m-derived low pass filter (T & π section) for cutoff frequency of 2 KHz. Infinite attenuation frequency is 2.1 KHz & design impedance is 300 Ω.

Q5) Solve any two : **[2 × 8 = 16]**

a) What is driving point and transfer impedance of following network shown?



b) What is attenuator? Explain the lattice attenuator in detail.

c) A series RLC circuit has R = 2Ω, L = 2mH, C = 10μF.
Calculate :
i) Q factor.
ii) Bandwidth.
iii) Resonant frequency.
iv) Half power frequencies.

Q6) Solve any three : **[3 × 6 = 18]**

a) Draw the pole zero diagram for given network and obtain v(t).

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

b) Draw the following curves for series RLC circuit :
i) Variation of capacitor, inductor and total reactance v/s frequency.
ii) Variation of total impedance v/s frequency.
iii) Variation of current & voltage across L & C v/s frequency.

c) What is equalizer? Explain shunt equalizer in detail.

d) Design symmetrical π attenuator to give 20 dB attenuation and to have design impedance of 100Ω.

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Seat No.	

S.E. (Electronics) (Semester - III) (Revised) Examination, November - 2017
ANALOG COMMUNICATION
Sub. Code: 63437

Day and Date :Tuesday, 21 - 11 - 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.**
3) **Assume suitable data wherever necessary.**

SECTION - I

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

a) Explain why modulation is required? What are the different types of modulation.

b) With a neat block diagram explain low level modulation.

c) What is TRF receiver? Draw and explain it.

d) With neat diagram explain de - emphasis circuit.

e) Explain practical diode detector indetail.

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

a) With a neat circuit diagram explain emitter modulation.

b) What is image frequency? How it is rejected in the AM receiver.

c) An audio frequency signal $25 \sin(2\pi \times 500t)$ is used to amplitude modulate the carrier of $40\sin(2\pi \times 10^5 t)$.

P.T.O.

Calculate:-

i) Modulation index.

ii) Sideband frequency.

iii) Amplitude of each sideband.

iv) Bandwidth requirement.

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

a) Explain how a PLL is used for frequency modulation.

b) Derive the expression for instantaneous value of FM voltage & draw the frequency spectrum of FM wave.

c) What is AGC? Explain the different types of AGC.

SECTION - II

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

a) Draw the details of Half wave dipole antenna and explain.

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

c) Explain generation of PTM signal by indirect method.

d) Explain TDM in detail.

e) A receiver connected to an antenna whose resistance is 60 Ohm has an equivalent noise resistance of 40 Ohm. Calculate the receivers noise figure in decibels and it's equivalent noise temperature.

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

a) Explain how a FM signal is demodulated using Foster Seely discriminator.

b) Explain the following parameters of an antenna.

i) Antenna gain.

ii) Captured power density.

iii) Input impedance.

iv) Bandwidth.

c) Draw and explain balanced slope detector.

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

a) What is PWM? Explain the direct method of generation of PWM.

b) Explain Yagi-uda and folded dipole antenna in detail.

c) Explain sky wave propagation in detail.

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S.E. (Electronics) (Part - II) (Semester - III) Examination, November - 2017

ELECTRONIC CIRCUIT ANALYSIS & DESIGN - I

Sub. Code: 63436

Day and Date : Wednesday, 15 - 11- 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.**
3) **Assume suitable data if necessary.**
4) **Standard data sheets/tables are allowed.**

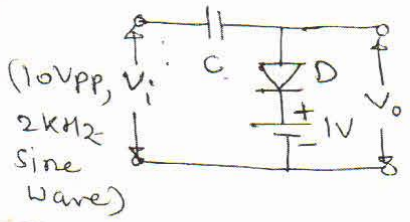
SECTION-I

Q1) Attempt any three(6 marks each): **[18]**

a) Derive expression for ripple factor for C filter.

b) Draw and explain the response of low pass filter for the following inputs.
   i) Step Input
   ii) Pulse Input
   iii) Square wave input

c) For the given circuit, draw output waveform.



d) Design zener shunt regulator to provide dc voltage of 10V at load current of 10mA. The input voltage is 20V $\pm$ 2V

P.T.O.

Q2) Solve any two (8 marks each): **[16]**

a) 150 - 0 - 150V (rms) transformer is used with full wave rectifier with each diode having internal resistance of 25Ω. R_L = 2kΩ.

Calculate:

i) DC load current

ii) Average load voltage

iii) rms value of ripple voltage

iv) Rectification efficiency (η).

b) What is tilt and undershoot for pulse input to high pass filter? Sketch and explain the output of high pass filter to square wave input for

i) RC << T

ii) RC >> T

c) Design a voltage regulator using IC 723 for the following specifications.

V_0 = 4V, $I_{L\ (max)}$ = 100 mA, V_{sense} = 0.65V.

Q3) Attempt any two (8 marks each): **[16]**

a) What is clipper circuit? Explain single level and double level clipping circuits.

b) Design series voltage regulator for the following specifications.

V_i = 20V ; V_o = 12V ; I_L = 50mA

Also calculate stability factor.

c) Draw and explain L section filter (LC filter) with waveforms. Derive expressions for ripple factor. Also state its advantages over C & L filter.

SECTION-II

Q4) Attempt any three: **[18]**

a) Explain analysis of common source Amplifier.

b) Derive expression for m-parameters in CC & CE configuration.

c) Calculate the size of emitter bypass capacitor to provide low frequency 3 dB point at 100Hz when $R_E = 1k\Omega$, $h_{fe} = 50$, $h_{ie} = 1k\Omega$ & $R_S = 600\Omega$.

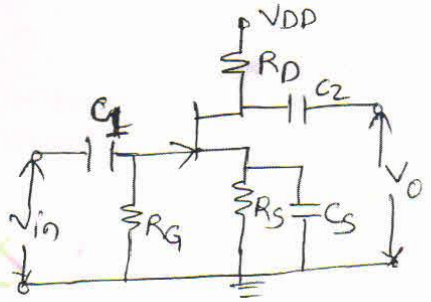
d) Give the circuit analysis of collector to base bias circuit with its advantages.

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

a) Design voltage divider bias for following specifications $V_{CC} = 12V$, $V_{CEQ} = 15V$, $I_{CQ} = 2$ mA & $\beta_{min} = 100$.

b) Draw & explain in detail low & high frequency step response of RC coupled amplifier.

c) Calculate circuit parameters Av, Ri, Ro for the JFET amplifier shown in fig. (1). Neglect Ed. Data given is $V_o = 15V$, $I_{DSS} = 8mA$, $V_P = -4V$, $R_D = 1.2\ k\Omega$, $R_G = 1M\Omega$, $V_{GSQ} = -0.94V$.



Q6) Attempt any two: **[16]**

a) Design a single stage RC coupled amplifier to give voltage gain of –100 with stability factor 10 & output voltage $5V_{(P-P)}$ & frequency range 50Hz to 1MHz.

b) Draw & explain approximate high frequency circuit for determination of current gain with resistive load & explain Miller effect.

c) A transistor is used in CE amplifier at quiscent collector current of 0.1 mA. If the load resistance is 56kΩ & $R_S = 600\Omega$. Calculate Ai, Ri, Av, Ro having h - parameters $h_{ie} = 6.4\ k\Omega$, $h_{re} = 1.5 \times 10^{-4}$, $h_{fe} = 240$, $h_{oe} = 6\ \mho$.

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Total No. of Pages : 4

Seat No.	

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

CONTROL SYSTEMS ENGINEERING

Sub. Code : 63444

Day and Date : Tuesday, 07 - 11 - 2017

Time : 10.00 a.m. to 01.00 p.m. **Total Marks : 100**

Instructions : 1) All Questions are compulsory.

2) Figures to the right indicate full marks

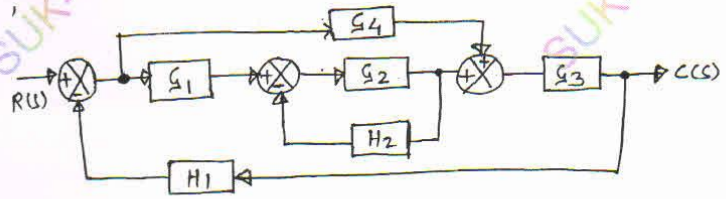
3) Assume necessary data wherever required.

SECTION - I

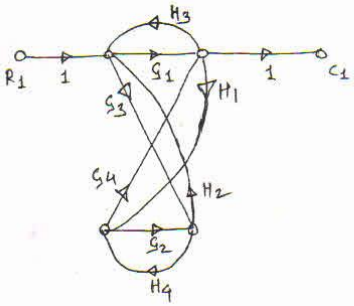
Q1) Attempt any two of the following : **[18]**

a) What is signal flow graph? Explain in detail Mason's gain formula.

b) Find out the transfer function $\frac{C(s)}{R(s)}$ of the following block diagram.



c) Find out the transfer function C_1/R_1 of the following signal flow graph.



P.T.O.

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

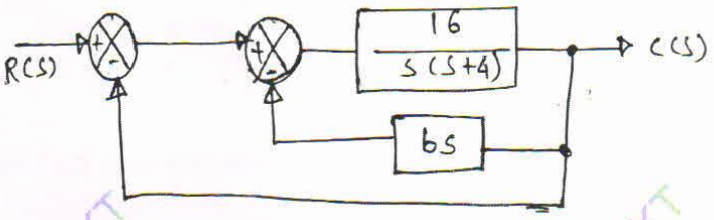
a) What is sensitivity? Explain in detail how the use of feedback reduces the parameter variations.

b) What is stability? Explain in detail Routh Hurwitz stability criteria.

c) The System illustrated in figure consists of a unity feedback loop containing a minor rate feedback loop.

i) Determine damping factor (ξ), undamped natural frequency (Wn), peak overshoot (Mp) without any rate feedback loop (b = 0).

ii) Determine the rate feedback constant (b) which will increase the value of $\xi = 0.8$.



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

a) Explain in detail various standard test signals.

b) For a unity feedback system having an open loop transfer function $G(S)=\frac{K(S+2)}{S(S^3+7S^2+12S)}$ Find out

i) Type of system

ii) Error constants Kp, Kv, Ka

iii) Steady state error for parabolic I/p.

c) Plot the root locus for the system having open loop transfer function $G(S)=\frac{K}{S(S+1)^2}$. Determine the value of 'K' for which the system response will be oscillatory. Also Calculate the frequency of oscillation at that value of K.

SECTION - II

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

a) Derive the correlation between time and frequency domain.

b) Draw the polar plot of the system with transfer function $G(S)=\frac{K}{1+ST}$.

c) Sketch the Bode plot of the following transfer function $G(jw)=\frac{10(1+0.5jw)}{jw(1+0.1jw)(1+0.2jw)}$ Find phase margin.

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

a) Why the state space analysis of the control system is essential? Explain in detail state, state variable, state vector & state space.

b) A system described by the following relation is illustrated

$$\begin{bmatrix}\dot{x}_1\\ \dot{x}_2\end{bmatrix}=\begin{bmatrix}-4 & -1\\ 3 & -1\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}+\begin{bmatrix}1\\ 1\end{bmatrix}u$$

$$\& \; y=\begin{bmatrix}1 & 0\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}$$

Obtain the transfer function of the system.

c) A system is represented by

$$\begin{bmatrix}\dot{x}_1(t)\\ \dot{x}_2(t)\end{bmatrix}=\begin{bmatrix}-1 & 0\\ 0 & -4\end{bmatrix}\begin{bmatrix}x_1(t)\\ x_2(t)\end{bmatrix}+\begin{bmatrix}0\\ 1\end{bmatrix}u(t)$$

$$\& \; y(t)=\begin{bmatrix}1 & 2\end{bmatrix}\begin{bmatrix}x_1(t)\\ x_2(t)\end{bmatrix}$$

Is the given system observable ? Find the rank of matrix.

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

a) What is the need of compensation? Explain in detail lag compensator.

b) Explain in detail block shematic of PLC controller.

c) Explain proportional controller in detail with the help of schematic diagram.

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Seat No.	

S.E. (Electronics Engg.) (Part -II) (Semester - IV) (Revised) Examination, November - 2017

ELECTRONIC CIRCUIT ANALYSIS & DESIGN -II

Sub. Code:63441

Day and Date :Thursday, 02 - 11 - 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) The current series feedback amplifier has the following parameters:
$R_1 = 30k\Omega, R_2 = 20K\Omega, hie = 1k\Omega, R_L = 1k\Omega, R_E = 100\Omega, hfe = 100$

Calculate: i) A_v

ii) β

iii) Ri_f

iv) Av_f &

v) Loop gain in dB

b) Explain the Bootstrapping technique used in emitter follower or Darlington amplifier.

P.T.O.

c) A push pull class B audio frequency power amplifier supplies 0.5 watts power to 8 Ω loudspeaker through an ideal output transformer having centre tapped primary winding. Each of the two identical transistors used in the circuit has VCE_{sat} = 0.5 V and Vcc=9V. Determine:

i) turns ratio of a transformer.

ii) Power dissipation of each transistor.

d) What is harmonic distortion? Derive an expression for the second order harmonic distortion using three point method.

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

a) Explain the operation of Complementary Symmetry Class B Power amplifier. Derive an expression for Conversion efficiency. State its advantages & disadvantages.

b) Design a two stage common emitter amplifier to meet the following specifications:

i) Load resistance (R_L) =2.2 KΩ

ii) Source resistance (R_s)=470Ω

iii) Supply Voltage (V_{cc})=15V

iv) Peak to peak Output Voltage ($V_{0p\text{-}p}$) =6V

v) Lower 3 dB frequency (F)=20Hz - 20KHz

Use transistor Bc 547 with: $PD_{(max)}$= 500m W, V_{CE}=45V, $IC_{(max)}$=100m A, $hf_{e(min)}$=200,

c) Draw a neat circuit of emitter follower amplifier Derive an expression for Current gain, Input Impedance, Output Impedance and Voltage gain.

Q3) Attempt any two of the following **[16]**

a) i) The input signal & Output voltages of an amplifier are1mV&1V respectively. If the gain with negative feedback is 100 & the input resistance without voltage series feedback is 2KΩ, Find the feedback factor & Input Resistance with feedback.

ii) An amplifier has open loop gain of Av=2500±250. It is necessary to have an amplifier whose gain varies by not more than ±0.5%. Calculate the gain with feedback (AV_f) and feedback factor (β).

b) i) Derive an expression for maximum collector dissipation in class B push pull amplifier.

ii) What is power amplifier? State the difference between power amplifier & voltage amplifier.

c) Design a transformer coupled class A power amplifier to deliver ac power 2W to a load resistance of 4Ω. The transformer efficiency (n) is 65%. Use VCC=12 V. Use Transistor data: PD_{max}=11W, V_{CE}=45V, IC_{max}= 3A, hfe_{min}=40.

SECTION_II

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

a) Explain the operation of Self bias bistable multivibrator. Derive equations for stable state currents & Voltages of On & Off transistor.

b) Draw a neat circuit diagram of Schmitt trigger and derive the expression for UTP, LTP and Hysteresis.

c) The circuit Components of a transistorized phase shift oscillator are, R_1 =25KΩ, R_2=60KΩ,R_c=40KΩ, R=7.1KΩ and hie =1.8KΩ. Determine the value of capacitor and current gain for the transistor to provide a resonating frequency of 10KHz.

d) Derive an expression for frequency of oscillation & minimum gain required for sustained oscillation in Colpitt's oscillator.

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

a) Design an phase advancing phase shift oscillator for the following specifications: Frequency of oscillation (f)=1KHz,

Peak to peak output amplitude ($V_{0(p-p)}$) = 6V Supply Voltage (V_{CC})=10V.

b) Design a fixed bias Bistable Multivibrator for the following specifications: V_{CC}=10V, $-V_{BB}$=-5V, $I_{C(sat)}$=5mA, h_{fe}=40.

c) Draw the neat circuit diagram of collector coupled Monostable Multivibrator. Explain its operation with suitable waveforms. Derive an expression for Pulse width 'T'.

Q6) Attempt any two of the following **[16]**

a) Design a transistorized Hartley oscillator for the following specification: V_0=3 Vrms, Output Frequency f_0=10 MHz, AV=25

Use transistor BC 147 B with: $PD_{(max)}$= 250 m W, V_{CE}=45 V, $IC_{(max)}$=200mA, $h_{fe\ typical}$ =330, h_{ie}=4.5K Ω

b) Design a Schmitt Trigger using BJT with the following specifications:

UTP =2V, LTP =1V, V_{CC}=5V, $I_{C(sat)}$=5mA, Consider trasistors are ideal.

c) Write a short note on:

i) Symmetrical triggering method

ii) Switching regulator LM 3524

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S.E. (Electronics) (Part - II) (Semester - III) (Revised) Examination, November - 2017

ELECTRONICS MEASUREMENT AND INSTRUMENTATION

Sub. Code : 63435

Day and Date : Monday, 13-11-2017 **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.**

SECTION - I

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

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

b) Explain the principle of operation of ohm-meter.

c) Draw and explain block diagram of cathode ray oscilloscope.

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

a) Draw and explain pulse and square wave generator.

b) What are the different types of CRO probes? Explain any one of active probe.

c) Explain in details with example, how calibration is done.

P.T.O.

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

a) Signal Generators.

b) DMM.

c) DSO.

d) Digital Tachometer.

SECTION - II

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

a) What is analyzer? Explain with suitable diagram Fourier analyzer.

b) How thermocouple is used for the measurement of temperature? Explain in detail.

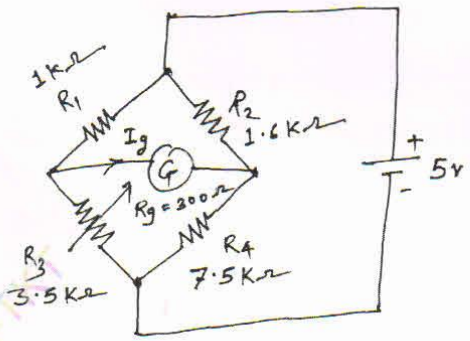
c) The Hay's bridge is balanced with following components and the source of excitation is 1,000 rad/sec. $R_1 = 9.5K\Omega$, $R_2 = 3.5K\Omega$, $R_3 = 1.2K\Omega$, $C_1 = 1.0$ f.Find the series equivalent inductance and resistance.

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

a) What is DAS? Explain Multi-channel DAS.

b) What is gauge factor? Differentiate between RTD and thermistor.

c) Find the current flowing through the galvanometer of the circuit shown



Q6) Attempt any three **[18]**

a) PH sensors & signal conditioning.

b) Rs 232.

c) Wien Bridge.

d) The impedance of the basic ac bridge are given as follows.

$Z_1 = 100\ \Omega < 80^\circ$ (inductive impedance)

$Z_2 = 250\ \Omega$ (Pure resistive)

$Z_3 = 400\ \Omega < 30^\circ$ (Inductive impedance)

Z_4 = Unknown

Determine the constants of the unknown arm.

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S.E. (Electronics Engineering) (Part - II) (Semester-IV) (Revised) Examination, November - 2017

DIGITAL SYSTEM & MICROPROCESSOR

Sub. Code : 63443

Day and Date : Monday, 06-11-2017 **Total Marks : 100**

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

Instructions :
1) **Figures to the right indicates 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) Draw and explain logic diagram of 4-bit adder-subtractor.

b) Write characteristics table & derive characteristics equations for D & R-S F/Fs.

c) Differentiate serial and parallel counter.

d) Write excitation table for D and J-K F/Fs.

e) Implement and explain 4 to 16 decoder using 3 to 8 decoders.

f) Reduce the function $f(A,B,C) = \Sigma (3,5,7)$ using k-map & implement using NAND gates.

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

a) Define MUX and Implement the switching function $F(A,B,C) = \Sigma(1,3,5,6)$ with an 4×1 Multiplexer with A and C connected to selection lines.

b) Reduce following function using k-map and implement using NOR gates. $F(w\ x\ y\ z) = \Pi\ (3,4,5,7,12,13)\ \&\ d(6,9,11)$

c) Draw and explain BCD to common anode 7-segment decoder with truth table.

P.T.O.

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

a) Derive characteristics equations for all flip flops.

b) Design mod-7 ripple counter using J-K F/Fs.

c) Explain RAM, ROM & EPROM.

SECTION-II

Q4) Answer any 4 of the following. **[20]**

a) Explain Flag Register of 8085.

b) Explain with timing the Demultiplexing of AD0-AD7 signals.

c) Define the terms- T-state, Machine cycle, instruction cycle & single stepping.

d) How does Microprocessor differentiates between data and instruction code?

e) Write a program to load 37H in register B and send it at the output port having address 01H.

Q5) Answer any 2 of the following. **[16]**

a) Explain with timing diagram OUT 93H instruction of 8085.

b) Write assembly language program for BCD to Hex code conversion.

c) Draw & Explain Interrupt structure of 8085.

Q6) Answer any 2 of the following. **[14]**

a) Compare between Memory mapped I/O & I/O mapped I/O Technique.

b) Write a assembly language program to unpack BCD number (57) stored in B register. Add the two unpacked numbers and store the result at memory location 6500H.

c) Draw and explain the interfacing of ADC-0809 to 8085.

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

DATA STRUCTURE & ALGORITHM

Sub. Code: 63442

Day and Date : Friday, 3 - 11 - 2017 **Total Marks : 100**

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

Instructions :
1) **All Questions are compulsory.**
2) **Draw neat labelled diagrams wherever necessary.**
3) **Figures to the right indicate full marks.**

SECTION - I

Q1) Attempt any two: **[2 × 8 = 16]**

a) Write a algorithm and program for bubble sort technique.

b) Define recursion. Write a algorithm to find factorial of given number.

c) What is record? How record will represent by structure?

Q2) Attempt any two: **[2 × 8 = 16]**

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

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

c) Explain following operation on singly link list.

i) Insertion at end

ii) Deletion of last node

iii) Searching node from given link list.

iv) Display nodes of link list.

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

a) Binary Search.

b) Single and multidimensional array.

c) Sparse Matrix.

d) Circular Link List.

P.T.O.

SECTION - II

Q4) Attempt any two: **[2 × 8 = 16]**

a) What is graph? Explain storage representation of graph.

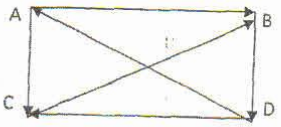
b) Write a different type of tree. Explain preorder traversal of binary tree with algorithm & example.

c) Explain BFS algorithm with example.

Q5) Attempt any two: **[2 × 8 = 16]**

a) What is hashing? Explain different hash functions.

b) Consider following graph and answer the following question



i) Find Adjacency matrix of graph.

ii) Find path matrix.

iii) Is graph is strongly connected?

c) Explain Binary search tree. Draw BST for following sequence 50,30,80,100,10,25,120,70,8,200.

Q6) Write short Notes (Any Three) **[3 × 6 = 18]**

a) Directed graph.

b) Rehashing.

c) Multiway Tree.

d) Application of graph.

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Seat No.	

S.E. (Electronics) (Part - II) (Semester - III) Examination, November - 2017

ENGINEERING MATHEMATICS - III

Sub. Code : 63434

Day and Date : Friday, 10 - 11 - 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.**
3) **Use of non-programmable calculator is allowed.**

SECTION - I

Q1) Solve any Three.

a) Solve $(D^2 + 13D + 36)y = e^{-4x} + \sinh x$ **[6]**

b) Solve $(D^2 - 4D + 3)y = x^3 e^{2x}$ **[6]**

c) Solve $(D^2 + 3D + 2)y = \sin(e^x)$ **[6]**

d) An electric circuit consists of an inductance L, a condenser of capacity C and an e.m.f. $E = E_o \cos wt$, so that the charge Q satisfies the differential equation $\frac{d^2Q}{dt^2} + \frac{Q}{CL} = \frac{E_o}{L} \cos wt$.

If $w = \frac{1}{\sqrt{CL}}$ and initially $Q = Q_o$ at $t = o$ and the current $i = i_o$ at $t = 0$, show that the charge Q at time t is given by.

$$Q = Q_o \cos wt + \frac{i_o}{w} \sin wt + \frac{E_o}{2LW} t \sin wt$$ **[6]**

Q2) Solve any two.

a) i) Find the unit vector normal to the surface $xy^3z^2 = 4$ at $(-1, -1, 2)$ **[4]**

P.T.O.

ii) In what direction from the point (2, 1, –1) is the directional derivative of $\phi = x^2yz^3$ a maximum? What is its magnitude? **[4]**

b) Prove that $\bar{F} = 2xyz^2i + (x^2z^2 + z\cos yz)\,j + (2x^2yz + y\cos yz)K$ is an irrotational field and find its scalar potential. **[8]**

c) If the directional derivative of $\phi = axy^2 + byz + cz^2x^3$ at (1, 2, –1) has a maximum magnitude 64 in the direction parallel to the Z- axis. Find the values of a, b, c. **[8]**

Q3) Solve any two.

a) In a large consignment of electric bulbs, 10 percent are defective. A random sample of 20 is taken for inspection. Using Binomial distribution find the probability that

i) all are good bulbs

ii) atmost three are defective bulbs

iii) exactly three are defective bulbs. **[8]**

b) A skilled typist, on routine work, kept a record of mistakes made per day during 300 working days.

Mistakes per day	0	1	2	3	4	5	6
No.of days	143	90	42	12	9	3	1

Fit a poisson distribution to the above data & hence calculate theoretical frequencies. **[8]**

c) In an intelligence test administered to 1000 children the mean score was, 42 with S.D. 24. Find the number of children.

i) Scoring more than 60 and

ii) between 20 and 40 assuming the distribution to be normal.

(Given: For S.N.V. z area from z = 0 to z = 0.75 is 0.2734, that between z = 0 and z = 0.9167 is 0.3202 and that between z = 0 to z = 0.08333 is 0.0332) **[8]**

SECTION - II

Q4) Attempt any three from the following:

a) Find Laplace transform of $\int_0^t \frac{e^t \sin t}{t} dt$. **[6]**

b) Find inverse Laplace transform using convolution theorem $\frac{1}{(s+1)(s^2+1)}$. **[6]**

c) Solve using Laplace transform $\frac{d^2x}{dt^2} + 4\frac{dx}{dt} + 13x = 2e^{-t}$ where $x = 0, \frac{dx}{dt} = -1$ when t = o. **[6]**

d) Find Laplace transform of

$$f(t) = a \sin pt, 0 < t < \pi/p$$

$$= 0, \pi/p < t < 2\pi/p$$

$$\& \; f\left(t + \frac{2\pi}{p}\right) = f(t).$$ **[6]**

Q5) Attempt any two of the following:

a) If $f(x) = \left(\frac{\pi - x}{2}\right)^2$ in the range [0, 2Π], show that in this range $f(x) = \frac{\pi^2}{12} + \sum_{n=1}^{\infty} \frac{\cos nx}{n^2}$ and hence reduce the following relations

i) $\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + ----\infty = \frac{\Pi^2}{6}$

ii) $\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + ----\infty = \frac{\Pi^2}{12}$. **[8]**

b) Find Fourier expansion for the function $f(x) = x - x^2$ in the interval $-1 \le x \le 1$ & hence show that $\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \text{----} \infty = \frac{\Pi^2}{12}$. [8]

c) Obtain the half - range sine series for

$f(x) = x, \ 0 \le x \le 4$

$= 8 - x, 4 \le x \le 8.$ [8]

Q6) Attempt ANY TWO of the following.

a) Show that the Fourier transform of $f(x) = e^{-x^2/2}$ is $e^{-s^2/2}$. [8]

b) Show that the Fourier cosine transform of $f(x) = e^{-x^2}$ is $\frac{1}{\sqrt{2}} e^{-s^2/4}$. [8]

c) Find the Fourier sine transform of the function $f(x) = e^{-x}$ and hence show that $\int_0^\infty \frac{x \sin mx}{1 + x^2} dx = \Pi/2 \, e^{-m}$. [8]

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