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Seat No.	

S.E. (Electronics & Telecommunication) (Semester - III) Examination, May - 2019
ANALOG CIRCUITS - I
Sub. Code : 63461

Day and Date : Thursday, 02 - 05 - 2019 **Total Marks : 100**

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

Instructions :
1) **All questions are compulsory.**
2) **Right to figure indicates full marks.**
3) **Use data sheets.**
4) **Assume suitable data wherever necessary.**

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

a) Explain working of low pass filter as an integrator. Design low pass filter for cutoff frequency of 10KHz.

b) What is clipper circuits? Explain diode series clipper with its transfer characteristics.

c) Write short note on voltage Doubler.

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

a) Explain BWR working with suitable diagrams. Derive expression for ripple factor, when capacitor filter is used.

b) Explain with suitable diagram L filter & derive its ripple factor.

c) Design power supply using capacitor filter for Vdc = 9v, Idc = 50mA, r = 0.02.

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

a) Design series pass transistor for following specifications V_0 = 10.2V, Vin = 15 to 20V, I_0 = 90mA, hfe_1 = 40 hfe_2 = 110.

b) Explain working of transistorised shunt regulator & then design it for Vin = 10 to 15V, V_0 = 6V, I_0 = 50mA use transistor having hfe = 40.

c) Explain the use of pre - regulator & write its design steps with the help of one example.

P.T.O.

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

a) Draw and explain hybrid equivalent circuit for CB configuration of transistor.

b) Derive expression for A_I, Y_I, Av and Ro of C_E amplifier in terms of h-parameter.

c) Derive expression for lower 3dB frequency of C_E amplifier by considering coupling capacitor [Cc]. Calculate Cc for $R_1 = 10K\Omega$, $R_2 = 4.7K\Omega$, hie = 3.8KΩ, hfe = 100, Rs = 500Ω.

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

a) Draw and explain high frequency model for transistor. Derive expression for f_B consider short circuit load.

b) Derive the expression for higher cut off frequency of R-C coupled amplifier considering square wave.

c) Design single stage R-C coupled C_E amplifier $V_{CC} = 15V$, hfe = 50, AV = 70, hie = 3.2KΩ, frequency range 10Hz to 20 kHz, S = 10.

Q6) Attempy any three questions. **[18]**

a) Derive the expression for lower cut off frequency of R-C coupled amplifier considering square wave.

b) Explain the transfer characteristics of p–channel enhancement MOSFET.

c) Explain with circuit voltage divider bias for FET.

d) For C_E amplifier has hfe = 50, hie = 2.2K'Ω, hoe = 50×10^{-6}, hre = 2×10^{-4}, Rc = 2KΩ, RL = 5KΩ, R1 = 12 KΩ, R2 = 4.7KΩ. Calculate Av, Ai, Yo.

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Seat No.	

S.E. (ETC) (Part - II) (Semester - IV)
Examination, May - 2019
ANALOG COMMUNICATION SYSTEM
Sub. Code: 63470

Day and Date : Friday, 24- 05 - 2019 **Total Marks : 100**

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

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

SECTION - I

Q1) Solve any three : [3×6]

a) Draw and explain Trapezoidal patterns for AM.

b) Draw and explain frequency spectrum and phase representation of AM wave.

c) A carrier wave frequency of 10Mhz and peak value of 10V is applied and amplitude modulated by a 5Khz sine wave of amplitude 6V. Determine modulation index and sideband frequencies.

d) Describe operation of phase shift method of SSB.

Q2) Solve any two : [2×8]

a) Explain concept of angle modulation with respect to FM.

b) Comment on pre-emphasis and de-emphasis used in FM.

c) Write note on indirect method of FM generation.

Q3) Solve any Two: [2×8]

a) Explain methods of tracking.

b) Explain effect of AGC with characteristics

c) Write note on image frequency and double spotting.

P.T.O.

SECTION - II

Q4) Solve any two : [2×8]

a) Explain PLL-FM demodulator.

b) Explain foster seeley discriminator.

c) Explain in brief about noise figure, noise temperature, noise bandwidth, SNR.

Q5) Solve any two : [2×8]

a) Explain shot noise, thermal noise, avalanche noise, burst noise.

b) Write note on flat top sampling.

c) Write note on classification of noise.

Q6) Solve any three [3×6]

a) Explain PWM applications.

b) Compare PAM with PWM.

c) State and prove sampling theorem.

d) Explain PCM transmitter.

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Total No. of Pages : 2

S.E. (ETC) (Part - II) (Semester - IV) (Revised) Examination, May -2019

LINEAR INTERGRATED CIRCUITS

Sub. Code : 63467

Day and Date : Thursday, 16 - 05 - 2019 **Total Marks : 100**

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

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

SECTION - I

Q1) Attempt any Two. **[2×8=16]**

a) Draw AC equivalent circuit for DIBO-DA. Derive expression for Ri and Ro.

b) Explain any four ideal and practical parameters of Op amp.

c) With neat circuit diagram explain Instrumentation Amplifier using three op amp. Derive the expression for voltage gain for the same.

Q2) Attempt any two. **[2×8=16]**

a) Discuss any two methods of frequency compensation used in op amp.

b) Explain open loop and closed loop configuration of op amp.

c) Draw and explain peak detector in details.

Q3) Write short notes on any three. **[3×6=18]**

a) IC CA3140

b) Thermal Drift

c) Current mirror circuits

d) Sample & Hold Circuits

P.T.O.

SECTION - II

Q4) Attempt any two. **[2×8=16]**

a) With neat circuit diagram explain Wide Band Reject Filter with its frequency response.

b) Design second order low pass butterworth filter with higher cut off frequency of 2KHz. Draw the design circuit diagram and sketch its frequency response. Assume C = 0.01 uf and pass band gain = 1.586.

c) With neat diagram explain Timer IC 555.

Q5) Attempt any two. **[2×8=16]**

a) With neat circuit diagram explain Hartley and Colpitts oscillator using Op amp.

b) Explain triangular wave generator with waveform.

c) Explain with neat diagram and waveform use of IC 555 as monostable multivibrator.

Q6) Write short notes on any three. **[3×6=18]**

a) IC OP 177 op amp

b) IC 565 PLL

c) RC phase shift oscillator

d) Chebyshev filter

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Seat No.	

Total No. of Pages : 2

S.E. (E & TC) (Part - II) (Semester - IV)
Examination, May - 2019
ANALOG CIRCUITS - II
Sub. Code: 63466

Day and Date : Tuesday, 14- 05 - 2019 **Total Marks : 100**

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

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

SECTION - I (A)

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

a) Design two stage direct amplifier with transistor specification Q_1 and Q_2. hfe = 100, $I_{C(max)}$ = 100mA, $V_{CE(max)}$ = 30 V, $V_{O(p-p)}$ = 5 V, R_L = 10kΩ, V_{CC} = 24 V, s = 5

b) Derive the parameter equations such as Ri, Ro, Av and Ai for voltage series negative feedback.

c) Design current series negative amplifier for following specifications : V_{CC} = 12V, Av = 30, S = 10, use transistor BC147A.

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

a) Design two stage common emitter amplifier to provide the following specification.
VCC = 10v, VO = 3V (rms), AVF≥100, RS = 600Ω, RL = 1 kΩ, f = 20Hz-20 kHz, use transistor BC147B

b) Design class AB push-pull amplifier for following specifications : Po = 400mW, loud speaker impedance = 6Ω, V_{CC} = 12V

c) Design class A push-pull amplifier for following specifications : Po = 500mW, loud speaker impedance = 8Ω, V_{CC} = 12V

P.T.O.

Q3) Write note on any three **[18]**

a) 3 point method of calculating harmonic distortion of power amplifier.

b) Complementary symmetry power amplifier

c) Types of negative feedback

d) Classification of Power Amplifiers

SECTION - II (B)

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

a) Derive the expression for frequency of oscillation for Wein Bridge Oscillator.

b) Design Hartley's Oscillator with following data V_o = 6V (p-p), Fo=2MHz, S=9.Transistor Data, PD = 0.2 W, VCE (max) = 40V, hfe = 110, hie = 2.7KΩ, IC (max.) = 0.1A

c) Design RC phase shift oscillator for following data, Fo=2.5KHz, IC (sat.) = 4.5mA, hfe=50, hie = 4.5KΩ , S=10.

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

a) Design astable multivibrator for symmetric square wave with following data, Frequency = 500Hz ,Vo = 12V, hfe(min) = 50, VBE(sat.) = VCE (sat.) = 0V, IC (sat.) = 6mA.

b) Design power supply using LM 317 for following data VO = 8 to 10V at 100mA current, and Input voltage in the range of 20V to 24V.

c) Design Monostable multivibrator for following data, TP=2.5ms, VCC=10V, VBB= –2V, VCE (sat.) = 0.7V, IC(sat)=5mA, C1=0.3μF, hfe(min)=40.

Q6) Write note on any three **[18]**

a) IC 723.

b) Barkhausen's criteria.

c) Schmitt Trigger.

d) Transistor switching parameters.

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Total No. of Pages : 2

Seat No.	

S.E. (Electronics & Telecommunication) (Part - I)
(Semester - III) Examination, May - 2019
DIGITAL ELECTRONICS
Sub. Code : 63462

Day and Date : Saturday, 04 - 05 - 2019 **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 appropriate data if needed.**

Q1) Solve any two of the following. **[16]**

a) Design and implement half adder with truth table.

b) Design and implement one bit comparator.

c) Give the specifications of digital IC's & explain propagation delay.

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

a) Design and implement 4 bit Binary to Gray code converter.

b) Design 8:1 MUX using two 4:1 MUX.

c) Design following logic function using 16:1MUX with truth table $F = \sum m(0,1,4,8,9,12,13,14)$.

Q3) Solve any two of the following. **[18]**

a) Evaluate & minimize following expression using k-map

$F(ABCD) = \sum m(0,1,4,5,6,7,9,11,15) + d(10,14)$.

b) Design & implement 4 bit comparator using IC7485.

c) Explain multiplexer IC 74151.

P.T.O.

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

a) With suitable logic diagram and truth table explain SR flip flop with preset and clear inputs.

b) Explain serial in serial out 4-bit shift register. Draw waveforms also.

c) Write excitation table for SR, D and JK flip flop.

d) Explain 3-bit ripple down counter with suitable state diagram and truth table.

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

a) Explain effect of clock skew and clock jitter on synchronous designs.

b) Explain sequence detector with suitable example.

c) Differentiate between Mealy & Moore machine.

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

a) Explain classification of memories in detail.

b) Realize JK flip flop using SR flip flop.

c) Explain Static and Dynamic RAM cell.

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Total No. of Pages : 3

Seat No.	

S.E. (ETC) (Semester - IV) Examination, May - 2019
ELECTROMAGNETICS ENGINEERING
Sub. Code : 63469

Day and Date : Wednesday, 22 - 05 - 2019 **Total Marks : 100**

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

Instructions :
1) **All Questions are compulsory.**
2) **Neat diagrams must be drawn wherever necessary.**
3) **Make suitable assumptions if necessary and state it clearly.**

SECTION-I

Q1) Solve any two. **[2×8=16]**

a) A point charge $Q_1 = 2$ mC is located in free space at $P_1(-3,7,4)$ while $Q_2 = 5$ mC is at $P_2(2,4,-1)$. Find $F_2 \& F_1$.

b) A uniform line charge, $P_l = 25\,\text{nC/m}$ lies on the line X = −3, Z = 4 in free space. Find E in Cartesian components at
Origin

c) Find the gradient of the function A given A = coshxyz.

Q2) Solve any two. **[2×8=16]**

a) Evaluate work done in bringing a charge of μC from origin to P(2,−1,4) through field $E = 2xyz\ a_x + x^2z\ a_y + x^2y a_z$ (V/m) through the line path, straight line segments (0, 0, 0) to (2, 0, 0) to (2, -1,0) to (2, -1,4).

b) Explain electric flux density D for point charge, line charge and surface charge.

c) Evaluate Electric field intensity due to infinite line charge.

P.T.O.

3) Solve any three. [3×6=18]

a) What is polarization in dielectric?

b) Explain the Cylindrical coordinate system.

c) Write a note on boundary condition for dielectric - dielectric interface.

d) Explain method of image for line charge.

SECTION-II

4) Solve any two. [2×8=16]

a) Derive Maxwell's equation in point form.

b) State and explain Stoke's Theorem in Cartesian, Cylindrical and spherical co-ordinate system.

c) A plane wave travelling in air is normally incident on a block of a paraffin with $\varepsilon_r = 2.2$. Find Γ_R and Γ_T

5) Solve any two. [2×8=16]

a) A plane electromagnetic wave travelling in the +z direction in an unbounded lossless dielectric medium ε_r=3, μ=1 has peak electric intensity E of 6V/m Find

i) The velocity of wave

ii) The intrinsic impedance of the wave

iii) Te peak value of the magnetic field intensity H.

b) Estimate the incremental field dH_2 at point P_2 caused by a source at P_1 of $I_1 dL_1$
$2\pi a_z - mt$, given $P_1(4,0,0)$ & $P_2(0,3,0)$

c) Derive magnetic field intensity due to infinite long straight filament.

6) Solve any three. [3×6=18]

a) Derive transmission line equation.

b) State and explain wavelength, velocity of propagation and group velocity.

c) A lossless transmission line is 80 cm long and operates at a frequency of 600 MHz. The line parameters are L = 0.25 $\mu H/m$ and C = 100 pF/m. Find the characteristic impedance, the phase constant and the phase velocity.

d) An infinite long current filament is placed along z-axis. The magnetic field intensity at point P (3, 4, 0) is $I_0\left(-0.8a_x + 0.6a_y\right)$ A/m. Find the current trough the filament.

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Total No. of Pages : 3

Seat No.	

S.E. (Electronics and Telecommunication Engineering)
(Part - II) (Semester - III) Examination, April - 2019
ENGINEERING MATHEMATICS - III
Sub. Code: 63460

Day and Date : Friday, 26 - 04 - 2019 **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 of the following.

a) $(2D^2+5D-3)y=\cos x$. [6]

b) $(D^2-3D+2)y=5xe^x$. [6]

c) $x^2\frac{d^2y}{dx^2}+x\frac{dy}{dx}=x^2+5$. [6]

d) $(2D^2+5D)y=3x^2+2x+1$ [6]

Q2) Solve any two of the following. [8]

a) Find Fourier series for $f(x)=x^2$ in $(0, 2\pi)$ Hence deduce that

$$\frac{\pi^2}{3}=-\left\{\frac{1}{1^2}+\frac{1}{2^2}+\frac{1}{3^2}+\ldots\ldots\right\}.$$ [8]

b) Find Fourier series for $f(x)=e^{-x}$ in the interval $(0, 2)$ [8]

c) Obtain half range sine series for $f(x)=\cos x$ in the interval $(0, \pi)$. [8]

P.T.O.

Q3) Attempt any two of the following.

a) Find Fourier Transform of $f(x)=\begin{cases}\frac{1}{2} & -1\le x\le 1\\ 0 & \text{otherwise}\end{cases}$ [8]

b) Find Fourier Cosine Transform of $f(x) = e^{-x}$ and find $f(x)$ by using inverse Cosine Fourier transform. [8]

c) Find finite Fourier Cosine Transform and its inverse of $f(x) = 2x$ in $0 < x < 4$. [8]

SECTION-II

Q4) Attempt any three of the following. [18]

a) Find the Laplace transform of the periodic function $f(t)=\frac{kt}{T}, 0<t<T, f(t+T)=f(t)$.

b) Find the Laplace transform of $\sin\sqrt{t}$, hence find Laplace transform of $\frac{\cos\sqrt{t}}{2\sqrt{t}}$.

c) Find the inverse Laplace transform of $\frac{s+4}{(s^2+4)\,s(s-1)}$.

d) Using Laplace transform, solve $(D^2+2D+5)y = e^{-t}\sin t$ where $y(0) = 0$ $y'(0) = 1$.

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

a) Find the Z-transform of sin (3k+5), $k \ge 0$.

b) Find the Z-transform of the following functions

i) $f(k) = 3(2^k) - 4\,(3^k)$, $k \ge 0$

ii) $f(k) = a^{|k|}$

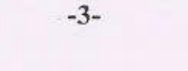
c) Find the inverse Z- transform of $\frac{2z^2-10z+13}{(z-3)^2(z-2)}, 2<|z|<3$.

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

a) A vector field $\bar{F}$ is given by $\bar{F}=(y\sin z-\sin x)i+(x\sin z+2yz)j+(xy\cos z+y^2)k$. Prove that it is irrotational and hence find its scalar potential.

b) Find the constants a and b so that the surface $ax^2-2byz=(a+4)x$ will be orthoganal to the surface $4x^2y+z^3 = 4$ at (1,–1, 2).

c) Show that $\nabla\left[\frac{(\bar{a}.\bar{r})}{r^n}\right]=\frac{\bar{a}}{r^n}-\frac{n(\bar{a}.\bar{r})\bar{r}}{r^{n+2}}$, Where $\bar{r}=xi+yj+zk$ and $\bar{a}=a_1i+a_2j+a_3k$.



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Total No. of Pages : 3

Seat No.	

S.E. (ETC) (Part - II (Semester - III)
Examination, May - 2019
NETWORK ANALYSIS
Sub. Code : 63463

Day and Date : Tuesday, 07 - 05 - 2019 **Total Marks : 100**

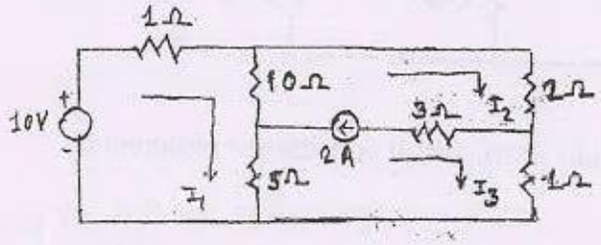
Time : 10.00 a.m. to 1.00 p.m.

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

SECTION - I

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

a) Determine current in 5Ω resistor for network shown in figure

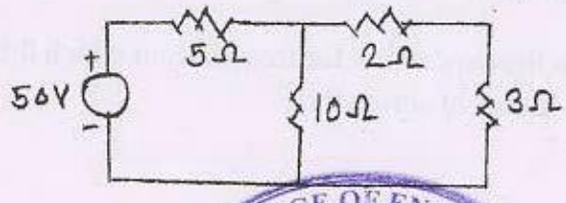


b) Write a note on tree, co -tree, twigs and links

c) Derive star -delta transformations.

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

a) Use Thevenin's theorem to find the current in 3Ω resistor for the circuit shown in figure.



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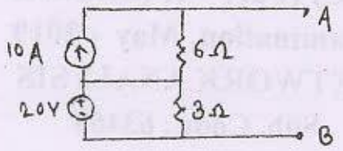
b) Replace the given network shown in figure by a single current source in parallel with a resistance.

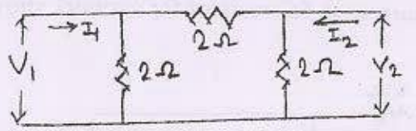


c) State and explain Millman's Theorem

3) Solve any two **[18]**

a) Derive series connection of two port network.

b) Find ABCD-Parameter for the following Circuit



c) Explain short circuit admittance parameter.

SECTION - II

4) Solve any two **[18]**

a) Derive expression of resonance frequency for parallel resonance.

b) Show that BW = (fr/Q) for series RLC. Calculate f0, f1 and f2 for series RLC having 50Ω resistance, 0.2H inductance and 10 μF capacitance with an applied voltage of 20V.

c) Obtain the expression for frequency at which the maximum voltage across the inductor in series RLC.

5) Solve any two **[16]**

a) Design constant k type low pass filter (T and π-section) having design impedance of 600Ω and cutoff frequency is 1.5kHz.

b) Derive expressions of Z_{OT} and Zoπ for filters.

c) Design m-derived high pass filter (T and π-section) having design impedance of 600Ω and cutoff frequencies are 10kHz and m = 0.3.

6) Solve any two **[16]**

a) Explain DC voltage response for RC circuit.

b) Write short note on sinusoidal voltage response for RL circuit.

c) For the following Fig. 6. C capacitor has initial voltage Vc (-0) = 10V at the same instant current through inductor is zero, switch k is closed at t = 0. Find V(t) across the inductor.

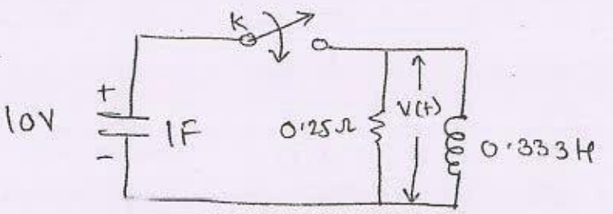


Fig. 6 C

X X X