

Seat No.	
---------------------	--

S.E. (Electronics) (Semester - IV)
Examination, May - 2018
LINEAR INTEGRATED CIRCUITS
Sub. Code : 63440

Day and Date : Friday, 04 - 05 - 2018

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) Solve any three of the following : [3×6=18]

- a) Explain difference between Voltage follower circuit and Inverter circuit using op-amp.
- b) Why the need of constant current mirror source? Explain the principle of operation of current mirror circuit?
- c) State and explain the characteristics of an ideal and practical op-amp.
- d) Explain the following terms with respect to Op-amp :
 - i) CMRR
 - ii) Input Offset Voltage

Q2) Solve any two of the following : [2×8=16]

- a) Explain in brief what is thermal drift?
- b) Prove that offset minimizing resistor (R_{om}) is generally parallel combination of Input resistor (R_1) & Feedback Resistor (R_f).
- c) Draw neat circuit diagram for inverting and non inverting amplifier. Also derive expression for its gain.

Q3) Solve any two of the following :**[2×8=16]**

- a) Derive and explain DC Analysis of Dual Input Balanced Output Configuration differential Amplifier.
- b) Derive closed loop voltage gain for Non-inverting amplifier with feedback.
- c) Explain slew rate with its causes. Also derive an expression for the same.

SECTION-II**Q4) Solve any three of the following :****[3×6=18]**

- a) Explain Precision rectifier with neat circuit diagram.
- b) Draw and explain the I-V Converter.
- c) What is Phase Lock Loop (PLL) and explain function of each block.
- d) With help of neat circuit diagram explain the summing amplifier.

Q5) Solve any two of the following :**[2×8=16]**

- a) With help of neat circuit diagram explain the operation of RC Phase Shift oscillator. Derive an expression for output frequency.
- b) What is second order Low pass filter? Explain its operation and draw its frequency response.
- c) Draw and explain triangular wave Generator.

Q6) Solve any two of the following :**[2×8=16]**

- a) With the help of neat circuit diagram explain F-V Converter.
- b) With neat circuit diagram derive and explain operation of Instrumentation amplifier using Transducer Bridge.
- c) Explain application of open loop configuration of op-amp.

① ① ① ①

Seat No.	
-------------	--

S.E. (Electronics Engg.) (Part - II) (Semester - IV) (Revised)**Examination, May - 2018****ELECTRONICS CIRCUIT ANALYSIS & DESIGN - II****Sub. Code: 63441****Day and Date : Monday, 07 - 05 - 2018****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) Std. Data sheet is allowed.

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

- a) What is negative feedback? With a help of block schematic, derive an expression for gain after feedback (A_{v_F}). State its advantages.
- b) A Complementary push pull amplifier is operated with supply voltage $V_{cc} = \pm 10$ V and delivers a power to load $R_L = 5\Omega$.

Calculate:

- i) Maximum AC Power output ($P_{ac(max)}$)
 - ii) DC Power Input (P_{dc})
 - iii) % Efficiency
- c) The emitter follower circuit has $R_s = 620 \Omega$, $R_L = 2.7 K\Omega$, $h_{fe} = 120$, $h_{ie} = 4.5 K\Omega$, Calculate A_i , R_i , A_v , R_o & R_o .
 - d) Prove that the maximum conversion efficiency (η) of transformer coupled class A power amplifier is 50%.

P.T.O.

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

- a) Design a two stage Voltage series feedback amplifier to provide the following specifications: $V_{CC} = 12$ V, $A_{VF} \geq 100$, $V_o = 5$ V(p-p)), $R_s = 330 \Omega$, $R_L = 2 \text{ K}\Omega$, $f = 20$ Hz - 20 kHz.

Use transistor BC147 with: $PD_{(Max)} = 250$ m W, $V_{CE} = 45$ V, $IC_{Max} = 100$ m A, $hf_{e(min)} = 100$, $hie = 2.7 \text{ K}\Omega$.

- b) What is harmonic distortion? State its cause. Derive an expression for the second order harmonic distortion using three point method.
- c) Design a bootstrapped emitter follower circuit to provide the following specifications: Input impedance (R_i) = 470 $\text{K}\Omega$, Lower 3 dB frequency = 50 Hz, $V_o = 3$ V (P-P) Load resistance $R_L = 4.7 \text{ K}\Omega$, Source Resistance (R_s) = 620 Ω .

OR

- c) Draw a neat block schematic of Current Series Feedback. Derive an expression for input impedance (R_{i_f}), Output impedance (R_{o_f}) and Voltage gain (gm_f).

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

- a) Design a direct coupled amplifier which uses identical transistors with the following specifications as: $V_{CC} = 15$ V, $V_{OP-P} = 9$ V, $R_L = 5.6 \text{ K}\Omega$, $f_0 = 50$ Hz and stability factor (S) = 5. Calculate individual and overall gain.

Use transistor BC147 with: $PD_{(Max)} = 250$ m W, $V_{CE} = 45$ V, $IC_{Max} = 100$ m A, $hf_{e(Min)} = 100$, $hie = 2.7 \text{ K}\Omega$.

- b) What is Class B power amplifier? Explain the operation of Class B push pull amplifier with suitable waveforms. State its merits and demerits.
- c) i) Explain how bootstrapping technique helps to increase the input impedance.
ii) An amplifier has a gain of 150 and pass band from 100 Hz to 100 KHz. If 5% of output voltage is feedback, determine the voltage gain after feedback and cut off frequencies.

SECTION-II

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

- a) Design a Collector coupled astable multivibrator for the frequency of 1 KHz to give output voltage of 5 V.

Use transistor BC 547 with: $PD_{(max)} = 500 \text{ m W}$, $V_{CE} = 45 \text{ V}$, $IC_{(max)} = 100 \text{ m A}$, $h_{fe_{(min)}} = 200$.

- b) Explain the operation of Step down switch mode power supply with suitable waveforms.
- c) Explain the operation of fixed bias bistable multivibrator. Derive equations for stable state currents & voltages of On & Off transistor.
- d) Derive an expression for frequency of oscillation (f) and minimum gain required for sustained oscillation in Wien bridge oscillator.

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

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

$UTP = 1.5 \text{ V}$, $LTP = 1 \text{ V}$, $V_{CC} = 9 \text{ V}$, $I_{C(Sat)} = 5 \text{ m A}$, $h_{fe} = 50$, $V_{BE(Sat)} = 0.7 \text{ V}$. $V_{CE(Sat)} = 0.3 \text{ V}$.

- b) Design a transistorized Hartley oscillator for the following specifications:

$V_o = 3 \text{ V rms}$, Output Frequency (f_0) = 10 MHz, $AV = 25$.

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

- 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 an phase advancing phase shift oscillator for the following specifications: Frequency of oscillation (f) = 2 KHz, Peak to Peak output amplitude ($V_{0(P-P)}$) = 5 V and Supply Voltage (V_{CC}) = 10 V.
- b) The Self biased symmetrical bistable multivibrator has the following data:

$R_C = 4.3 \text{ K}\Omega$, $R_E = 330\Omega$, $R_1 = 20 \text{ K}\Omega$, $R_2 = 10\text{K}\Omega$, $V_{CC} = 15 \text{ V}$, $V_{BE(Sat)} = 0.8 \text{ V}$, $V_{CE(Sat)} = 0.4 \text{ V}$ & zero base to emitter voltage for cut off.

Determine:

- i) Stable state currents & Voltages.
- ii) Minimum h_{fe} required.
- c) Write a short note on:
- i) Crystal oscillator.
- ii) Switching regulator LM3524.

εεε

Seat No.	
---------------------	--

S.E. (Electronics Engineering) (Semester -IV) Examination, May - 2018
DATA STRUCTURE & ALGORITHM

Sub. Code : 63442

Day and Date : Friday, 11 - 05 - 2018

Total Marks : 100

Time : 10.00 a.m. to 01.00 p.m.

- Instructions:**
- 1) Question one is 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) 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 circular queue? Write a algorithm to add and remove item from circular queue.
- b) Write a algorithm for transforming infix expression into postfix expression using suitable example.
- c) Explain following operation on singly link list.
 - i) Insertion as first node
 - ii) Deletion of first node
 - iii) Searching node from given link list.
 - iv) Display nodes of link list.

SV - 964

Q3) Write short note (any three)

[$3 \times 6 = 18$]

- a) Insertion sort
- b) Circular link list
- c) Sparse Matrix
- d) Single and multidimensional array

SECTION - II

Q4) Attempt any two:

[$2 \times 8 = 16$]

- a) What is graph? Explain link list representation of graph.
- b) Write a different type of tree. Explain post order traversal of binary tree with algorithm & example.
- c) Explain DFS algorithm with example.

Q5) Attempt any two:

[$2 \times 8 = 16$]

- a) What is hashing? Explain different hash functions.
- b) Write warshall's algorithm with an example.
- c) Explain Binary search tree. Draw BST for following sequence.
150,30,180,100,10,25,220,170,8,200

Q6) Write short note (any three)

[$3 \times 6 = 18$]

- a) Chaining
- b) Rehashing
- c) Multiway tree
- d) Application of graph



SV - 868

Seat No.	
---------------------	--

Total No. of Pages : 2

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

Examination, May - 2018

DIGITAL SYSTEM AND MICROPROCESSOR - IV (Revised)

Sub. Code : 63443

Day and Date : Monday, 14 - 05 - 2018

Total Marks : 100

Time : 10.00 a.m. to 01.00 p.m.

Instructions : 1) **Figure to the right Indicates full Marks.**
 2) **Assume suitable data wherever necessary.**

SECTION - I

Q1) Write any three [18]

- a) Design full adder using IC 74138(3:8 line decoder).
- b) Explain Flip-Flop Operating Characteristics.
 - i) Propagation delay time.
 - ii) Set up time.
 - iii) Hold time.
- c) Explain Master Slave J-K Flip-Flop.
- d) Convert J-K Flip-Flop to T Flip-Flop.

Q2) Solve any two. [16]

- a) Design an even parity generator for a 4 bit input.
- b) Reduce Using mapping the expression $f = \sum m(1,2,3,5,7,8,9,10,12,13)$ and implement the real minimal expression in universal form.
- c) Explain Twisted Ring Counter (Johnson Counter).

P.T.O

Q3) Solve any two.

[16]

- a) Design Mod-6 Synchronous counter using J-K Flip Flop.
- b) Draw the logic digatram & explain
 - i) 4 bit serial in serial out shift register
 - ii) 4 bit parallel in parallel out shift register.
- c) Derive Characteristics equation for all flip-flops.

SECTION - II

Q4) Answer any two of the following

[2 × 8 = 16]

- a) Draw and Explain Machine Cycle of instruction STA C200H.
- b) Explain addressing modes of 8085 with example.
- c) Interface DAC 0808 to 8085 using 8255 and write a program to generate Triangular waveform.

Q5) Answer any two of the following

[2 × 8 = 16]

- a) Write a program for exchanging ten bytes stored at B000h to A000h.
- b) Explain arithmetic & logical operations of 8085.
- c) What happens when RET instruction is executed in 8085? Explain with state diagram

Q6) Write short notes on ony three of the following

[3 × 6 = 18]

- a) Stack instructions in 8085
- b) Mode 0 of 8255
- c) I/O Mapped I/O vs Memory mapped I/O
- d) DMA Controller



Seat No.	
-------------	--

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

Examination, May - 2018

CONTROL SYSTEM ENGINEERING

Sub. Code : 63444

Day and Date : Wednesday, 16- 5 - 2018

Total Marks : 100

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

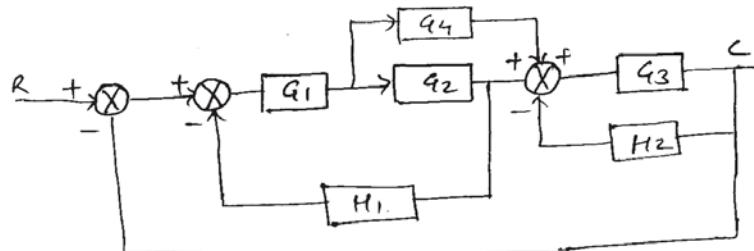
- Instructions :**
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Assume suitable data wherever necessary.
 - 4) Use of graph papers are allowed.
 - 5) Use of scientific calculator is allowed.

SECTION - I

Q1) Solve any two.

[16]

- a) Explain mathematical modelling of Mass, Spring, and Damper.
- b) Find overall transfer function of following figure using block diagram reduction technique.

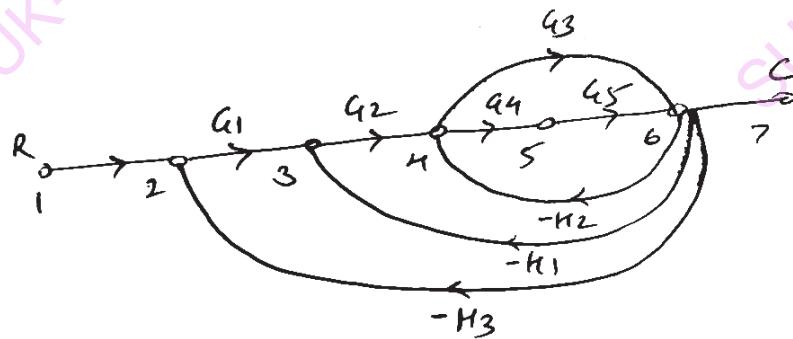


- c) Explain Routh criterion for stability which are difficulties arises in the Routh's criterion. Explain how it overcomes.

P.T.O.

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

- Explain control of effect of disturbance signals by use of feedback.
- Determine overall transfer function. Use Mason's Gain Formula.



- Draw the time response of second order system for unit step input for underdamped case and derive expression for it.

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

- Explain steady state error and error constants.
- The open loop transfer function is $G(S) = K/S(S+1)(S+3)$, Sketch the root locus of the system.
- Define time domain specifications and derive expressions for any two.

SECTION - II

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

- Explain frequency domain specification.
- Sketch the Bode plot for $G(s) = 1/S(S+3)$ and Determine Gain Margin and Phase Margin.
- Explain effect of addition of poles and zeros on Bode plot.

Q5) Solve any two.

[16]

- a) Explain concept of state, state variable and state model.
- b) Check for controllability and observability.

$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & -2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} U$$

$$y(t) = [1 \quad 2] \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

- c) Derive the equation for transfer function from state model for continuous time system.

Q6) Solve any three.

[18]

- a) lead - lag compensator.
- b) PID Controller
- c) Nyquist Stability Criterion
- d) Polar Plot



Seat No.	
---------------------	--

**B.Sc., B.Sc. (Biotech), B.Sc. (Sugar Tech.), B.Sc. (I.T.),
B.Sc. (Animation Science), B.Sc. (Forensic Science), B.Sc.
(Food Processing), B.C.A., B.B.A., Law, B. Tech., B.Sc.
(Nano Science), B.I.D., B.F.T.M., B. Desh., B.D.F.C., B.C.S.,
B.Form, S.E., B. Architecture, B. Textiles, B.M.M., B.Voc.
(All Degree) (Semester - IV) Examination, May - 2018**

ENVIRONMENTAL STUDIES (Compulsory) (Old)

Day and Date : Sunday, 20 - 05 - 2018

Total Marks : 50

Time : 11.00 a.m. to 01.00 p.m.

Instructions : 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Q1) Answer any two of the following: [10]

- a) Explain the concept of sustainable development.
- b) Discuss the Roof top water harvesting.
- c) Explain the concept of conservation of biodiversity.

Q2) Give sources, effects & control of urban & industrial solid waste. [10]

OR

Discuss disaster management with reference to flood and cyclone.

Q3) Explain environmental effect of overuse of chemical fertilizer. [10]

OR

Give salient features of Air (Prevention & control) of Pollution Act of India.

Q4) Write a short notes on (any four) : [20]

- a) Wetland Reclamation
- b) Food web
- c) Watershed Management
- d) Advantages & disadvantages of dam
- e) Green house effect
- f) Benefits of forest

मराठी रूपांतर

- सूचना :**
- 1) सर्व प्रश्न लिहणे गरजेचे आहे.
 - 2) प्रश्नाच्या उजवीकडील संख्या पूर्ण गुण दर्शवितात.

प्र.1) खालीलपैकी कोणत्याही दोन प्रश्नांची उत्तरे लिहा. [10]

- अ) शाश्वत विकासाची संकल्पना स्पष्ट करा.
- ब) छतावरील पाण्याचे संकल्पना या विषयी चर्चा करा.
- क) जैवविविधतेचे संरक्षण ही संकल्पना स्पष्ट करा.

प्र.2) नागरी व औद्योगिक घनकचऱ्याचे स्रोत, परिणाम व प्रतिबंध उपाय सांगा. [10]

किंवा

पूर व चक्रिवादाले याचा संदर्भ घेवून आपत्ती व्यवस्थापन स्पष्ट करा.

प्र.3) रासायनिक खतांच्या अतिवापरामुळे निर्माण होणारे परिणाम स्पष्ट करा. [10]

किंवा

भारतीय हवा प्रदूषण (नियंत्रण व प्रतिबंध) कायदा या मधील प्रमुख तरतुदी सांगा.

प्र.4) टिपा लिहा. (कोणत्याही चार) [20]

- अ) पडिक जमीन सुधारणा
- ब) अन्नजाळे
- क) पाणलोट क्षेत्र विकास
- ड) धरणाचे फायदे व तोटे
- इ) हरितगृहाचे परिणाम
- फ) जंगलाचे फायदे



Seat No.	
-------------	--

S.E. (Electronics) (Part - II) (Semester - III)**Examination, April - 2018****ENGINEERING MATHEMATICS -III****Sub. Code :63434****Day and Date : Tuesday, 24- 04 - 2018****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) Use of non-programmable calculator is allowed.

SECTION - I**Q1) Solve any Three.****[18]**

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

b) Solve: $(D^3 + 1)y = \sin 3x - \cos^2 x / 2$

c) Solve: $(D^2 - 2D + 4)y = 3x^2 - 5x + 2$

d) An electric circuit consists of an inductance L, a condenser of capacity C and an emf force $E = E_0 \cos \omega t$, so that the charge q satisfies the

differential equation $\frac{d^2 q}{dt^2} + \frac{q}{LC} = \frac{E_0}{L} \cos \omega t$

If $\omega = \frac{1}{\sqrt{LC}}$ initially at $t = 0$, $q = q_0$ and $i = i_0$. Show that the charge q at

time t is given by $q = q_0 \cos \omega t + \frac{i_0}{\omega} \sin \omega t + \frac{E_0}{2L\omega} t \sin \omega t$

Q2) Solve any two.**[16]**a) Find the directional derivative of $\phi = x \log z - y^2$ at $(-1, 2, 1)$ in the direction of the normal to the surface $xy^2 + yz^3 = -4$ at $(2, -1, 1)$

b) Prove that $\nabla \cdot \left[r \nabla \left(\frac{1}{r^3} \right) \right] = \frac{3}{r^4}$.

P.T.O.

- c) Find the constants m, n such that the surface $mx^2 - 2nyz = (m+4)x$ will be orthogonal to the surface $4x^2y + z^3 = 4$ at the point $(1, -1, 2)$.

Q3) Solve any two. [16]

- a) The probability that a pen manufactured by a company will be defective is $\frac{1}{10}$. If 12 such pens are manufactured, find the probability that

- i) exactly two will be defective
- ii) atleast two will be defective
- iii) none will be defective

- b) Fit a Poisson distribution to the following data and calculate the theoretical frequencies.

Deaths:	0	1	2	3	4
---------	---	---	---	---	---

Frequency:	123	59	14	3	1
------------	-----	----	----	---	---

- c) An aptitude test for selecting engineers in an industry is conducted on 100 candidates. The average score is 42 and standard deviation is 24. Assuming normal distribution for the scores find:

- i) The number of candidates whose score is more than 60.
- ii) The number of candidates whose score lies between 30 and 60.

(Given : for S.N.V. z the area under normal curve from $z = 0$ to $z = 0.5$ is 0.1915 and from $z = 0$ to $z = 0.75$ is 0.2735)

SECTION - II

Q4) Attempt any three from the following.

- a) Find Laplace transform of $te^{3t} \sin 2t$. [6]

- b) Find Inverse Laplace transform of $\frac{s^2}{(s^2 + 4)^2}$. [6]

- c) Evaluate using Laplace transform $\int_0^\infty \frac{e^{-2t} \sinh t}{t} dt$. [6]

- d) Find Laplace transform of Half wave rectified sine wave function

$$f(t) = \begin{cases} a \sin pt, & 0 < t < \frac{\pi}{p} \\ = 0, & \frac{\pi}{p} < t < \frac{2\pi}{p} \end{cases}$$

$$\text{and } f\left(t + \frac{2\pi}{p}\right) = f(t)$$

[6]

Q5) Attempt any two of the following.

- a) Obtain a Fourier series for

$$f(x) = \begin{cases} 0, & -5 \leq x < 0 \\ = 3, & 0 < x \leq 5 \end{cases}$$

if the period is 10. Hence show that $\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \dots \infty$ [8]

- b) Find Fourier series for $f(x) = \cos px$ in $[-\pi, \pi]$. [8]

- c) i) Obtain the half - range sine series for $f(x) = \pi x - x^2$, $0 \leq x \leq \pi$.
ii) Expand $f(x) = x$, $0 < x < 2$ in a half - range sine series. [8]

Q6) Attempt any two of the following.

- a) Find Fourier sine transform of $f(x) = \frac{e^{-ax}}{x}$. [8]

- b) Express the function $f(x) = 1$ for $|x| \leq 1$, as a Fourier integral. Hence
 $= 0$ for $|x| > 1$

evaluate $\int_0^\infty \frac{\sin \lambda \cos \lambda x}{\lambda} d\lambda$. [8]

- c) Find the Fourier transform of the function [8]

$$f(x) = \begin{cases} 1 + \frac{x}{a}, & (-a < x < 0) \\ = 1 - \frac{x}{a}, & (0 < x < a) \\ = 0, & \text{otherwise} \end{cases}$$



Seat No.	
-------------	--

S.E. (Electronics) (Semester - III) (Revised)**Examination, April - 2018****ELECTRONICS MEASUREMENT AND
INSTRUMENTATION****Sub. Code : 63435****Day and Date : Wednesday, 25- 4 - 2018****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.

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

- a) Draw block diagram of measuring system and explain each block in detail.
- b) Explain the principle of a successive approximation type DVM.
- 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) Explain the working of Spectrum Analyzer.
- c) Explain general classes of errors occurring in measuring system.

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

- a) CRO probes.
- b) Fourier analyzer.
- c) AF Generators.
- d) Digital frequency meter.

SECTION - II

Q4) Attempt Any Two of the following: [16]

- a) What is basic principle of strain Gauge? Explain construction of strain Gauge.
- b) Derive Bridge Balance condition for Hays Bridge. State advantages.
- c) Draw the block diagram and explain single slope A/D Converter.

Q5) Attempt Any Two of the following: - [16]

- a) What is piezoelectric effect? Explain the working of piezoelectric transducer.
- b) What are objectives of DAS? Explain multichannel DAS with neat block diagram.
- c) Explain Andorsens Bridge.

Q6) Write short notes on (Any three) [18]

- a) wheatstones Bridge
- b) Cold junction compensation
- c) Sample and hold circuit
- d) Selection criterion of Transducer

x x x

Seat No.	
-------------	--

S.E. (Electronics Engg.) (Part-II) (Semester - III)
Examination, April- 2018
ELECTRONIC CIRCUIT ANALYSIS AND DESIGN - I
Sub. Code : 63436

Day and Date : Thursday, 26 - 4 - 2018

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.
 - 3) Assume Suitable data if necessary.
 - 4) Standard data sheet is allowed.

SECTION-I

Q1) Attempt any three of the following: [18]

- a) Draw neat circuit diagram of Bridge rectifier, derive an expression for:
 - i) Ripple factor
 - ii) Rectification Efficiency
 - iii) Transformer Utilization Factor
- b) Design a transistorized shunt regulator with the following specifications:
 $V_i = 20 \pm 20\% V$, $V_o = 5 V$, $I_L = 100 \text{ mA}$
- c) Explain Voltage Tripler & Quadrupler circuits.
- d) Explain the operation of L Section filter and derive expression for its ripple factor.

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

- a) Design a power supply using full wave rectifier with Capacitor filter to provide an output voltage of 8 V at 50 mA and the ripple factor of 0.02.
- b) Explain low pass RC circuit as an integrator. A symmetrical square wave whose peak to peak amplitude is 2 V & whose average value is zero is applied to an RC integrating circuit. The time constant equals the half period of the square wave. Find the peak to peak value of the output amplitude.
- c) Explain:
 - i) Protection circuits for regulator.
 - ii) Line Regulation & Load Regulation.

Q3) Attempt any Two of the following:

- a) Design a series pass voltage regulator to provide output voltage of 15 V at 100 mA. The unregulated input is 25 V. Also calculate stability factor.
- b) A Bridge rectifier is applied with input from a step down transformer having turns ratio of 10:1 and input 230 V, 50 Hz from mains supply. If each diode having forward resistance of 2Ω and the load resistance is of $2\text{ K}\Omega$, Determine:
 - i) DC Power output
 - ii) PIV across each diode
 - iii) Regulation efficiency
 - iv) % Regulation
- c) Explain square & step response of RC high pass filter

SECTION-II

Q4) Attempt any Three of the following:

- a) Explain Voltage Divider biasing of a transistor.
- b) Draw the high frequency hybrid-II model and explain the meaning of each component of a model.
- c) Compare BJT and FET.
- d) Write short note on bias compensation techniques.

Q5) Attempt any Two of the following:

- a) Design single stage RC coupled amplifier to give a voltage gain of 80 with stability factor better than 11 and output voltage of 3 Vrms using transistor BC 107 with $h_{fe} = 110$ and frequency range 100 Hz to 1 MHz.
- b) Calculate coupling capacitor C_c required to provide a low frequency 3 dB point at 125 Hz if $R_s = 600\ \Omega$, $h_{ie} = 800\Omega$, $h_{fe} = 50$, $R_1 = 5\text{ K}\Omega$, $R_2 = 1.5\text{ K}\Omega$ for
 - i) Ideal bypass capacitor C_e
 - ii) Practical bypass capacitor C_e with $R_{ce} = 15\Omega$
- c) Draw h parameter model and define h parameters for CE, CB and CC configuration.

Q6) Attempt any Two of the following:

[16]

- a) Draw approximate short circuit high frequency model. Derive expression for unity gain bandwidth product (f_T) in terms of g_m and $C_{b'e}$.
- b) Draw the circuit diagram of a fixed bias and self bias circuits and derive the expressions for the stability factors.
- c) Differentiate between enhanced and depletion type MOSFET.



Seat No.	
-------------	--

S.E. (Electronics) (Semester - III) Examination, April -2018**ANALOG COMMUNICATION****Sub. Code : 63437****Day and Date : Friday, 27 - 04 - 2018****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.

SECTION - I**Q1) Solve any three. [18]**

- a) What is trapezoidal pattern. Sketch the pattern for
 - i) $M < 1$
 - ii) $M = 1$
 - iii) Improper phase relationship
 - iv) Asymmetrical modulation.
- b) With a neat block diagram explain high level modulated Am transmitter.
- c) Explain the following terms.
 - i) sensitivity
 - ii) selectivity
 - iii) fidelity.
- d) For frequency modulation define following.
 - i) Modulation index
 - ii) Frequency deviation
 - iii) Percentage modulation.
- e) Describe filter method for SSB generation.

P.T.O.

Q2) Solve any Two.

[16]

- a) An AM wave is specified as follows:

$V_c(\text{peak}) = 120\text{V}$, $V_m(\text{Peak}) = 60\text{V}$, $f_c = 120 \text{ MHz}$, $f_m = 0.1 \text{ MHz}$ & $R_L = 60\Omega$.

Determine

- i) Modulation index
 - ii) LSF
 - iii) USF
 - iv) Bandwidth
 - v) Carrier Power
 - vi) Total Power
 - vii) USB Power
 - viii) LSB Power
- b) Draw and explain a reactance modulator.
- c) Draw & explain a simple diode detector and also comment on its distortions.

Q3) Solve any Two.

[16]

- a) Draw a balanced modulator and explain how it is used to suppress the carrier.
- b) Discuss about the frequency spectrum and Bandwidth of FM wave using Bassel function.
- c) Draw a superheterodyne receiver and explain how a constant If is obtained.

SECTION - II**Q4) Solve any three.**

[18]

- a) What is the principle used in turned circuit frequency discriminator? Explain
- b) What is time division multiplexing? Explain.

- c) Draw a pulse amplitude modulator circuit and explain.
- d) Explain the following terms related to antenna.
- i) radiation pattern
 - ii) Beam width
 - iii) Gain.
- e) Two resistors $20\text{ k}\Omega$ and $50\text{k}\Omega$ are at room temperature of 290°K . Determine the thermal noise for bandwidth of 100KHz . for
- i) each resistor
 - ii) For two resistors in series
 - iii) For two resistors in parallel.

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

- a) Draw a neat block diagram and explain FM receiver.
- b) What is sampling theorem? Explain different sampling techniques used in pulse amplitude modulation.
- c) What is a spacewave propagation? Explain.

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

- a) Explain how a FM signal is demodulated using a Ratio detector.
- b) With neat waveforms explain the generation of pulse position modulation.
- c) What is internal noise? Explain.

