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Total No. of Pages :4

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S.E.(Electronics)(Part-I) (Semester -III)(Revised) Examination, November - 2016

ENGINEERING MATHS-III

Sub. Code :63434

Day and Date :Tuesday, 15 -11 -2016 **Total Marks : 100**

Time :10.30 a.m. to 1.30 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: **[6]**

a) Solve $(D^3+1)y=3+e^{-x}+Se^{2x}$

b) Solve $(D^3-D^2-6D)y=x^2+1$ **[6]**

c) Solve $(D^2+2D+1)y=x\cos x$ **[6]**

d) An uncharged condenser of capacity C is charged by applying an e.m.f. of value $E\sin\left(\frac{t}{\sqrt{LC}}\right)$ through the leads of an inductance L and of negligible resistance. The charge Q on the plate of the condenser satisfies the equation

$\frac{d^2Q}{dt^2}+\frac{Q}{LC}=\frac{E}{L}\sin\left(\frac{t}{\sqrt{LC}}\right)$. Prove that the charge at any time t is given by $Q=\frac{EC}{2}\left\{\sin\frac{t}{\sqrt{LC}}-\frac{t}{\sqrt{LC}}.\cos\frac{t}{\sqrt{LC}}\right\}$ **[6]**

P.T.O.

Q2) Solve any two:

a) A particle moves along a curve $\bar{r} = (t^3 - 4t)i + (t^2 + 4t)j + (8t^2 - 3t^3)k$, where t is time. Find the magnitude of tangential and normal components of its acceleration when t=2. **[8]**

b) Find Div $\bar{F}$ and curl $\bar{F}$, where $\bar{F} = \nabla(x^3 + y^3 + z^3 - 3xyz)$ and if $\bar{G} = (x + y + 1)i + j - (x + y)k$, prove that $\bar{G} \cdot \text{Curl}\,\bar{G} = 0$ **[8]**

c) i) What is the directional derivative of $\phi = xy^2 + yz^3$ at the point (2,–1,1) in the direction of the vector (i+2j+2k) **[4]**

ii) If $\bar{a}$ is constant vector and $\bar{r}$ is position vector with module r, then prove that curl $(\bar{a} \times \bar{r}) = 2\bar{a}$ **[4]**

Q3) Solve any two:

a) If ten percent of bolts produced by a machine are defective then determine the porbability that out of 10 bolts, chosen at random. **[8]**

i) one

ii) none

iii) atmost 2

iv) atleast 2 bolts will be defective.

b) The probability density function of discrete random variable X is

X:	0	1	2	3	4	5	6	7
P(x):	0	k	2k	2k	3k	k^2	$2k^2$	$7k^2+k$

Find

i) k **[4]**

ii) $P(x \geq 6)$ and $P(x<6)$ **[4]**

c) A manufacturer of envelopes knows that the weight of the envelopes is normally distributed with mean 1.9 gm and variance 0.01gm. Find how many envelopes weighing.

i) 2 gm or more

ii) 2.1 gm or more can be expected in a given packet of 1000 envelopes (Given:S.N.V. : Z=0 to 1 is 0.3413 ; z=0 to 2 is 0.4772) **[8]**

SECTION - II

Q4) Attempt any three from the following:

a) Find Laplace transform of $t^{-1} e^{-t} \sin t$. **[6]**

b) Find inverse Laplace transform of $\frac{s^2+3s+3}{(s^2+2s+2)(s^2+2s+5)}$ **[6]**

c) Find Laplace transform of $(1+2t-3t^2+4t^3)\,H(t-2)$ **[6]**

d) Solve using Laplace transform
$(D^2+4D+8)y=1$ with $y=0$, $Dy=1$ at $t=0$ **[6]**

Q5) Attempt any two of the following:

a) Find a fourier series with period 3 to represent $f(x)=2x-x^2$ in the range$[0,3]$. **[8]**

b) Expand $f(x)=e^x$ as a sine and cosine series over$[0,1]$. **[8]**

c) Obtain the Fourier series for the function f(x) given by

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

$$=1-\frac{2x}{\pi}, \quad 0 \le x \le \pi$$

and hence deduce that

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

Q6) Attempt any two of the following:

a) Find Fourier transform of the function

$f(x) = 1-x^2, \quad |x| \le 1$

$= 0 \quad , \quad |x| > 1$

and hence evaluate $\int_0^{\infty}\left(\frac{x\cos x - \sin x}{x^3}\right)\cos\frac{x}{2}\,dx.$ **[8]**

b) Find the Fourier sine & cosine transform of the following function

$f(x) = x, \quad 0 \le x \le 1$

$= 2-x, \quad 1 \le x \le 2$

$= 0, \quad x > 2$ **[8]**

c) Using inverse Fourier sine transform find $f(x)$, if $F_s(s) = \frac{1}{s}e^{-as}$ **[8]**

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Total No. of Pages :2

S.E.(Electronics) (Part - I) (Semester - III) (Revised) Examination, November - 2016

ELECTRONICS MEASUREMENT AND INSTRUMENTATION

Sub. Code : 63435

Day and Date :Thursday, 17-11-2016 **Total Marks : 100**

Time : 10.30 a.m. to 1.30 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) Explain the static and dynamic characteristics of an instrument.

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

c) Draw and explain pusle and square wave generator.

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

a) Draw block diagram of measuring system and explain each block in detail.

b) Explain the basic principle working of a dual slope integrating type of digital voltmeter.

c) Explain with the help of neat block diagram the working of Horizontal deflection system of CRO.

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

a) Factors affecting on the selection of instrument.

b) Dual beam oscilloscope.

c) AF Generators.

d) DMM

P.T.O.

SECTION - II

Q4) Attempt any two (2): **[16]**

a) Explain with suitable diagram logic analyzer.

b) What is strain gauge? Explain unbonded resistance wire strain gauge.

c) Derive the bridge balance conditions for Anderson's bridge. List its applications.

Q5) Attempt any two (2) **[16]**

a) Explain with block diagram successive approximation type ADC.

b) What are the limitations of Wheatstone's bridge? Explain the working of Kelvin bridge.

c) The four arms of the Hay's bridge are arranged as follows:

AB is a coil of unknown impedance.

BC is a non - reactive resistance of 100 Ω

CD is a non - reactive resistance of 833 Ω in series with standard capacitor of 0.38 μf.

DA is non - reactive resistor of 16800 Ω

If the supply frequency is 50 Hz, determine the inductance and resistance of balance.

Q6) Attempt any three (3) **[18]**

a) PC based DAS.

b) Transducer selection criteria.

c) Wien bridge.

d) IEEE - 488 field bus.

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S.E. (Electronics) (Part - I) (Semester - III) Examination, November - 2016

ELECTRONIC CIRCUIT ANALYSIS & DESIGN - I

Sub. Code : 63436

Day and Date : Monday, 21 - 11 - 2016 **Total Marks : 100**

Time : 10.30 a.m. to 1.30 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]**

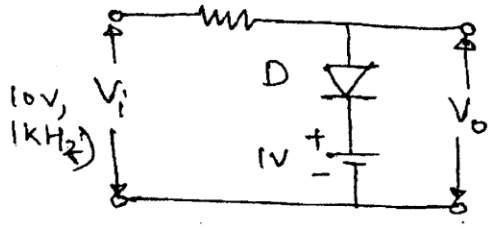
a) Explain following in series voltage regulator.

i) Overload Protection circuit

ii) Pre-regulator

b) Explain series inductor filter with waveforms. Write equation for ripple factor.

c) Draw the output for the following clipper circuit, if V_{in} is $10V_{PP}$ sine wave. Also draw transfer characteristics.



d) Write short note on fixed voltage regulators.

P.T.O.

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

a) Design zener shunt regulator to provide 6V output from 15V unregulated power supply $I_L = 40mA$.

b) A 20Hz symmetrical square wave with peak to peak amplitude of 10V is applied as input to the high pass filter whose lower 3dB frequency, is 5Hz. Calculate and sketch the output waveform. What is peak to peak output amplitude?

c) Draw and explain voltage multiplier circuits (voltage doubler & voltage tripler)

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

a) Design a power supply with π filter to provide a dc voltage of 20V at 100mA with ripple factor not exceeding 0.01%.

b) Explain following terms with respect to full wave rectifier using centre tap transformer.

i) PIV

ii) TUF

iii) Rectification efficiency

iv) Ripple factor

v) % Regulation

c) Draw and explain series pass voltage regulator. Derive expression for stability factor S.

SECTION - II

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

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

b) Explain Enhancement & Depletion type MOSFET.

c) Calculate the size of coupling capacitor to provide Low frequency 3dB point at 100Hz if $R_S = 600\Omega$, $h_{ie} = 1k\Omega$, $h_{fe} = 50$, $R_1 = 5.2k\Omega$, $R_2 = 1.24\ k\Omega$

[Assume practical bypass capacitor with $R_{CE} = 15\Omega$]

d) Derive the expression for stability factor "S" of a fixed bias circuit.

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

a) Design self bias circuit with $h_{fe} = 100$, $V_{CC} = 12V$, $V_{CEQ} = 5V$, $I_{CQ} = 4MA$.

b) Draw an approximate *h* parameter model of a CE amplifier without emitter resistance (R_E) & derive expression A_i, A_v & R_i.

c) Describe the term "sag" drawing a diagram. How does the lower 3dB frequency of an amplifier determines the amount of sag in the output when handling a square wave.

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

a) Design a single stage RC coupled amplifier to provide a output voltage of 5V(P.P.) with a load resistance of 5KΩ & stability factor of 10.

b) Explain in detail comparison of FET, BJT & MOSFET.

c) A BJT having $g_m = 58$ mA/V, $r_{b'e} = 860\Omega$, $C_{b'c} = C_{ob} = 4pf$, $C_{b'e} = 27$ pf, $h_{fe} = 50$, $r_{bb'} = 140\Omega$. Find $f_\beta, f_\alpha, \& f_T$

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Total No. of Pages : 2

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S.E.(Electronics) (Semester-III) (Revised) Examination, November - 2016

ANALOG COMMUNICATION

Sub. Code : 63437

Day and Date : Wednesday, 23 - 11 - 2016 **Total Marks : 100**

Time : 10.30 a.m. to 1.30 p.m.

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

SECTION-I

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

a) What is medium power AM modulation? Explain.

b) What is the necessity of de-emphasis circuit in the FM receiver? Explain.

c) Explain vestigial sideband modulation.

d) What is frequency modulation and phase modulation? Explain with neat waveforms?

e) Calculate the percentage power saving when the carrier is suppressed in an AM modulated with 85% & 40% modulation index.

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

a) What is super heterodyne receiver? Explain with a neat block diagram.

b) With the help of mathematical equation show the amplitude modulation contains two sidebands. Draw frequency spectrum of AM signal.

c) Derive the expression for FM signal and explain.

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

a) Draw the practical diode detector circuit and explain.

b) What are the different methods of S.S.B. generation? Explain phase shift method.

c) Explain TRF receiver with block diagram.

P.T.O.

SECTION-II

Q4) Solve any Three **[18]**

a) What is pulse amplitude modulation? Explain PAM generation method.

b) What are the different types of radio wave propagation? Explain ground wave propagation.

c) Draw the details of Yagi-Uda antenna and explain.

d) Compare TDM and FDM

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 decibels and it's equivalent noise temperature.

Q5) Solve any Two **[16]**

a) Describe space wave propagation in detail.

b) Explain foster seely discriminator with reference to following points:-

i) Schematic diagram.

ii) Vector diagram.

iii) Working.

c) What is noise? Explain external noise in detail.

Q6) Solve any Two **[16]**

a) Explain the following parameters of an antenna.

i) Antenna gain.

ii) captured power density.

iii) Input impedance.

iv) Bandwidth.

b) What are the methods of generation of PWM? Explain PWM indetail.

c) Draw the block diagram of FM receiver and explain?

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S.E. (Electronics) (Semester - III) (Revised)

Examination, November - 2016

NETWORK ANALYSIS

Sub. Code:63438

Day and Date : Friday, 25 - 11 - 2016 **Total Marks : 100**
Time :10.30 a.m. to 1.30 p.m.

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

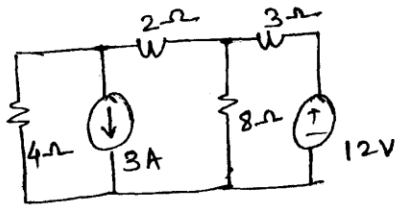
SECTION -I

Q1) Solve any three: **[3×6=18]**

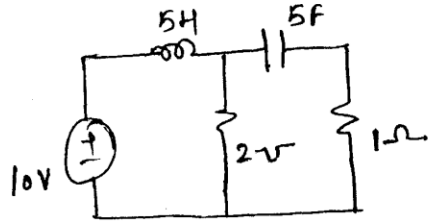
a) What is incidence matrix & explain the procedure to form incidence matrix with suitable example.

b) Derive an expression for Delta to star conversion.

c) Use source transformation to find V_o



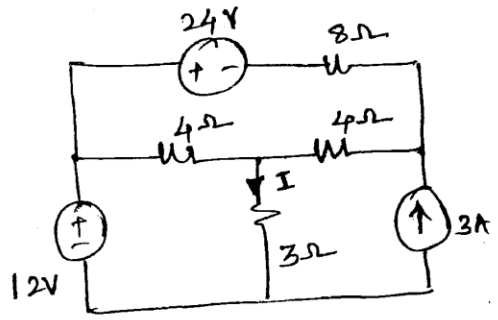
d) Draw the dual network for the given network shown below:



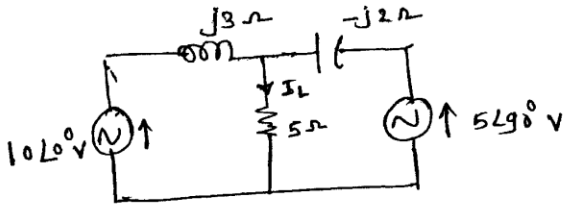
P.T.O.

Q2) Solve any two: **[2×8=16]**

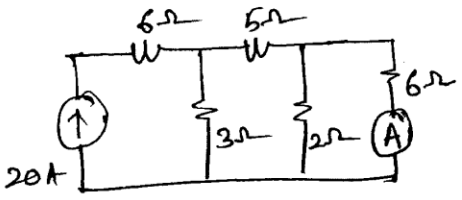
a) Find current I using superposition theorem.



b) For the circuit shown in figure below, determine the load current I_L by using Norton's theorem.



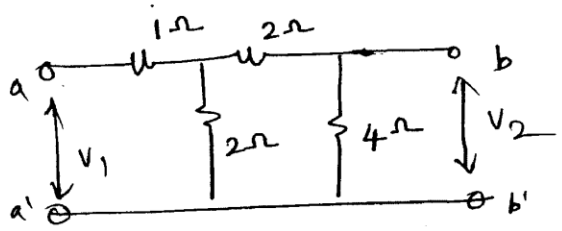
c) Using compensation theorem, determine the ammeter reading where it is connected to the 6Ω resistor as shown in figure below. The internal resistance of the ammeter is 2Ω.



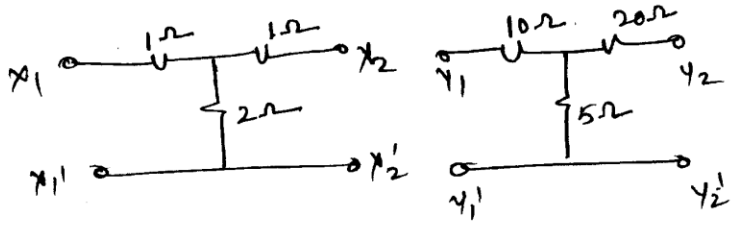
Q3) Solve any two: **[2×8=16]**

a) Express ABCD parameters in terms of Z-parameters. The Z-parameters of a two port are $Z_{11} = 10\Omega$, $Z_{22} = 20\Omega$ $Z_{12} = Z_{21} = 5\Omega$. Find ABCD parameters.

b) Find H-parameter of the network shown below:



c) Derive an expression for series combination of two port network. Obtain Z-parameter of series connected two port network shown below:

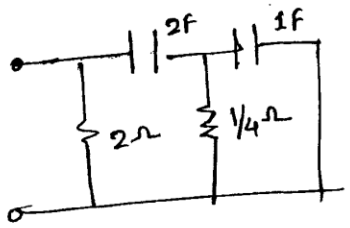


SECTION -II

Q4) Solve any three: **[3×6=18]**

a) Explain the concept of complex frequency.

b) Obtain the transform impedance of the network shown below.



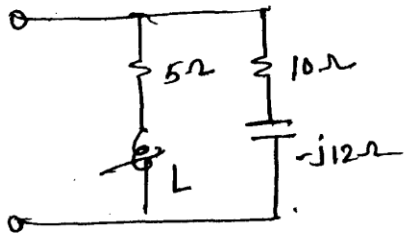
c) Design a T-type attenuator to give an attenuation of 60dB and to work in a line of 500Ω impedance.

d) Write short note on: Composite filter.

Q5) Solve any two: **[2×8=16]**

a) For series RLC circuit, R = 10Ω, L = 0.1H & C = 50 μF, determine the frequency at which the circuit resonates. Also find the voltage across the inductor at resonance & Q-factor of the circuit.

b) Find the valve of L at which the circuit resonates at a frequency of 1000 rad/sec in the circuit shown below:

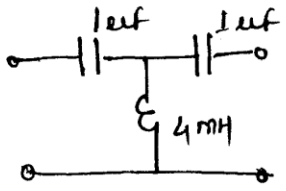


c) Design a m- derived LPF having cut-off frequency of 1kHz, design impedance of 400Ω and resonant frequency 1100Ω.

Q6) Solve any two: **[2×8=16]**

a) Design an m-derived T-section HPF with cut-off frequency 10kHz, design impedence of 200Ω and m = 0.4. **[8]**

b) i) Determine the cut off frequency & design impedance of T-section shown in figure below **[6]**



ii) Explain dis-advantages m-derived filter. **[2]**

c) Explain the properties and necessary conditions of derving point function. **[8]**

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S.E. (Electronics) (Semester-IV)
Examination, November - 2016
LINEAR INTEGRATED CIRCUITS
Sub. Code: 63440

Day and Date : Monday, 07 - 11 - 2016 **Total Marks : 100**
Time : 2.30 p.m. to 5.30 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) State and explain the characteristics of an ideal and practical op-amp.

b) What is level translator circuit? Explain why it is used with cascaded differential amplifier.

c) Prove that offset minimizing resistor (Rom) is generally parallel combination of Input resistor (RI) & Feedback Resistor (Rf).

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

i) SVRR.

ii) Slew Rate.

iii) Input Offset Current.

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

a) Explain in brief what is thermal drift.

b) Explain in detail different types of Comparators.

c) The 741 C op-amp having the following parameters is connected as a inverting amplifier with $R_1 = 470\ \Omega$ and $R_f = 4.7\ K\Omega$; A = 200,000, Ri = 2MΩ, Ro = 75Ω, fo = 5MHz, 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 and explain DC Analysis of differential Amplifier.

b) Explain difference between Voltage follower circuit and Inverter circuit using op-amp.

c) Derive closed loop voltage gain for Non-inverting amplifier with feedback.

SECTION-II

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

a) Derive and explain Anti-Log Amplifier.

b) Draw and explain the grounded load V-I Converter.

c) Draw a neat circuit diagram of Phase Lock Loop (PLL) and explain function of each block.

d) With help of neat circuit diagram explain the operation of RC Phase Shift oscillator. Derive an expression for output frequency.

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

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

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

c) Draw a neat circuit of triangular wave Generator using comparator and Integrator. Derive an expression for its output frequency.

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

a) With neat circuit diagram explain Wide Band Reject Filter.

b) With neat circuit diagram derive and explain operation of Instrumentation amplifier using Transducer Bridge.

c) Design a second order High 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 Engg.) (Part - II) (Semester - IV) (Revised) Examination, November - 2016

ELECTRONIC CIRCUIT ANALYSIS & DESIGN - II

Sub. Code : 63441

Day and Date : Tuesday, 08 - 11 - 2016 **Total Marks : 100**

Time : 2.30 p.m. to 5.30 p.m.

Instructions :
1) **All questions are compulsory.**
2) **Figures to the right indicate 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) What is harmonic distortion? Derive an expression for the second order harmonic distortion using three point method.

b) What is negative feedback? Discuss the effect of negative feedback on different parameters of amplifier.

c) A complementary Symmetry Class B Power amplifier has a load resistance $R_L = 10\ \Omega$ with a supply voltage of $\pm$ 12 V.

Calcualte :

i) $P_{ac(Max)}$

ii) P_{dc}

iii) Power dissipation/transistor

iv) % efficiency (η).

d) i) An amplifier has an open loop gain of 500 and a feedback factor of 0.05. If the open loop gain changes by 15% due to temperature, find the percentage change in closed loop gain.

ii) An amplifier has gain of 300. When negative feedback is applied the gain is reduced to 240. Find the value of feedback factor.

P.T.O.

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

a) Design a transformer coupled class A power amplifier to deliver ac power 2W to a load resistance of 4 Ω. The transformer efficiency (η) is 70%. Use VCC = 12 V

Use Transistor data : $PD_{Max} = 1.1$ W, $V_{CE} = 45$ V, $IC_{Max} = 3$ A, $hfe_{Min} = 40$

b) What is current Series feedback? Derive an expression for feedback factor, Input impedance and voltage gain.

c) Design a two stage direct coupled amplifier which uses identical transistors with the following specifications as : $h_{fe(min)} = 100$, $I_{C(max)} = 100$ mA, $V_{CE(max)} = 30$ V and the circuit parameters are : $V_{CC} = 12$ V, $V_{O\,P\text{-}P} = 5$V, $R_L = 4.7$ KΩ, ΔI_{CQ} allowed is 5%, $f_0 = 20$ Hz and Stability factor (S) = 5. Calculate individual and overall gain.

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

a) Design a bootstrapped emitter follower circuit to provide the following specifications: Input impedance (Ri) = 470 KΩ, Lower 3 dB frequency = 50 Hz, Vo = 5V (P-P), Load resistance R_L = 10 K Ω, Source Resistance (Rs) = 470 Ω.

b) Design a two stage voltage series feedback amplifier for the following specifications: Avf ≥ 75, frequency (F) = 20 Hz to 20 KHz, Vo = 5 Vrms, R_L = 3.3 KΩ. Consider Rs = 150 Ω.

c) With help of neat circuit, explain the operation of push pull class B Power amplifier. Derive an expression for its conversion efficiency.

SECTION - II

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

a) Draw a neat circuit of Phase advancing Phase shift oscillator. Prove that minimum gain required for sustained oscillation is given by, $h_{fe} \geq 29\frac{R}{Rc} + 23 + 4\frac{Rc}{R}$

b) Draw a neat circuit diagram of Schmitt trigger. Explain its operation with suitable waveform.

c) A fixed biased bistable multivibrator uses Si transistors with the following parameters:

$V_{CC} = 10$ V, $-V_{BB} = -6$ V, $R_1 = 12$ KΩ, $R_2 = 47$ KΩ, $R_C = 2.7$ KΩ and $h_{fe} = 40$

Calculate stable state currents and voltages for VCE (Sat) = 0.3 V and VBE (Sat) = 0.6 V.

Also verify that one transistor is in saturation and other is in cut off.

d) With a neat circuit, explain the operation of Step Up switch mode power supply with suitable waveforms.

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

a) Design a transistorized Schmitt trigger for the following specification:

$V_{CC} = 10$ V, $I_{C(Sat)} = 5$ mA, UTP = 2.5 V, LTP = 1.5 V and $h_{fe} = 20$.

b) Design a monostable multivibrator for the following specification:

Frequency F = 5 KHz, $V_{CC} = 10$ V, -VBB = -5 V, VCE(sat) = 0.3 V, VBE(sat) = 0.6 V Design of trigger circuit is expected.

Use transistor BC 147 with : $PD_{(Max)} = 0.25$ w, $V_{CE(Max)} = 45$V, $I_{C(Max)} = 200$ mA, $h_{fe} = 110$ and $h_{ie} = 4.5$ K Ω, $V_{CE(Sat)} = 0.3$ V.

c) With a neat circuit, explain the working of Hartley oscillator. Derive an expression for frequency of oscillation (f) & minimum gain required for sustained oscillation.

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

a) Design Colpitts Oscillator for the following specification:

Output Voltage $V_0 = 5$ V $_{(P-P)}$, frequency (f) = 2 MHz, $A_V = 30$ and Stability factor (S) = 9. Use $h_{fe} = 100$ and $V_{CC} = 12$ V.

b) i) Prove that time period in astable multivibrator is given by, $T = 2$

$$R_B C \ln\left(1+\frac{Vcc}{VBB}\right)$$

ii) Write short note on Switching regulator IC "LM 3524".

c) Design an self biased bistable multivibrator for the following data:

Vo = 5 V (Peak), Vcc = 10 V, hfe = 20, Ic(sat) = 10 mA, VBE (off) = -0.5 V, $I_{CBO} = 0$ mA.

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Total No. of Pages : 2

Seat No.	

S.E. (Electronics Engineering) (Semester - IV)

Examination, November - 2016

DATA STRUCTURE & ALGORITHM

Sub. Code:63442

Day and Date : Wednesday, 09 - 11 - 2016 **Total Marks : 100**
Time :2.30 p.m. to 5.30 p.m.

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

SECTION -I

Q1) Attempt any two: **[2×8=16]**

a) What is data structure? Explain different data type.

b) What is stack? Write an algorithm for push & pop operation.

c) Explain single and multidimensional array.

Q2) Attempt any two: **[2×8=16]**

a) What is Circular queue? Write a algorithm to add, remove & display item of Circular queue.

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

c) Explain following operation on Doubly link list.

i) Insertion at end

ii) Deletion of last node

iii) Searching node from given link list

iv) Display nodes of link list

P.T.O.

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

a) Linear Search

b) Application of queue

c) Dequeue

d) Advantages of link list over stack and queue

SECTION -II

Q4) Attempt any two: **[2×8=16]**

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

b) Explain adjacency matrix representation and link list representation of graph.

c) Explain Binary search tree. Draw BST for following sequence

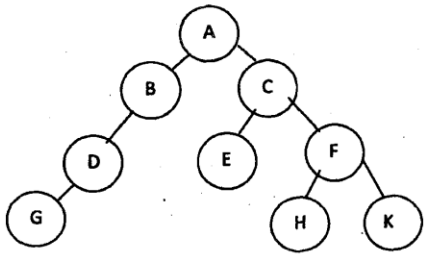
150, 300, 80, 10, 30, 25, 220, 70, 90, 50

Q5) Attempt any two: **[2×8=16]**

a) What is AVL tree? Give its properties and application.

b) Explain DFS algorithm with example.

c) Write a Preorder, Post order & In order Sequence for following tree.



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

a) Chaining

b) Multiway Search Tree

c) Directed Graph

d) Heap Sort

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Total No. of Pages 2

Seat No.	

S.E. (Electronics Engineering) (Semester - IV) (Revised) Examination, November - 2016

DIGITAL SYSTEM & MICROPROCESSOR

Sub. Code : 63443

Day and Date :Thursday, 10-11-2016 **Total Marks : 100**

Time : 2.30 p.m. to 5.30 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) Define following terms with example.

i) Literals

ii) Minterms

iii) Maxterms

b) Implement full subtractor using decoder and OR gates.

c) Explain Master-Slave J-K F/F.

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

e) Design 3-bit synchronous up counter using T-F/Fs.

f) Define combinational logic circuits. Write design steps.

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

a) Reduce the expression $f(w,x,y,z) = \prod(2,8,9,10,11,12,14)$ and implement using NOR logic.

b) Draw the logic diagram and explain.

i) 4-bit serial in serial out shift register.

ii) 4-bit parallel in parallel out shift register.

c) Design logic circuit to convert 4-bit Binary code into a Gray code.

P.T.O.

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

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

b) Write excitation tables for all flip flops.

c) Define Demultiplexer and design 1×8 Demultiplexer.

SECTION-II

Q4) Answer any four of the following: **[20]**

a) What will be the contents of Accumulator, Carry flag, Z flag after the execution of XRAA instruction.

b) Explain the instructions i) CNC ii) LDAX D

c) Describe DMA signals of 8085.

d) Write a program to subtract the data of port A from data of port-B of 8255 and send result at port-C. (Given:-Port addresses of 8255 are from 00h onwards).

e) Explain state transition diagram of 8085.

Q5) Answer Any two of the following: **[16]**

a) Explain with diagram, the interfacing of seven segment display using 8255 ports.

b) Write assembly language program for block move of 100 data bytes.

c) Draw a interfacing diagram for 8 bit DAC0808 to 8085 CPU using 8255 PPI and write a program to generate for triangular wave. (Assume port addresses of 8255 as 30H onwards).

Q6) Answer Any two of the following: **[14]**

a) Write assembly language program to transfer serial data present in register B on SOD pin of 8085 microprocessor.

b) Explain the interfacing of keyboard.

c) Explain the various data transfer schemes.

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Total No. of Pages : 3

Seat No.	

S.E. (Electronics Engineering) (Semester - IV)
Examination, November - 2016
CONTROL SYSTEMS ENGINEERING
Sub. Code : 63444

Day and Date : Friday, 11 - 11 - 2016 **Total Marks : 100**

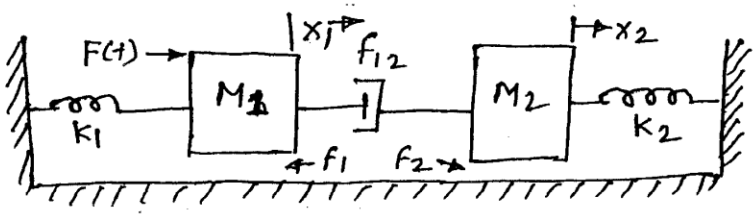
Time : 2.30 p.m. to 5.30 p.m.

Instructions :
1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Assume suitable data wherever necessary.**
4) **Use of graph papers are allowed.**
5) **Use of scientific calculator is allowed.**

SECTION - I

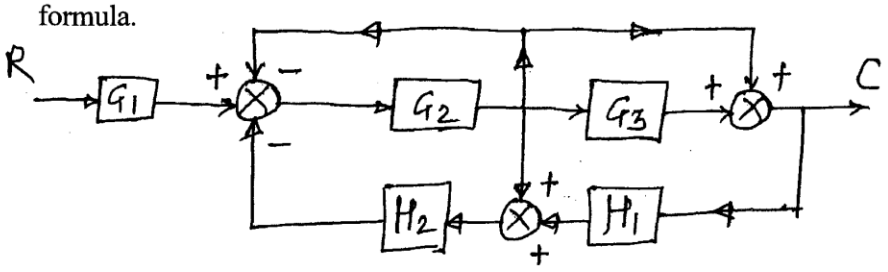
Q1) Solve any TWO **[2×9=18]**

a) Write differential equations for mechanical systems shown in fig. below.



b) Draw and explain any two examples of open loop and closed loop systems.

c) Draw signal flow graph and find transfer function using. Masons gain formula.

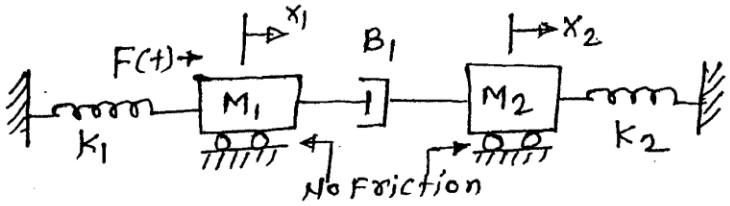


P.T.O.

Q2) Solve any TWO **[2×8=16]**

a) Explain Reduction of parameter variations by use of feedback.

b) Obtain the differential equation of mechanical system. Draw the Electrical analogous circuit based on force current analogy.



c) Explain Routh-Hurwitz stability criterion. Which are difficulties arises in the Routh. Hurwitz criterion. How it overcomes.

Q3) Solve any TWO **[2×8=16]**

a) Explain standard test signals.

b) For a unity feedback system having open loop transfer function $G(S) = K(S+13)/S(S+3)(S+7)$, Using throuth criterion, Determine the range of values of K for the system to be stable, marginal value of K and frequency of sustained oscillation.

c) The open loop control system transfer function is

$G(S) = K/S(S^2+4S+8)$, Sketch the root loci of the system touching the following points-

i) No of root loci
ii) No of asymptotes
iii) Angle of asymptotes
iv) Point of intersection with real axis
v) Angle of departure
vi) Imaginary axis intercepts

SECTION - II

Q4) Solve any TWO **[9×2=18]**

a) Explain the co-relation between time and frequency response.

b) Explain with example the procedure of Nyquist plot.

c) Sketch the Bode plot for the system $G(S)=0.5\left[S(S^2+S+1)\right], H(S)=1$

Determine

i) The gain and phase cross over frequencies.

ii) Gain and phase margin. and

Q5) Solve any TWO **[2×8=16]**

a) Explain the concept of state, state variables and state model.

b) A single input single output system is given as

$$x(t)=\begin{bmatrix}-1 & 0 & 0\\ 0 & -2 & 0\\ 0 & 0 & -3\end{bmatrix} x(t)+\begin{bmatrix}1\\1\\0\end{bmatrix} u$$

$$y=\begin{bmatrix}1 & 0 & 2\end{bmatrix}x(t)$$

Test for controllability and observability

c) Explain state space Representation using phase Variables.

Q6) Solve any TWO **[2×8=16]**

a) Draw and explain lead compensation network.

b) Explain PLC addressing.

c) Draw and explain PID controller.

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Seat No.	

Total No. of Pages : 4

S.E. (Electronics Engineering) (Part - II) (Semester - IV) (Old Syllabus) Examination, November - 2016

SIGNALS AND SYSTEMS

Sub. Code : 43610

Day and Date : Friday, 11 - 11 - 2016 **Total Marks : 100**

Time : 2.30 p.m. to 5.30 p.m.

Instructions :
1) **All questions are compulsory.**
2) **Figures to right indicate full marks.**
3) **Use of scientific calculator is allowed.**
4) **Assume suitable data wherever necessary.**

SECTION - I

Q1) Solve any two sub questions. **[16]**

a) i) Describe and sketch the following signals.

1) $u(t)-u(t-4)$

2) $u[n]-u[n-5]$

ii) Describe and sketch the following signals.

1) $x(t)=t-2$ for $0 \le t \le 4$

2) $y[n]=2^n$ for $0 \le n \le 4$

b) Explain the concept of Power signal and Energy signal.

c) For the given signal x(t) in fig. 1 evaluate x (t-1), x (t+2) δ (t), x (-t) u (t), x (2t).

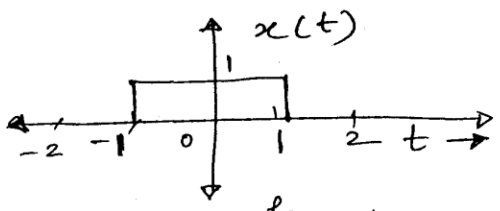

fig. 1

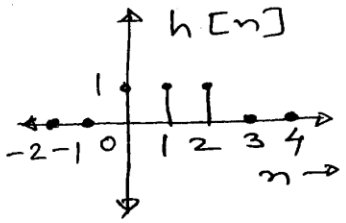

fig. 2

P.T.O.

Q2) Solve any two sub questions. **[16]**

a) For the given signal x (t) in fig. 1 and h [n] in fig.2 evaluate even and odd parts.

b) Obtain the convolution of two Continuous Time Signals shown below in fig.3 and also sketch the result.

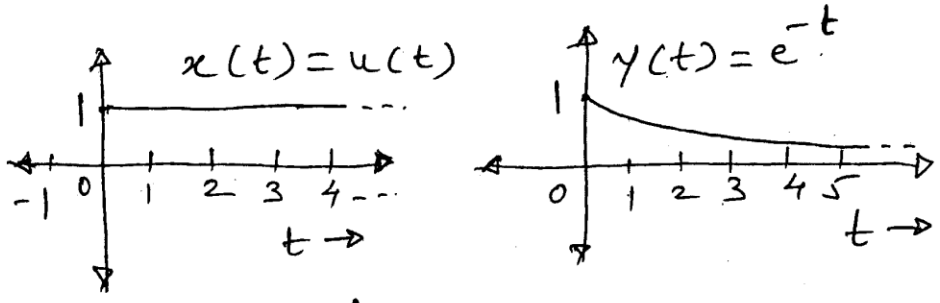

fig. 3

c) i) Define the Continuous Time System Properties Dynamicity and Time Invariance.

ii) Define the Linearity property and check whether the given system y (t) = x (t/2) is linear or non linear.

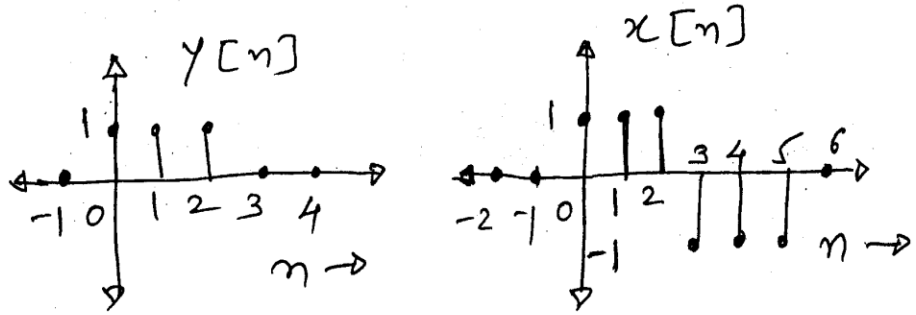

fig. 4

Q3) Solve any two sub questions. **[18]**

a) Obtain the convolution of two Discrete Time Signals shown above in fig. 4 and also sketch the result.

b) Explain and prove the Distributive property of discrete time signal convolution with a suitable example.

c) Explain the concept of Sampling Theorem in Time Domain and explain alising effect in detail.

SECTION - II

Q4) Solve any two sub questions. **[16]**

a) Obtain the Fourier Transform of the Signal m (t) shown below in fig.5 and sketch the Magnitude spectrum and phase spectrum.

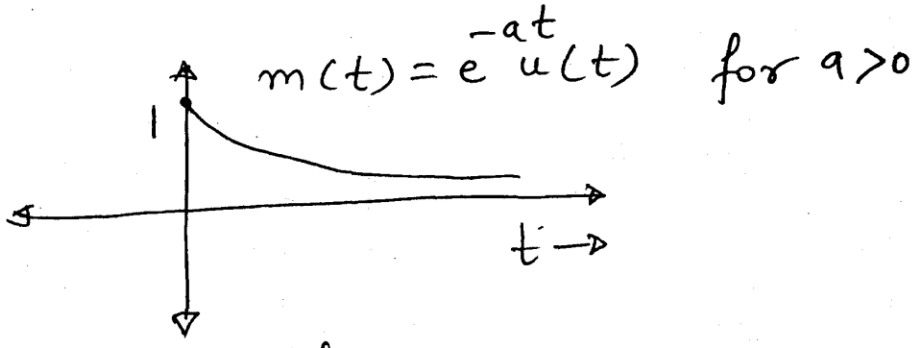

fig. 5

b) Explain the Linearity, Time Shifting and Duality properties of Fourier Transform.

c) Explain Time Differentiation and Time Integration Properties of Fourier Transform.

Q5) Solve any two sub questions. **[16]**

a) Explain the periodic signal representation by Fourier Series and evaluate the relation between Trigonometric form and Exponential form.

b) Draw the Amplitude and Phase spectrum of Unit Impulse Train shown in Fig. 6 below.

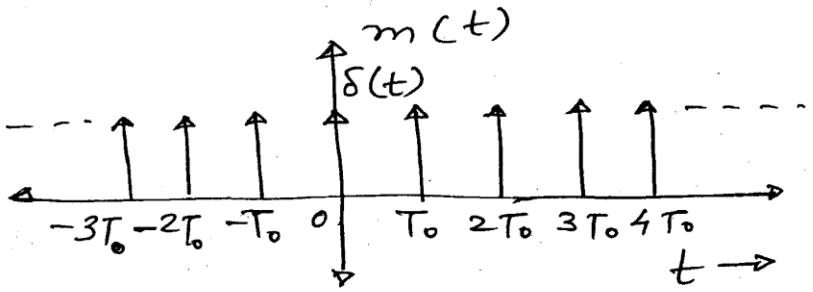

Fig. 6

c) Explain the relation between Trigonometric and Exponential forms of Fourier series.

Q6) Solve any three sub questions. **[18]**

a) Find Z Transform of finite duration sequences given below and write comments about ROC.

$$x[n]=\{2, 2, \underset{\uparrow}{4}, 2, 2\} \text{ and } y[n]=\{-2,-3,\underset{\uparrow}{-4}, 2, 3, 4\}$$

b) Find Z Transform of $x[n]=u[n]$. Comment about ROC, sketch ROC.

c) Describe the properties of Region of Convergence (ROC).

d) Describe the Time Shifting and Frequency Shifting properties of Z Transform.