SC-403

Seat No.	

Total No. of Pages : 2

S.E. (E & TC Engg.) (Semester - IV)
Examination, November - 2019
DATA STRUCTURE
Sub. Code : 63468

Day and Date : Friday, 15 - 11 - 2019 **Total Marks : 100**
Time : 2.30 p.m. to 5.30 p.m.

Instructions : 1) **Attempt all qustions.**
2) **Figures to the right indicate full marks.**

Q1) Solve any TWO: **[2×9=18]**

a) Write an algorithm for bubble sort and explain with an example.

b) What is stack? Write an algorithm for push operation to save item on stack and explain it in brief.

c) Write C code for

i) Removing element from queue.

ii) Inserting element into queue.

Q2) Solve any TWO: **[2×8=16]**

a) What is linked list? Explain different types of linked list.

b) Define stack and explain its representation using linked list.

c) Write the C program for PUSH and POP operation.

Q3) Solve any TWO: **[2×8=16]**

a) Explain term garbage collection also explain overflow and underflow situations.

b) What is queue? Explain different types of queue.

c) What is a multidimensional array? Explain the representation of two dimensional array in memory.

P.T.O.

Q4) Solve any TWO: **[2×8=16]**

a) Explain traversing operation on a graph and its types.

b) Explain binary tree with neat diagram and properties.

c) Explain warshall's algorithm with suitable example.

Q5) Solve any TWO: **[2×8=16]**

a) Define AVL tree explain the insertion in the AVL tree with different rotations.

b) Write a short note on counting number of binary tree.

c) Explain insertion in m way search tree with proper example.

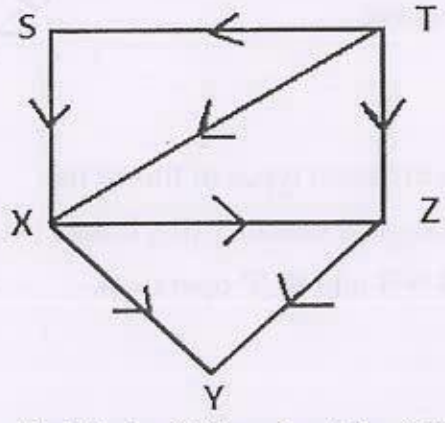
Q6) Solve any THREE: **[3×6=18]**

a) Represent the following algebraic expression in tree structure
$E = [a - (b + c)]^* [(d + e) / (f - g + h)]$.

b) Construct a binary tree from the given order.
Postorder : HIDEBJFKGCA.
Inorder : HDIBEAFJCGK.

c) What is hashing? Explain different hash functions.

d) Consider graph G in the figure below, Suppose the nodes are stored in an array in a memory as follows X, Y, Z, S, T then



i) Find indeg (Y) and outdeg (Y).

ii) Find all simple paths from X to Z.

iii) Find all simple paths from Y to Z.

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SC-406

Seat No.	

Total No. of Pages : 2

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

Day and Date : Tuesday, 19 - 11 - 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 indicate full marks.**

SECTION - I

Q1) Solve any two: **[2×8=16]**

a) State the Gauss law and its three applications.

b) Evaluate

i) Find $\nabla\varnothing$ of a scalar function $\phi = x^2yz$.

ii) Find the gradient of a function $A = 2x^3 + y^3 + z^2$

c) Four point's charges of 3 ηC each are placed at four corners of a square 2 meter in side. Find the force acting on each charge.

Q2) Solve any two: **[2×8=16]**

a) Explain boundary conditions for dielectric - dielectric interface.

b) State and derive Diversion Theorem.

c) Give the field $\bar{D} = 6r\sin\left(\frac{1}{2}\varnothing\right)\bar{a}_r + 1.5r\cos\left(\frac{1}{2}\varnothing\right)\bar{a}_\phi\ C/m^2$, evaluate both side of the divergence theorem for the region bounded by $r = 2$, $0 \le \varnothing \le \pi$, $0 \le z \le 5$.

Q3) Solve any three: **[3×6=18]**

a) Transform vector to cylindrical coordinate form Cartesian coordinate system.

b) Explain Method of Images.

c) Write a note on Coulomb Law.

d) Transform the vector to cylindrical coordinates : $\bar{F} = 10\bar{a}_x - 8\bar{a}_y + 6\bar{a}_z$ at pint P(10, –8, 6)

P.T.O.

SECTION - II

Q4) Solve any two. **[2×8=16]**

a) Derive the magnetic field intensity due to infinite filament line.

b) The magnetic field intensity of linearly polarized uniform plane wave propagation in +y direction in seawater ($\varepsilon_r = 80$, $\mu_r = 1$, $\sigma = 4$ s/m) is $\bar{H} = 0.1\sin\left[10^{10}\pi t - \pi/3\right]$ A/m. Determine γ, β, α, η, λ and v_p.

c) Explain the concept of vector magnetic potential.

Q5) Solve any two. **[2×8=16]**

a) Derive the Maxwell equation for static field.

b) Derive the transmission Line equations.

c) The parameter of a certain transmission line operating at 6×10^8 rad/s are L = 0.4 μ H/m, C = 40 pF/m, G = 80μ S/m and R = 20 Ω/m. Find propagation constant, attenuation and phase constant, wavelength and characteristic impedance.

Q6) Solve any three. **[3×6=18]**

a) Explain the smith chart.

b) Write a note on Reflection coefficient and VSWR.

c) Prove that, $Z_0 = \sqrt{Z_{0c}Z_{sc}}$.

d) Calculate the value of the vector current density in rectangular coordinator at P(2, 3, 4) if $\bar{H} = x^2z\bar{a}_y - y^2x\bar{a}_z$.

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Total No. of Pages : 2

Seat No.	

S.E. (ETC) (Part - II) (Semester - IV) (Revised)

Examination, November- 2019

LINEAR INTEGRATED CIRCUITS

Sub. Code : 63467

Day and Date : Thursday, 14- 11 - 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 indicate full marks.**

SECTION-I

Q1) Attempt any two. **[2×8=16]**

a) Derive expression for Slew Rate. State its significance.

b) Draw and explain dual input balanced output differential amplifier with DC-Analysis.

c) Draw and explain sample and hold circuit in details.

Q2) Attempt any two. **[2×8=16]**

a) Draw and explain functions of all building blocks of Op Amp.

b) Explain summing, scaling and averaging amplifiers using Op amps.

c) Discuss methods of frequency compensation. How it affects the bandwidth.

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

a) Clipping and clamping circuits.

b) Instrumentation Amplifier using three Op amp.

c) Log and Antilog Amplifiers.

d) IC CA3140.

P.T.O.

SECTION-II

Q4) Attempt any two. **[2×8=16]**

a) With neat Diagram explain Timer IC 555.

b) Draw and explain Narrow Band Reject Filter.

c) Explain Hartley oscillator using Op amp.

Q5) Attempt any two. **[2×8=16]**

a) Explain triangular wave generator with circuit diagram and waveform.

b) Explain RC Wein Bridge oscillator in detail.

c) Explain IC OP 177 Op amp in details.

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

a) All Pass Filter.

b) IC 565 PLL.

c) IC AD 620 Instrumentation Amplifier.

d) Chebyshev Filter.

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Total No. of Pages : 2

Seat No.	

S.E. (Electronics & Telecommunication) (Part - II) (Semester - IV) Examination, November - 2019

ANALOG COMMUNICATION SYSTEMS

Sub. Code: 63470

Day and Date : Wednesday, 20 - 11 - 2019 **Total Marks : 100**

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

Instructions : **1)** **All questions are compulsory.**

2) **Assume suitable data wherever necessary.**

SECTION - I

Q1) Solve any three: **[3 × 6 = 18]**

a) Explain medium power AM generation.

b) Draw and explain AM Envelope.

c) Calculate modulation index if transmitter transmits 10kw power without modulation and 12kw after amplitude modulation.

d) Explain third method related to SSB.

Q2) Solve any two: **[2 × 8 = 16]**

a) Explain concept of angle modulation with respect to Phase Modulation.

b) How FM generation is DONE with indirect method.

c) Compare AM with FM.

Q3) Solve any two: **[2 × 8 = 16]**

a) Define sensitivity,dynamic range,Selectivity,Fidility of super heterodyne receiver.

b) Explain AM detection using simple and practical Diode Detector.

c) Write note on image frequency and double spotting.

P.T.O.

SECTION - II

Q4) Solve any two: **[2 × 8 = 16]**

a) Explain ratio detector.

b) Explain foster seeley discriminator.

c) Describe FM noise suppression.

Q5) Solve any two: **[2 × 8 = 16]**

a) Classify Noise signals.

b) What is aliasing.

c) Write briefly about noise figure,noise temperature,Noise BW,S/N ratio.

Q6) Write note on (any three): **[3 × 6 = 18]**

a) PPM modulator.

b) Compare PAM with PCM.

c) Sampling theorem.

d) PWM Generation.

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SC - 836

Total No. of Pages : 3

Seat No.	

S.Y. B.Tech. (ETC) (Part - II) (Semester - III) (CBCS)
(Revised) Examination, November - 2019
ENGINEERING MATHEMATICS - III
Sub. Code : 73245

Day and Date : Saturday, 23 - 11 - 2019 **Total Marks : 70**

Time : 10.00 a.m. to 12.30 p.m.

Instructions :
1) Attempt any three questions from each section.
2) Figures to the right indicate full marks.
3) Use of non-programmable calculator is allowed.
4) Assume suitable data, if necessary.

SECTION - I

Q1) Solve the following differential equations

a) $(D^3 - 7D - 6)y = e^{2x}(1+x)$ **[6]**

b) $(D^4 - 16)y = 2\cos^2 x$ **[6]**

Q2) a) Find the directional derivative of $\phi = x^2 - y^2 + 2z^2$ at the point $p(1,2,3)$ in the direction of the line PQ where Q is the point $(5,0,4)$ **[6]**

b) Show that the vector $\overline{f} = (x+2y+az)i + (bx-3y-z)j + (4x+cy+2z)k$ is solenoidal and determine the constants a, b, c if $\overline{f}$ is irraotational **[5]**

Q3) a) If $s_1 = \left\{\frac{0}{0} + \frac{0.5}{20} + \frac{0.65}{40} + \frac{0.08}{60} + \frac{1}{80} + \frac{1}{100}\right\}$ and

$s_2 = \left\{\frac{0}{0} + \frac{0.45}{20} + \frac{0.60}{40} + \frac{0.04}{60} + \frac{0.95}{80} + \frac{1}{100}\right\}$ then find following fuzzy sets **[6]**

i) $(s_1 \cup s_2)(x)$

ii) $(s_1 \cap s_2)(x)$

iii) $\overline{(s_1 \cup s_2)(X)}$

iv) $\overline{(s_1 \cap s_2)(X)}$

P.T.O.

b) Find the degree of subsethood s(A,B) and s(B,A) for the fuzzy sets [5]

$$A(x)=1-\frac{x}{10},\quad x\in\{0,1,2,3,.....10\}$$

$$B(x)=\frac{x}{x+2},\quad x\in\{0,1,2,3,.....10\}$$

Q4) Attempt any two

a) $x^3\frac{d^2y}{dx^2}+3x^2\frac{dy}{dx}+xy=\sin(\log x)$ [6]

b) Prove that $\nabla.\left[r\nabla\left(\frac{1}{r^3}\right)\right]=\frac{3}{r^4}$ [6]

c) Find α-cuts and strong α-cuts of set B [6]

$$B=\left\{\frac{0.2}{1}+\frac{0}{2}+\frac{0.65}{3}+\frac{0.7}{4}+\frac{0.35}{5}\right\}\text{ for }\alpha=0.2,\ 0.4,\ 0.6,\ 0.8$$

SECTION - II

Q5) Solve the following

a) Obtain the Fourier series for $f(x)=|x|,\ -\pi\le x<\pi$ [6]

b) Obtain half range cosine series for $f(x)=x-x^2$ for $0\le x\le 1$ [6]

Q6) Solve the following.

a) Find the Laplace transform of $\frac{\cosh 2t.\sin 2t}{t}$ [6]

b) Evaluate using Laplace transform $\int_0^\infty e^{-4t}\sin^3 t.dt$ [5]

Q7) Solve the following.

a) Six fair coins are tossed simultaneously. If 192 such tosses are made find the expected number of tosses showing [6]

i) one and only one heads

ii) no heads

iii) all heads

b) A firm produces articles of which 0.1 percent are defective. It packs them in cases each containing 500 articles. If a whole-saler purchases 100 such cases, how many cases can be expected to be free from defectives, how many can be expected to have one defective? [5]

Q8) Solve any two of the following.

a) Find half range sine series for $f(x)=x(\pi-x)$ in $(0,\pi)$. Deduce that

$$\frac{\pi^2}{32}=\frac{1}{1^3}-\frac{1}{3^3}+\frac{1}{5^3}-\frac{1}{7^3}+.....$$ [6]

b) Find the inverse Laplace transform of $\frac{5s^2-15s-11}{(s+1)(s-2)^2}$ [6]

c) The lifetime of certain type of battery has mean life of 400 hrs. And a standard deviation is 50 hrs. Assuming the distribution of lifetime to be normal, find [6]

i) the percentage of batteries which have lifetime of more than 350 hrs.

ii) The percentage of batteries which have lifetime between 300 and 500 hrs.

{Given S.N. V.Z. are between z=0 and z=1 is 0.3413, between z=0 and z=2 is 0.4772)

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Seat No.

Total No. of Pages :3

SE (ETC) (Part-II) (Semester - IV) Examination, November - 2019
ANALOG CIRCUITS - II
Sub. Code : 63466

Day and Date :Wednesday , 13-11-2019 **Total Marks :100**
Time : 2.30 p.m.to 5.30 p.m.

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

SECTION - A

Q1) attempt any two (8Marks Each)

a) What is the need of cascading? Explain different types of coupling

b) Design two stage direct amplifier with transistor specification Q1 and Q_2.hfe= 100. $I_{C(max)}$=100mA. $V_{CE(max)}$=30V, $V_{o(p-p)}$=5 V, R_1 = 5kΩ V_{CC}=20 V, s=8

c) Design a two stage Rc coupled amplifier to meet the following specifications Rs = 300Ω. RL = 5kΩ, frequency range is 50Hz to 100KHz, Voltage Gain per stage > 60 and supply voltage = 12 V

Q2) attempt any two (8Marks Each)

a) Explain working of class B push pull amplifier with neat diagram. Also explain cross over distortion

b) Design class AB push - pull Amplifier for following specifications: Po=300mW. loud speaker impedance = 10Ω, Vcc = 15 V

c) Design two stage voltage series feedback amplifier with overall gain at 200 and cover 3db frequency not more than 10Hz the output should be of $10V_{p-p}$ consider Rs = 300Ω

P.T.O.

Q3) Write note on any three (6Marks Each)

a) Need of Power Amplifiers

b) Advantages of negative feedback.

c) Class AB push pull amplifier.

d) Darlington pair

SECTION - B

Q4) Attempt any two (8Marks Each)

a) With neat circuit diagram explain design steps of RC Phase oscillator and derive the expression for frequency of oscillation for RC phase shift oscillator.

b) Design Hartley's Oscillator with following data Vo=6V (p-p), Fo=2MHz S=10 transistor Data, PD= 0.2W, VCE(max)=40V, hfe= 100, hie= 2.7kΩ, IC(max.) =0.1A.

c) Design Colpit's oscillator for 11 MHz frequency and giving 6V(p-p) output, Use transistor BC 147A with hfe=270, hie=2.7kΩ, IC (max) = 100mA, VCE(max)=45V, VBE(active)=0.6V.

Q5) Attempt any two (8marks Each)

a) Design astable multivibrator with following data, Frequency=500Hz Vo=12V, hfe(min) = 50. VBE(sat.) = VCE(sat.) =0.3V, IC (sat.) = 6mA.

b) With neat circuit diagram and waveforms explain operation of Monostable Multivibrator.

c) Design schmitt trigger circuit with given data VCC=12V, LTP=2.5V, UTP=4V, IC(sat)=5.1mA. hfe=40, VCE(sat,)=0.2V, VBE(sat.)=0.7V.

Q6) Attempt any three (6Marks Each)

a) Crystal Oscillator.

b) LM 3524 (SMPS).

c) Design steps of power supply using LM317.

d) Voltage regulators 78XX, 79XX

SC - 837

Total No. of Pages : 3

Seat No.	

S.Y.B.Tech (E&Tc.) (Part-I) (Semester - III) (CBCS)

Examination, November - 2019

ANALOG COMMUNICATION AT B.TECH

Sub. Code: 73246

Day and Date : Tuesday, 26 - 11 - 2019 **Total Marks : 70**

Time : 10.00 a.m. to 12.30 p.m.

Instructions : **1) All questions are compulsory.**

2) Figures to the right indicate full marks.

Q1) Attempt following Multiple choice questions. **[14×1=14]**

a) Types of analog pulse modulation systems are_____.

i) Pulse amplitude modulation

ii) Pulse width modulation

iii) Frequency modulation

iv) Both (i) and (ii)

b) Amplitude limiter in FM receivers are used to _____

i) Remove amplitude variations due to noise

ii) Filteration

iii) Demodulation

iv) Amplification

c) In Frequency Modulation-

i) Amplitude of the carrier remains same

ii) Frequency of the carrier varies in accordance with the modulating signal

iii) The number of side bands are infinite

iv) All of the above

d) In phase modulation, the _____of carrier is varied according to the strength of the signal.

i) Amplitude ii) Frequency

iii) Phase iv) None of the above

P.T.O.

e) Linear modulation or under-modulation (amplitude) occurs when signal amplitude is _____ carrier amplitude.
   i) Equal to ii) Greater than
   iii) Less than iv) None of the above

f) The AM spectrum consists of
   i) Carrier frequency
   ii) Upper side band frequency
   iii) Lower side band frequency
   iv) All of the above

g) If modulation is 50% then signal amplitude is _____carrier amplitude.
   i) Equal to ii) Greater than
   iii) Less than iv) None of the above

h) Aliasing refers to
   i) Sampling of signals less than at Nyquist rate
   ii) Sampling of signals greater than at Nyquist rate
   iii) Sampling of signals at Nyquist rate
   iv) None of the above

i) The modulation technique that uses the minimum channel bandwidth and transmitted power is-
   i) FM ii) DSB-SC
   iii) DSB-FC iv) SSB-SC

j) Drawbacks of Tuned Radio Receiver are
   i) Oscillate at higher frequencies
   ii) Selectivity is poor
   iii) Bandwidth of the TRF receiver varies with incoming frequency
   iv) All of the above

k) Noise is added to a signal_____.
   i) In the channel ii) At receiving antenna
   iii) At transmitting antenna iv) During regeneration of information

l) The carrier is suppressed in_____.
   i) Mixer ii) Frequency multiplier
   iii) Transducer iv) Balance modulator

m) Theoretical bandwidth of FM is_____.
   i) 2fm ii) 4fm
   iii) Infinite ∞ iv) Fm+fc

n) The ideal modulation index(m) of AM is-
   i) m=0 ii) m>1
   iii) m<1 iv) m=1

Q2) Solve Any two **[2×7=14]**
   a) Explain need of modulation in detail.
   b) Explain Trapezoidal patterns for AM modulation index calculations
   c) Explain filter method of SSB generation.

Q3) Solve Any two **[2×7=14]**
   a) Draw and explain frequency spectrum of FM with help of Bessel's Function.
   b) A sisusoidal carrier signal has amplitude of 6 volts and frequency 30 khz. It is amplitude modulated by sisusoidal voltage of amplitude 3 volts and frequency 2 khz. Find modulation index,% M, frequency of sideband components with its amplitudes, bandwidth. Draw frequency spectrum of AM.
   c) Draw and explain working of diode detector with waveforms.

Q4) Solve Any Two **[2×7=14]**
   a) Explain superhetrodyne receiver with advantages and disadvantages.
   b) Draw & explain Negative peak clipping & diagonal clipping with waveforms.
   c) Explain in PWM and PPM generation with waveforms.

Q5) Solve Any Two **[2×7=14]**
   a) State & explain Sampling theorem with occurrence of aliasing error.
   b) Draw & explain fosters-seeley discriminator.
   c) Explain signal to noise ratio, Noise Factor, noise Figure, Noise Temperature.

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SC - 414

Total No. of Pages : 3

Seat No.	

S.E. (Electronics and Telecommunications) (Part - II) (Semester - III) Examination, November - 2019

ENGINEERING MATHEMATICS - III

Sub. Code : 63460

Day and Date : Saturday, 23 - 11 - 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) Attempt any three. **[18]**

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

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

c) Solve $(x^2D^2 - 4xD + 6)y = x$

d) The differential equation of a circuit is $R\frac{dq}{dt} + \frac{q}{c} = 40e^{-3t} + 20e^{-6t}$. Given that R = 20 ohms and C = 0.01 farad. Initialy if q = 0 when t = 0 then show that minimum charge on the capacitor is 0.25 coulombs.

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

a) Obtain fourier series for a function $f(x) = \frac{1}{2}(\pi - x)$ in interval $(0, 2\pi)$.

Also deduce that $\frac{\pi}{4} = \left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} \ldots\ldots\right)$.

b) Obtain fourier series for a function $f(x) = x^2$ in internal $(-l, l)$ and hance deduce the resent $\frac{\pi^2}{1^2} = \left(\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \ldots\right)$

c) Find a half range fourier sine series for $f(x) = e^x$ in $0 \le x \le \pi$.

P.T.O.

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

a) Find the fourier transform of $f(x)=\left(e^{-x^2/2}\right)$ in $-\infty < x < \infty$.

b) Find fourier sine and cosine transforms of
$f(x) = \sin x\ ,\ 0 \le x \le a$
$= 0 \quad ,\ x \ge a$

c) Find inverse fourier cosine transform of $F_c(\lambda)=\dfrac{\sin(a\lambda)}{\lambda}$.

SECTION - II

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

a) Find Laplace transforms of $\dfrac{1}{t}\left[\cos(at)-\cos(bt)\right]$.

b) Find Laplace transforms of $\int_0^t e^{-3t}\sin^3 t\,dt$.

c) Find $L^{-1}\left[\dfrac{(s+29)}{(s+4)(s^2+9)}\right]$.

d) Use transform method to solve $(D^2 + 2D + 1)\,y = (te^{-t})$ with $y(0) = 1$ and $y'(0) = -2$.

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

a) i) Find the directional derivative of $\Phi=(xy^2+yz^3)$ at the point $(1, -1, 1)$ along the vector $(i + 2j + 2k)$

ii) Find the angle between the normals to the surfaces $(x^2y+z-3)=0$ and $(x\log z - y^2 + 4) = 0$ at the point of intersection $p(-1, 2\ 1)$.

b) Prove that $\vec{F}=(x+2y+9z)i+(bx-3y-z)j+(4x+cy+2z)k$ is solenoidal and determine constants a, b, c if $\vec{F}$ is irrotational.

c) Prove that $\nabla^2\left[\nabla\cdot\left(\dfrac{\vec{r}}{r^4}\right)\right]=\left(\dfrac{-12}{r^6}\right)$.

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

a) Find Z - transform of $f(k)=\left(\dfrac{2}{3}\right)^{|k|}$ for all k.

b) Find Z - transform of $f(k)=ke^{-k}\sin(4k)$ for $k \ge 0$.

c) Find the inverse Z - transform of $f(z)=\dfrac{1}{(z-2)(z-3)}; |z|<2$.

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SC-417

Total No. of Pages : 3

Seat No.	

S.E. (Electronics and Telecom.) (Part - II) (Semester - III) Examination, November - 2019

ANALOG CIRCUITS - I

Sub. Code :63461

Day and Date : Tuesday, 26 - 11 - 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.**
4) **Use of standard data sheet is allowed.**
5) **Assume suitable data if necessary and highlight it.**

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

a) Give detail analysis of Low pass RC circuit for ramp input signal.

b) Design shunt clipper for Vin = 10V sine wave and clipping level 2.2V. Also draw input and output waveforms.

c) With neat circuit diagram and waveforms explain the operation of full wave voltage doubler.

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

a) With neat circuit diagram and wavefarms explain operation of bridge wave rectifier without and with capacitive filter.

b) Derive an expression for HWR following parameter.

i) Vdc

ii) Vrms

iii) r

iv) η

c) Desrign full wave rectifier with capacitive filter for V_{dc} = 12V, I_{dc} = 100 mA, r = 3%.

P.T.O.

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

a) Design zener shunt regulator which provide output voltage of 5V and output curent 50 mA for Vin = 10 to 15 V.

b) Design emitter follower regulator with V_o = 9V I_o = 100 mA, Vin = 15 to 30V.

c) Design series pass regulator with V_o = 10V, I_o = 50mA, Vin = 15 to 30 V.

Use controller transistor = SL100

Use error detector transistor = BC107

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

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

b) Derive general expression for

i) Input Impedance

ii) Voltage gain and current gain in terms of h parameters and the load.

c) Derive expression for lower 3 dB frequency due to Cc. Calculate size of Cc to provide 3 dB point of 100Hz when Rc = 1kΩ, hfe = 50, hie = 1kΩ, Rs = 600Ω, $R_1 \parallel R_2$ = 1kΩ.

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

a) Draw and explain following terms w.r.t. hybrid II - model of a transistor.

i) Hybrid capacitance

ii) Base spreading resistance

iii) Transconductance

b) Derive the expression for sag in term of lower cutoff frequency of R.C. coupled amplifier considering square wave.

c) Design single stage RC coupled CE amplifier for given data

Vcc = 9 V, S = 10, Av = 80, f = 20Hz to 20 KHz,

Transistor Data: hfe = 40, hie = 1kΩ.

Q6) Solve any Three. **[18]**

a) Explain with diagram working of Depletion type MOSFET.

b) Explain with diagram fixed bais for JFET.

c) High frequency response to square wave.

d) For silicon transistor hfe = 50, h_{ie} = 1kΩ, f_T = 300 MHz, $C_{b'c}$ = 4 pf, Ic = 1.5 mA, T = 22°C.

Calculate

i) gm

ii) $r_{b'e}$

iii) $r_{bb'}$

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