Total No. of Printed Pages:03

SUBJECT CODE NO:- H-136
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EC/ECT/IEC/E&C)
Signals & Systems
(OLD)

[Time: Three Hours]   [Max.Marks:80]

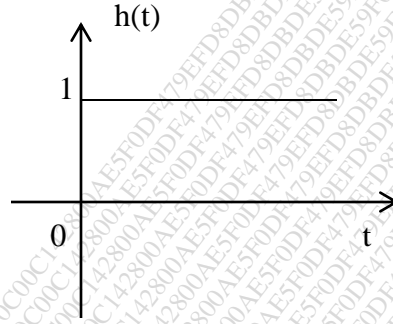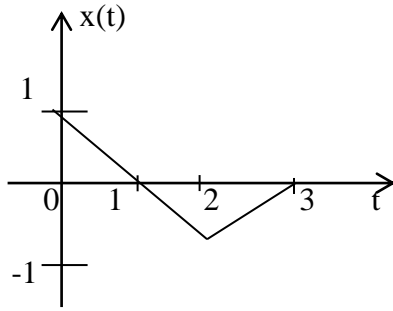Please check whether you have got the right question paper.

N.B
1) Q. No. 1 and Q. No. 6 are compulsory
2) Attempt any two questions from Q. No. 2 to Q. No. 5 and Q. No. 7 to Q. No. 10
3) Assume suitable data if necessary.

Section A

Q.1   Attempt any five:-   10

a) What is fundamental time period of
$$x(n) = cos\left(\frac{2\pi n}{5}\right) + cos\left(\frac{2\pi n}{7}\right)$$

b) Give examples of multichannel & multidimensional signal.

c) Represent signal graphically $C.e^{-\alpha n}$ for n$\geq$ 0

d) Prove that Energy of power signal is infinity.

e) Define with example static and dynamic system.

f) State the properties of convolution integral.

Q.2   a) Identify formula for even & odd component for signal x(t).   07

b) Sketch following signal $x(t) = 5\ sin\ t$ for $-\infty\ \leq to\ \leq\ \infty$. Also check whether the   08
above signal is energy or power for time period 4π .

Q.3   a) Sketch the following signals for $x(t) = 2$, $-1 \leq t \leq 2$ 08
$= 0$, $otherwise$
i) $x(2t).u(t)$ ii) $x(-2 + t)$
ii)   even part   iv) $x(t^2)$

b) Check the following system are   07
i)   Time variant / Time Invariant
ii)   Linear/ Non-linear
A) $Y(n) = x(n) - x(n - 2)$
B) $Y(n) = \cos x\ (n)$

Q.4   a)   Obtain convolution of   08
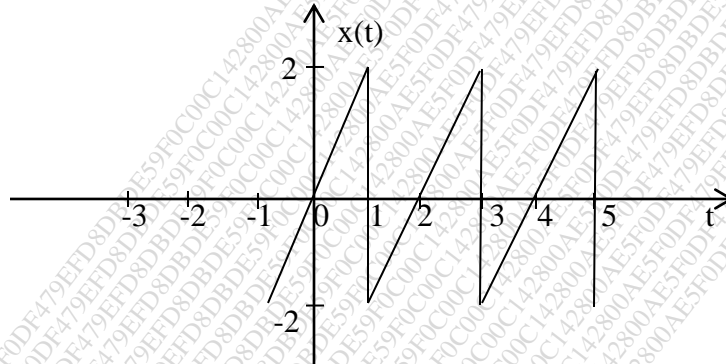

b)   Explain the complex Exponential Fourier series.   07

Q.5   a)   Determine value power & energy for following signal x(t).   08

b)   What are Signals? Classify & explain in details with example.   07

Section B

Q.6   Attempt any five:-   10

a)   Write analogy between convolution & correlation.

b)   What is the value autocorrelation occurs at origin? Why?

c)   Define Fourier Series & Fourier transform.

d)   State the advantages & limitations of Fourier transforms.

e)   Enlist standard test signals.

f)   Give formula to identify cross correlation.

Q.7   a) Explain Polar Fourier Series of following signal.   08
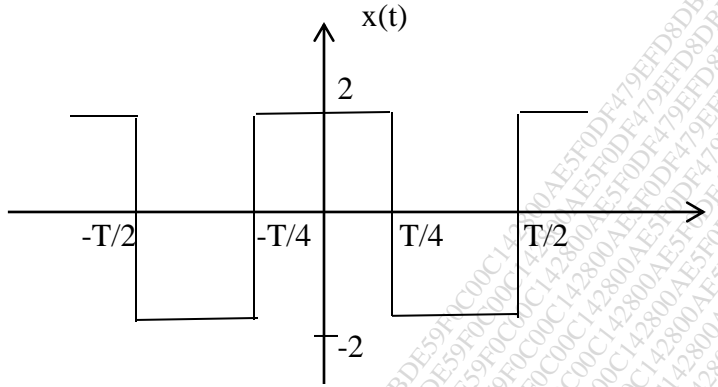
b) State & explain following properties of Fourier transform.   07
   i)   Frequency shifting
   ii)   Time shifting
   iii) Integration
   iv)   Frequency differentiation

Q.8   a) Draw correlogram of   07
   $x(t) = A \sin(2\pi f t)$

b) Show that, the cross correlation of two energy signal corresponding to multiplication of   08
Fourier transform of one signal by complex conjugate of Fourier transform of other
signal.

Q.9   a) Determine autocorrelation, PSD & power of following signal   10
   $x(t) = 5 + \sin(5\pi t + 60)$

b) Write a short Note on Aliasing.   05

Q.10   a) Explain the properties of cross-correlation for energy & power signal.   08

b) Determine autocorrelation for $x(n) = \{0,1,2,3\}$ 07

Total No. of Printed Pages:05

SUBJECT CODE NO:- H-111
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (All Branches)
Engineering Mathematics - IV
(REVISED)

[Time: Three Hours]   [Max. Marks: 80]

Please check whether you have got the right question paper.

N.B
1. Q. No. 1 and 6 are compulsory
2. Solve any two questions from the remaining questions of each section
3. Figures to the right indicate full marks
4. Assume suitable data, if necessary

Section A

Q.1   Attempt <u>any five</u>   10

1. Find the Laplace transform of $sin2t\ sin3t$

2. Find Laplace transform of $t^2 H\ (t - 2)$

3. Find Laplace transform of $f(t) = (t - 2)^2, t > 2$
   $$= 0, \qquad t < 2$$

4. Find the inverse Laplace transform of $\frac{S+2}{S^2-4S+13}$

5. Find the inverse Laplace transform of $\frac{S\ e^{-3s}}{S^2-1}$

6. Form the partial differential equation from

   $$(x - h)^2 + (y - k)^2 = a^2 - z^2$$

   OR

   Find Z-transform of $\sin h\left(\frac{k\pi}{2}\right), k \geq 0$

7. Solve: $pq = p + q$

   OR

   Find the z-transform of $ke^{ak}, K \geq 0$

8. Solve $x\frac{\partial z}{\partial x} - 4y\frac{\partial z}{\partial y} = 0$

   OR

   Find the z-transform of $2^k \cos h \propto k, \ k \geq 0$

Q.2   a. Find the Laplace transform of $\int_0^t t \cos^2 t \, dt$ 05

   b. Find the inverse Laplace transform of $\tan^{-1}(s)$ 05

   c. Solve: $p^2 + q^2 = Z$ 05

      OR

   Find z-transform of $\cos(\frac{k\pi}{3} + 5)$

Q.3   a. Evaluate : $\int_0^\infty e^t \frac{\sin^2 t}{t} \, dt$ 05

   b. Find the inverse Laplace transform by using convolution theorem   05

   $$\frac{S}{S^4 + 8S^2 + 16}$$

   c. Solve $x^2 p + y^2 q + z^2 = 0$ 05

      OR

   Find the inverse z- transform of $\frac{z}{(z-2)(z+3)^2}, \ |z| > 3$

Q.4   a. Find the Laplace transform of periodic function   05

   $$f(t) = E, 0 < t < \frac{p}{2}$$
   $$= -E, \quad \frac{p}{2} < t < p$$
   And $\quad f(t) = f(t + p)$

   b. Solve by Laplace transform $\quad y'' + 2y' + 5y = e^{-t} \sin t$; given   05
      that $\quad y(0) = 0, y'(0) = 1$

   c. Obtain the solution of $\quad \frac{\partial v}{\partial t} = k\frac{\partial^2 v}{\partial x^2}$ under the conditions   05

   i. $\quad v \neq \infty, t \to \infty$
   ii. $\quad v = 0, for \ x = 0 \ and \ x = \pi$
   iii. $\quad u = \pi x - x^2 \ as \ \ t = 0$ in the range of $(0, \pi)$

OR

Find the z-transform of $k^2, k \geq 0$

Q.5   a. Express the following function in terms of Heaviside unit step function and hence find its   05
          Laplace transform $f(t) = (t + 1), 0 < t < 2$
          $$= 3, \qquad t > 2$$

      b. Solve the simultaneous L.D.E. by Laplace transform method   05

          $\frac{dx}{dt} + 4y = 0, \frac{dy}{dt} - 9x = 0$, given

          $x = 2, y = 1$ at $t = 0$

      c. Solve $\frac{\partial^2 u}{\partial x^2} + \frac{d^2 u}{\partial y^2} = 0$ which satisfies the conditions $u(0, y) = 0 = u(l, y)$ 05
          $$\text{And } u(x, \infty) = 0, \qquad u(x, 0) = kx$$
          OR
          Solve the difference equation by using z- transform
          $6y(k + 2) - y(k + 1) - y(k) = 0, k \geq 0$
          Given y(0)= y(1) =1

                                                   Section B
Q.6   Attempt any five   10
      a. Prepare a forward difference table for the data
          x : 2   4   6   8   10
          y :15   23 27 33 40

      b. Find the first approximate value of the root (i.e. x₁) by Newton Raphson method for
          $logx - x + 3 = 0$

      c. Find the values of x, y, z in the first iteration of Gauss –Seidal method
          $83x + 11y - 4z = 95$
          $7x + 52y + 13z = 104$
          $3x + 8y + 29z = 71$

      d. Find f(8) for the data
          x :   5   6   9
          f(x) : 12   13   14

      e. Find the residues at each of its poles of
          $f(z) = \frac{3z^2}{(z-1)(z+3)}$

f. Evaluate $\int_c sinhz\, dz$, where c : $|z| = 1$

g. Show that coshz is analytic every where

h. State Cauchy-Riemann equations in Cartesian and polar form

Q.7   a. Given that $\frac{dy}{dx} = 2 + \sqrt{xy}$ and y (1)=1. Find the approximate value of y at x=1.2 using Euler's modified method   05

b. Use runge-kutta fourth order method to find y at x=0.2. given that   05

$$\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}, \qquad y(0) = 1$$

c. Under the transformation $w = \frac{1}{z}$ find the image of $x^2 + y^2 - 6x = 0$ 05

Q.8   a. Find the root of the equation $x\ log^x_{10} = 1.2$ by Newton-Raphson method   05

b. Prove that $u = r^3 \cos 3\theta - rsin\theta$ is harmonic and hence find its harmonic conjugate   05

c. Evaluate by cauchy's Residue Theorem   05

$$\oint_c \frac{z^2}{(z-1)(z+2)^2} dz, \qquad c: |z| = \frac{3}{2}$$

Q.9   a. State cauchy's integral formula and hence evaluate   05

$$\oint_c \frac{z+1}{(z^3 - 4z)} dz, \text{ where } c: |Z + 2| = \frac{3}{2}$$

b. Find the bilinear transformation which maps the points -1, 0, 1 into the points $-1, -i, i$ of w-plane respectively   05

c. Fit a second degree parabola to the following data   05

x :	0	1	2	3	4
y :	-4	-1	4	11	20

Q.10 a. Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at x=0 for the data   05

x :	0	1	2	3	4
y :	2	5	10	14	19

b. Find the analytic function $f(z) = u + iv$ if $v = \left(r - \dfrac{1}{r}\right)\sin\theta$

05

c. Evaluate $\int_0^{\pi - \pi i} e^{\bar{z}}dz$, along the curve $x = t, y = -t$

05

Total No. of Printed Pages:03

SUBJECT CODE NO:- H-112
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (All Branches)
Engineering Mathematics -IV
(OLD)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B
i. Q.No.1 and 6 are compulsory.
ii. Solve <u>any two</u> questions from remaining of each section.
iii. Figures to the right indicate full marks.
iv. Assume suitable data, if necessary.

SECTION-A

Q.1   Solve <u>any five</u> from the following   10

a) Find k such that $f(z) = \frac{1}{2}\log(x^2 + y^2) + i\tan^{-1}\left(\frac{ky}{x}\right)$ is analytic.

b) Find the image of $|z| = 2$ under the mapping $W = z + 3 + 2i$.

c) State Cauchy's integral theorem.

d) Determine the singularity and the residue of the function $f(z) = \frac{\sin z}{z}$.

e) Expand $f(z) = \cos z$ about $z = \frac{\pi}{2}$ by using Taylor's series.

f) Evaluate $\int_0^{2i} \sin hz\, dz$.

g) Solve: $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = 0$.

OR

Find Z-transform of $F(k) = \frac{1}{k}, k \geq 1$

h) Solve: $2x\frac{\partial z}{\partial x} - 3y\frac{\partial z}{\partial y} = 0$.

OR

Find Z-transform of $F(k) = \frac{a^k}{k!}, k \geq 0$

Q.2   a) Find the analytic function $f(z) = u(r,\theta) + iv(r,\theta)$ such that $v(r,\theta) = r^2\cos 2\theta - r\cos\theta + 2$ 05

b) Evaluate $\int_{(0,0)}^{(1,1)}(3x^2 + 4xy + 3y^2)\,dx + 2(x^2 + 3xy + 4y^2)\,dy$ along $y^2 = x$ 05

c) Evaluate $\int_0^\infty \frac{dx}{(a^2+x^2)^2}$ by using residue theorem.   05

Q.3   a) Evaluate $\oint_C \frac{\sin^6 z}{\left(z-\frac{\pi}{2}\right)^3}dz$, where C is $|z| = 2$ by Cauchy's integral formula.   05

b) Show that the real and imaginary part of analytic function $f(z) = u + iv$ is harmonic function.   05

c) Obtain the solution of partial differential equation $\frac{\partial u}{\partial t} = a^2 \frac{\partial^2 u}{\partial x^2}$, with subject to the condition 05

   $u(0,t) = 0, \; u(l,t) = 0, u = 3\sin\frac{\pi}{l}x$, when $t = 0$. For all values of $0 < x < l$.

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OR

</div>

   Find Z-transform of $F(k) = 3^k \cos\left(\frac{k\pi}{2} + \frac{\pi}{4}\right), k \geq 0$

Q.4   a) Find and plot the image of triangular region with vertices $(0,0)$, $(0,1)$ and $(1,0)$ under the 05
      transformation $w = (1 - i)z + 3$.

    b) Expand $f(z) = \frac{1}{(1-z)(z-2)}$ into Laurent series for $i)\; 1 < |z| < 2$ 05

    c) Solve $\frac{\partial^2 v}{\partial x^2} + \frac{\partial^2 v}{\partial y^2} = 0$, subject to the conditions   05

       i) $v = 0$ when $y \to \infty$
       j) $v = 0$ when $x = 0$ for all values of y
       k) $v = 0$ at $x = \pi$
       l) $v = v_0$ when $y = 0$ for $0 < x < \pi$

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OR

Solve $y(k + 2) - 5y(k + 1) + 6y(k) = u(k); y(0) = 0, y(1) = 1$

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Q.5   a) Find the bilinear transformation which maps the point $z = 0, -i, -1$ into the points 05

<div align="center">

$w = i, 1, 0$.

</div>

    b) Evaluate $\int_0^{2\pi} \frac{d\theta}{2 + \cos\theta}$ by calculus of residue.   05

    c) The vibration of an elastic string is governed by the partial differential equation 05

      $\frac{\partial^2 u}{\partial t^2} = \frac{\partial^2 u}{\partial x^2}$. The π and the ends are fixed. The initial velocity is zero and the initial deflection

      $u(x, 0) = 2(\sin x + \sin 3x)$. Find the deflection $u(x, t)$ of the vibrating sting for $t > 0$.

<div align="center">

OR

Find inverse z-transform of $\frac{z^2 + z}{z^3 - 3z^2 + 3z - 1}, |z| > 1$

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SECTION-B

</div>

Q.6   Solve <u>any five</u> of the following   10
    a) Find Laplace transform of $e^{-t} \sin t \, H(t - 2\pi)$
    b) Find inverse Laplace transform of $\frac{e^{-\pi s}}{s^2 + 9}$
    c) Find inverse transform of $\frac{1}{(s+3)^{\frac{3}{2}}}$
    d) State second shifting theorem of Laplace transform
    e) Find Laplace transform of $t \cos 2t$.
    f) State inverse convolution theorem of Laplace transform.

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g) Find Fourier transform of $f(x) = x, |x| \le a$; $= 0,\ otherwise$

h) Find Fourier sine transform of $\frac{1}{x}$

Q.7 a) Evaluate $\int_0^\infty \sin 4t\ \delta(t - \frac{\pi}{8})dt$ — 05

b) Find inverse Laplace transform of $\frac{1}{s}\log\sqrt{\frac{s^2+1}{s^2}}$ — 05

c) Find Fourier sine and cosine transform $f(x) = ae^{-\alpha x} - be^{-\beta x}$ — 05

Q.8 a) Find Laplace transform of $\frac{\sin^2 t}{t}$ — 05

b) Find inverse Laplace transform of $\frac{s^2}{(s^2+a^2)^2}$ — 05

c) Solve the integral equation $\int_0^\infty f(x)\cos \lambda x\ dx = e^{-\lambda}, \lambda > 0$. — 05

Q.9 a) Express the function in terms of Heaviside unit step function hence find their Laplace transform of — 05

$$f(t) = 4,\quad 1 < t < 2$$
$$= -2,\quad 2 < t < 3$$
$$= 5,\quad t > 3$$

b) Find f(x) if its Fourier sine transform is $\frac{\lambda}{\lambda^2+1}$ — 05

c) Solve $\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + 5y = e^{-x}\sin x,\ where\ y(0) = 0\ and\ \frac{dy}{dx} = 1\ at\ x = 0$ — 05

Q.10 a) Find Laplace transform of — 05

$$f(t) = 1,\quad 0 < t < 1$$
$$= 0,\quad 1 < t < 2 \qquad if\ f(t) = f(t+3)$$
$$= -1,\quad t > 2$$

b) Solve $\frac{dx}{dt} - y = e^t; \frac{dy}{dt} + x = \sin t, x(0) = 1, y(0) = 0$ by Laplace transform method. — 05

c) Using Fourier transform, solve the equation $\frac{\partial u}{\partial t} = k\frac{\partial^2 u}{\partial t^2}$ for $x \ge 0, t \ge 0$ under the given condition $u = u_0$ at $t = 0, t > 0\ and\ u(x,0) = 0, x \ge 0$. — 05

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-205
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EC/ECT/IEC/E&C)
Signals and Systems
(REVISED)

[Time: Three Hours]   **[Max. Marks: 80]**

Please check whether you have got the right question paper.

i.   N.B   i.   Q.No.1 and Q.No.6 are compulsory.
                 ii.   Attempt any two from Q.2 to Q.5 and Q.7 to Q.10
                 iii.   Assume suitable data if required

Section A

Q.1   Attempt <u>any five</u> questions   10
       a) Prove the property of impulse function

$$\int_{-\infty}^{\infty} x(t)\delta(t)dt = x(0)$$

       b) Define Deterministic and random signal
       c) Describe LTI system
       d) Compare energy and power signals.
       e) Write important properties of delta function
       f) Describe invertible and inverse system
       g) Define Gaussian function.

Q.2   a) Determine whether following system is linear, memory less, causal, Time invariant   08
       i. $y(t) = x(0.5t)$
       ii. $y(n) = cosx(n)$
       iii. $y(n) = \log_{10}(|x[n]|)$
       iv. $y(t) = \sin[x(t+2)]$

       b) Find whether the following signals are energy or power. Find appropriate value.   07
       1) $x(n) = \cos(xn)$ $-4 \le n \le 4$
              $= 0$ $0 \ otherwise$
       2) $x(t) = (2e^{-t} - 6e^{-2t})u(t)$

Q.3   a) Obtain linear convolution by mathematical method for   08
          $x(n) = \{1,1,0,1,1\}$ and $h(n) = \{1,-2,-3,4\}$
                    ↑   ↑

       b) Sketch $x(t) = [u(t) + r(t-1) - 2u(t-3)]\ u(-t+5)$ 07

Q.4   a) Find trigonometric Fourier series of the wave shown: 08
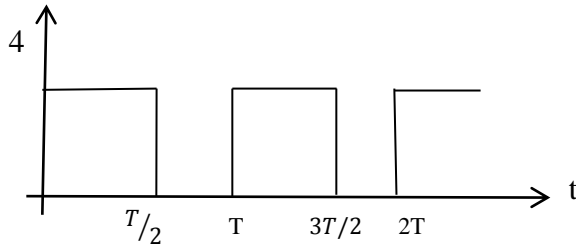
b) State different properties of the Fourier transform and prove any three properties of FT.   07

Q.5   Write short notes on (any three)   15
     a) Application of Fourier series and Fourier transform to system analysis
     b) Classification of system
     c) Properties of convolution sum
     d) Operations of signals

Section B

Q.6   Attempt <u>any five</u> questions   10
     a) What is the 'S' Domain?
     b) Determine the ESD of a sinc pulse given by
       $x(t) = A\, sinC(2wt)$
     c) How aliasing effect is eliminated in sampling process?
     d) State properties of auto correlation
     e) Define cross correlation of periodic signals
     f) Find Laplace transform of $x(t) = \cos(t - \frac{2\pi}{7})$
     g) Define correlogram and correlation

Q.7   a) State and prove scaling property of LT   07

     b) Calculate Laplace transform of   08
     $x(t) = e^{-2t}u(t) - e^{2t}u(-t)$ and $plot\ the\ RO$C

Q.8   a) Draw the correlogram between the signals   08
     $x(t) = \sin(2\pi ft)$ and $y(t) = \sin(4\pi ft)$
     b) Define and state properties of cross correlation. Find ACF of DT signal   07
     $Xn = \{1,2,3,0,-1\}$

Q.9   a) Obtain spectral density, auto correlation and signal energy when   07
       $V(t) = A \, sinC[4w(t + td)]$
      b) State and explain the properties of PSD in detail   08

Q.10   Write short note on (any three)   15
      a) Inversion using duality
      b) Covariance and convolution
      c) Application of Laplace transform
      d) Correlation and spectral density relation.

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-206
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EC/ECT/IEC/E&C)
Electronics Devices & Circuits - II
(OLD)

[Time: Three Hours]   [Max. Marks: 80]

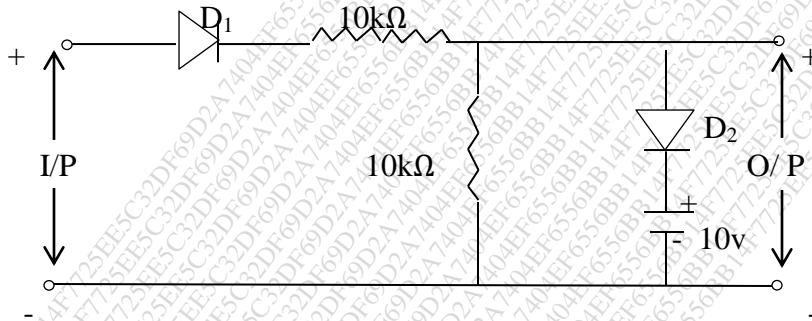Please check whether you have got the right question paper.

N.B
1. Q.1 from sections A and Q.6 from section – B are compulsory
2. Solve <u>any two</u> questions from remaining questions from each section A and B
3. Assume suitable data wherever necessary

Section A

Q.1   Solve <u>any five</u> questions   10
   a) How power is dissipated in power amplifier?
   b) Draw the construction of IMPATT diode
   c) Explain working of LASER diode in brief
   d) What are ideal characteristics of op-amp?
   e) Draw I/P , O/P wave forms for class AB amp
   f) What is meant by push pull amplifier
   g) Give the different applications of BARITT diode
   h) Draw block diagram of operational amplifier

Q.2   a) Draw and explain V-I characteristics of Tunnel diode   08
        b) What is meant by CCD? Explain   07

Q.3   a) Draw and explain transformer coupled amplifier   07
        b) A class – B output stage has an efficiency of 60% if the maximum collector dissipation of   08
           each transistor is 2.5w, calculate the d.c input power and the a.c output power

Q.4   a) Derive dual input dual output AC analysis of operational Amplifier   08
        b) Explain why pulse amplifier is needed draw its freq. domain response   07

Q.5   Write short note on (any three)   15
   a) Read diode
   b) Heat sink design
   c) Class-c amplifier
   d) Harmonic distortion in power amplifier

Section- B

Q.6   Solve <u>any five</u> questions.   10
   a) Draw the response of differentiator for square wave input
   b) What is clamper? Draw input and output waveform for positive clamper
   c) Explain in brief the role of commutating capacitor in self-biased binary
   d) Differentiate between symmetric and asymmetric triggering
   e) What is RC control blocking oscillator?
   f) What are basic types of sweep generators?
   g) Derive an equation for integrator
   h) What is the effect of positive clipper circuit?

Q.7   a) What is the effect of negative biasing in negative clamper circuit?   08
       b) Draw the frequency response of integrator for sine wave input   07

Q.8   a) What is meant by collector coupled bi. Stable multivibrator? Explain.   07
       b) For the circuit shown below the input is 50 sin wt. draw the transfer characteristics and   08
           input output wave forms assuming ideal diodes

Q.9   a) What are different methods for controlling pulse duration in blocking oscillator?   08
       b) Draw and explain Miller's time base generator   07

Q.10   Write short note on (any three)   15
   a) Schmitt trigger
   b) Boot strap sweep generator
   c) A current time base generator
   d) Differentiator

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-171
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EC/ECT/IEC/E&C)
Digital Logic Design
(OLD)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.
N.B   i) Question no.1 from Section A & Question No.6 from Section B are compulsory.
            ii) From the remaining solve any two questions from each section.
            iii) Figures to the right indicate full marks.

"Section A"

Q.1   Solve any five question of the following   10

         (a) Classify Logic families
         (b) Define Propagation delay time in digital IC
         (c) What is Don't care condition.
         (d) Write truth table of full substractor
         (e) Draw 1:4 Demux using gates.
         (f) Define comparator
         (g) Advantages of CMOS over TTL, Explain.
         (h) What are the Application of Multiplexer.

Q.2   (a) Explain in detail characteristics of digital IC   08
         (b) Design Gray to Binary code convertor.   07

Q.3   (a) Explain the parallel adder IC7403   07
         (b) Design 32:1 mux using 8:1 mux & 4:1 mux.   08

Q.4   (a) Design mod 6 counter using IC7490   08
         (b) Design 2 bit comparator   07

Q.5   Write Short note on any three   15
             1. BiCMOS
             2. ALV 74181
   3. Parity Checker, Generator
             4. K-map
             5. Tri state Logic

"Section B"

Q.6   Solve any Five question of the following   10

         a. Draw J-K Flip Flop using gates
         b. Race around condition
         c. Draw SISO, SIPO, PISO & PIPO (Logic symbol)

1

    d. Draw state diagram of MOD 10 counter.
    e. Write application of counter
    f. Define Mealy & Moore machine.
    g. Differentiate between synchronous & asynchronous counter
    h. Differentiate between RAM and ROM

Q.7   a. Explain the operation of SISO right Shift Register with neat circuit diagram.   08
    b. Convert J.K. Flip Flop to D Flip Flop   07

Q.8   a. Design a sequential circuit using T Flip-Flop for the state diagram shown below   08
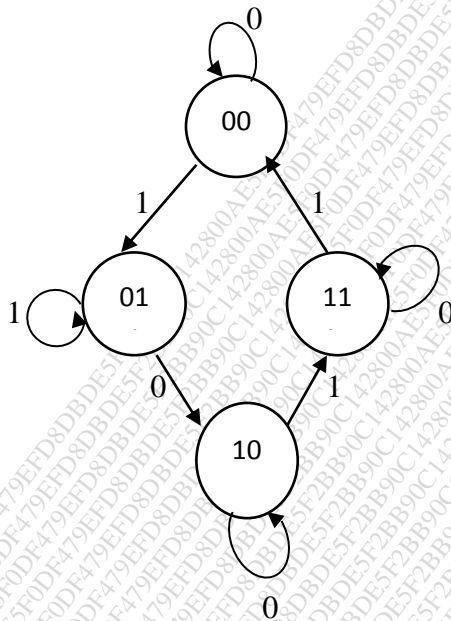
    b) Design mod 10 counter using IC 7490   07

Q.9   a) Explain the Read operation of a Memory with Waveforms.   08
    b) Explain different modeling styles of VHDL   07

Q.10   Write short note on any three   15

    a) D Flip Flop
    b) Design Steps of Asynchronous counter
    c) EPROM
    d) State diagram
    e) Entity & Architecture of VHDL

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-326
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EC/ECT/IEC/E&C)
Electronics Devices & Circuits-I
(OLD)

[Time: Three Hours]   **[Max.Marks: 80]**

Please check whether you have got the right question paper.
N.B   1) Q. No. 1 and Q. No. 6 are compulsory.
            2) Solve three questions from each Section.
                                    Section A

Q.1   Answer the following questions. [any five]   10

         a) What is Zener breakdown?
         b) Draw half wave rectifier using π-type filter.
         c) What do you mean by transition and diffusion capacitance?
         d) What is Boot strapping?
         e) Draw construction and symbol of p-channel JFET.
         f) Draw MOSFET as a switch.
         g) What is pinch off voltage?

Q.2   a) Explain the following devices w.r.t. to their symbol, construction and characteristics.   08
            1) Varactor Diode
            2) Point Contact diode

         b) Draw and explain with input and output waveforms the full wave rectifier circuit using   07
            capacitor filter.

Q.3   a) Draw the equivalent circuit of a common emitter amplifier in terms of h-parameters and   08
            obtain the expression for voltage gain.

         b) What is Darlington configuration? Explain. State its advantages.   07

Q.4   a) What is Power MOSFET? Explain.   08

         b) What is CMOS Inverter? Explain. State its applications.   07

Q.5   Write notes on [Any three].   15
         a) π-type filter
         b) Band structure of PN junction
         c) Biasing in MOSFET.
         d) Cascaded Amplifier.

326   1

Section B

Q.6   Answer the following questions:- [Any five]   10

   a) What is BJT modelling?
   b) Draw the high frequency equivalent circuit for FET amplifier.
   c) What is voltage series and current shunt feedback?
   d) Explain the principle of positive feedback.
   e) Draw the RC phase shift oscillator.
   f) What is meant by hybrid- π model?
   g) Define higher cut off frequency.

Q.7   a) What is Hetrojunction Bipolar Transistor? Explain.   08

       b) Draw and explain the high frequency equivalent circuit of BJT.   07

Q.8   a) Explain the effect of Negative feedback on the input and output impedance of amplifier. 08

       b) Draw the Wein Bridge oscillator circuit. State its advantages. Explain its working.   07

Q.9   a) Draw and explain the emitter follower circuit at high frequency.   08

       b) Draw and explain the operation of UJT Relaxation oscillator.   07

Q.10   Write notes on:- [Any three]   15
   a) Video Amplifier.
   b) Concept of stability in Electronic circuits.
   c) Gain Bandwidth product.
   d) Optocouplers.

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-327
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (ECT/E&C/IE) (CGPA)
Electronics Devices & Circuits
(REVISED)

[Time: Three Hours]   [Max. Marks: 80]

Please check whether you have got the right question paper.

N.B
   i)Q. No. 1 and Q. No. 6 are compulsory
   ii)Solve any two questions from [section A] Q. No. 2, 3, 4 and 5 and solve any two
   questions from [section B] Q. No. 7,8,9 and 10.

Section [A]

Q.1   Answer the following [Any five]   10

   a)   Define peak Inverse voltage [PIV]of z diode.
   b)   The transistor has $IE = 10\ mA$ and $\alpha = 0.987$. Calculate the value of $I_C\ and\ I_B$.
   c)   What is Avalanche breakdown?
   d)   Distinguish between JFET and BJT.
   e)   What is class C power amplifier?
   f)   What is cross over distortion?
   g)   Draw the construction and symbol of D-MOSFET.
   h)   Explain in brief the operation of positive clipper.

Q.2   A) Draw and explain the operation of bridge rectifier using capacitor filter. Draw Input and   08
          Output waveforms.
       B) Explain the operation of negative and positive voltage clamping circuits.   07

Q.3   A) Explain the operation of class B push pull amplifier in detail   08
       B) Determine the value of collector current and collector to emitter voltage for the voltage   07
          divider bias circuit as shown in fig (a), Assume $V_{BE} = 0.7v\ \ and\ \beta = 100$

Fig (a)

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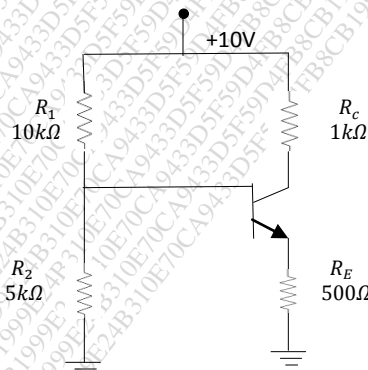Q.4   A) Explain the operation of CMOS Inverter in detail.   08
        B) With neat construction & working explain the Drain characteristics of JFET.   07

Q.5   Write notes on [Any three]   15
        a) Types of filters
        b) R C coupled amplifier.
        c) Complementary symmetry amplifier.
        d) Handling precautions of CMOS devices.

Section [B]

Q.6   Answer the following [Any five]   10

        a) Give the principle of positive feedback.
        b) Draw and label the circuit of Hartley oscillator.
        c) Compare between Actable and Monostable multi vibrator [four points].
        d) What are Barkhzusen criteria for oscillation?
        e) List the IC number for positive and negative voltage regulation for three pin IC regulators.
        f) State the limitations for voltage multiplier circuit
        g) If $L_1 = 1mH, L_2 = 2mH$ and $c = 0.1nf$. What is the frequency of oscillation of the Hartley oscillator?
        h) Draw the circuit diagram of UJT relaxation oscillator.

Q.7   A) Explain the Schmitt trigger circuit in detail.   08
        B) Show by drawing neat waveforms, how we can generate narrow pulses from square wave,   07
           Use differentiator circuit state the applications of this circuit.

Q.8   A) Explain the effect of negative feedback on input and output impedance, voltage and current   08
           gain, Bandwidth, Noise and Distortions.
        B) In colpitts oscillator, the values of the Inductor and capacitors in the tank circuit are L=40,   07
           $C1 = 100\ pf$ and $C2 = 500\ pf$. Find
           i.   The frequency of oscillations.
           ii.   If the output voltage is 10 volt. Find the feedback voltage.

Q.9   A) What is multiplier? Draw and explain circuit required for obtaining an output voltage four   08
           times that of applied input voltage.
        B) With neat block diagram explain shunt voltage regulator.   07

Q.10   Write note (Any three)   15
        a) Variable voltage Regulator
        b) Tuned LC circuit
        c) Bistable multi vibrator
        d) Integrator

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-277
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EC/ECT/IEC/E&C)
Electrical Machines & Instrumentation
(REVISED)

[Time: Three Hours]   **[Max. Marks: 80]**

Please check whether you have got the right question paper.

N.B
  i) Q. No 1 and Q. No 6 are compulsory.
  ii) Solve any two from remaining questions from each section.
  iii) Figure to the right indicate full marks.

Section A

Q.1   Attempt any five   10
   a) Draw circuit for DC series motor with proper labelling.
   b) What are constrains for permanent magnet stepper motor?
   c) DC shunt motor runs at constant speed. Why?
   d) Compare squirrel cage & phase wound rotor.
   e) What is the significance of back EMF.
   f) What is hunting in synchronous moror?
   g) Explain servomotors
   h) Give principle of 3-∅ induction motor.

Q.2   a) Explain different methods of speed control for DC shunt motor.   08

      b) Draw and explain speed /Torque characteristics of DC shunt motor.   07

Q.3   a) Explain various speed control methods of 3-∅ induction motor.   07

      b) Explain working principle of synchronous motor. Why synchronous motor is not self-   08
         starting.

Q.4   a) Explain construction & working of stepper motor.   07

      b) Explain the construction and working of hysteresis motor.   08

Q.5   a) Explain 3point starters with neat diagram   07

      b) Derive an EMF equation of DC generator.   08

Section B

Q.6   Attempt any Five: 10
a)   What is smoke detector?
b)   List different photo sensors.
c)   Explain piezoelectric effect.
d)   Give the classification of displays.
e)   What is RTC?
f)   List the property of ESD.
g)   Explain see back effect.
h)   Define opto coupler

Q.7   a)   Explain LVDT with suitable diagram. List its applications.   08

b)   Explain signal conditioning with neat circuit diagram. Also state the need.   07

Q.8   a)   Explain the working of object counter.   07

b)   With a neat block diagram explain sound level meter.   08

Q.9   a)   With neat circuit diagram explain strip chart recorders   08

b)   Explain the working of object counter.   07

Q.10   a)   Describe the structure and working of liquid crystal display.   07

b)   Explain the operation of x-y plotter. State it's applications   08

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-278
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EC/ECT/IEC/E&C)
Electrical Machines & Instrumentation
(OLD)

[Time: Three Hours]
[Max.Marks: 80]

Please check whether you have got the right question paper.

N.B
i. Q.No.1 from section A and Q.No.6 from section B are compulsory.
ii. Attempt any two questions from the remaining questions in each section.

Section A

Q.1 Solve any five from following: 10

i) What is the function of commutator in DC motor?
ii) Why the damper winding used in synchronous motor.
iii) What is difference between self –excited & separately excited generators?
iv) Write application of induction motor.
v) What are the different losses in DC generators?
vi) What is synchronous condenser?
vii) List down the application of stepper motor.
viii) Why starters requires in induction motor.

Q.2 a) Explain the working principle & construction of induction motor. 08
b) Explain the different electrical braking for series DC motor. 07

Q.3 a) Explain the principles, construction and working of electrical generator. 08
b) Explain in details the construction, working and advantages of stepper motor. 07

Q.4 a) Explain power stages, losses and efficiency of induction motor. 08
b) What are the different starting methods of synchronous motor? 07

Q.5 a) Explain the procedure for starting the synchronous motor and give the comparisons 08
between synchronous motor and induction motor.
b) Explain the different method of speed control for DC shunt motor. 07

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Section B

Q.6   Solve any five from following: 10

   a) Pressure measurement.
   b) What are different sensors for water level measurement?
   c) Difference between LED and LCD display.
   d) How smoke detector works.
   e) Give classification of transducer.
   f) Application of thermocouple
   g) Signal conditioning circuit. For measurement.
   h) How microphone works.

Q.7   a) How temperature sensor LM35 –is interfacing with the microcontroller.   08
       b) What are different types of digital transducer, explain with example?   07

Q.8   a) Explain the classification of the transducer in details.   08
       b) Explain the working of piezoelectric transducers with application.   07

Q.9   a) Explain the displacement measurement by LVDT in details.   08
       b) What are the different photosensitive devices, explain in brief?   07

Q.10   Attempt any three.   15

   a) Alpha numerical display.
   b) Hall Effect transducer.
   c) Optical oscillograph.
   d) Water level measurement.

2

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-361
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EC/ECT/IEC/E&C)
Network Analysis
(OLD)

[Time: Three Hours]   **[Max.Marks: 80]**

Please check whether you have got the right question paper.

N.B   1. Q.No.1 and Q.No.6 are compulsory from section A and B.
            2. Attempt any two questions from remaining questions from each section separately.

Section A

Q.1   Solve any five   10
            a) State Reciprocity theorem.
            b) Write limitations of superposition theorem.
            c) Define Mesh and super mesh.
            d) Define oriented graph.
            e) Convert

            f) Define current magnification factor.
            g) Write Fr for RLC series as well as parallel.

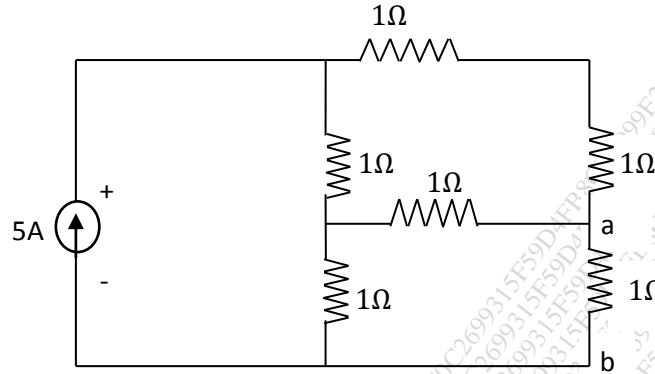Q.2   a) State and prove quality factor of RLC series resonance is   08

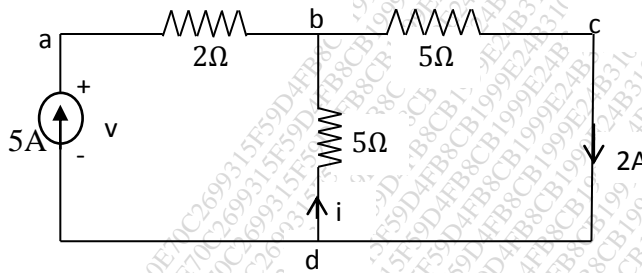$$Q = \frac{wL}{R} = \frac{1}{Rwc} = \frac{1}{R}\sqrt{\frac{L}{c}}$$

        b) Derive relation between quality factor (Q_r) and detuning factor (δ) of RLC series circuit.   07

1

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Q.3 a) Using current sources shifting and source transformation find voltage across $a - b$. (V_{ab}) 08

b) Find i(current), what is the value of V 07

Q.4 a) Explain Tie set matrix. 07

b) Define Duals and Duality. Explain graphical method of constructing the Dual Network with one examples. 08
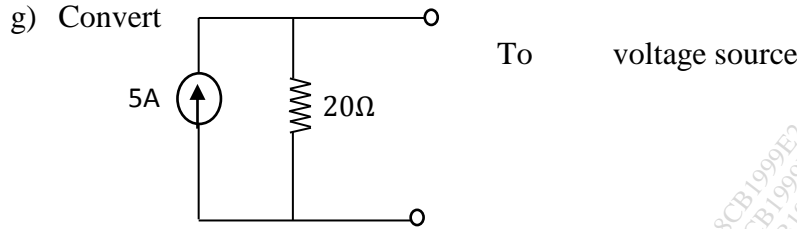
Write notes 15
 1) Parallel resonance
 2) Concept of tree and co-tree.
 3) Star to delta and delta to star conversion.

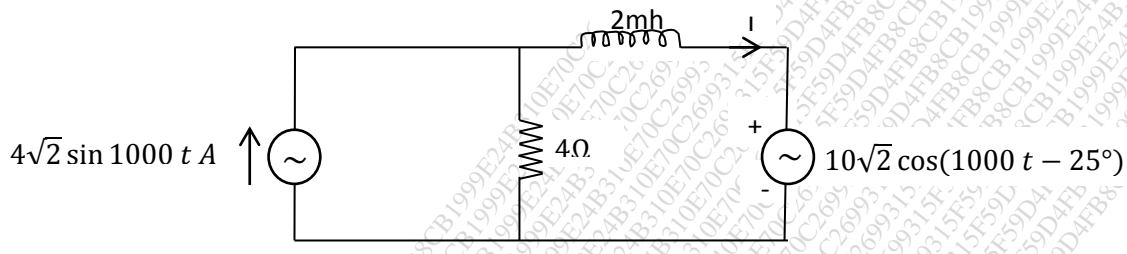## Section B

Q.6 Solve any five 10
 a) Define open circuit impedance parameter.
 b) State substitution, theorem.
 c) Write parameters of Lines.
 d) Write types of filters.
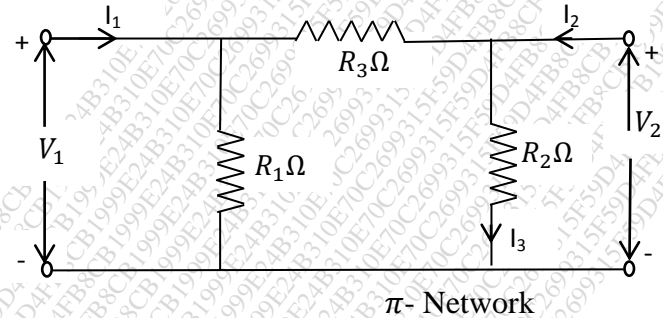 e) Define decibel and Neper.
 f) State Millman's theorem.

2

g) Convert

To   voltage source

5A   20Ω

Q.7   a)   Use superposition theorem to find I in circuit.   10

$4\sqrt{2}\sin 1000\, t\, A$ 4Ω $10\sqrt{2}\cos(1000\, t - 25°)$

   b)   Compare Thevenin's theorem with Norton's theorem.   05

Q.8   a)   Determine the Z-parameters of the circuit as below.   08

π- Network

   b)   Explain Hybrid parameters?   07

Q.9   a)   Design constant K High pass filter having f_c= 4KHz and design impedance $R_0 = 600\Omega$ for π 08
           section

   b)   Why to study m-derived filters. Derive m for m derived low pass filter?   07

Q.10 Write notes on: 15
      a)   Maximum power transfer theorem
      b)   Y-parameters
      c)   Millman's Theorem in detail.

3

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-362
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (ECT/E&C/IE) (CGPA)
Network Analysis
[REV]

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.
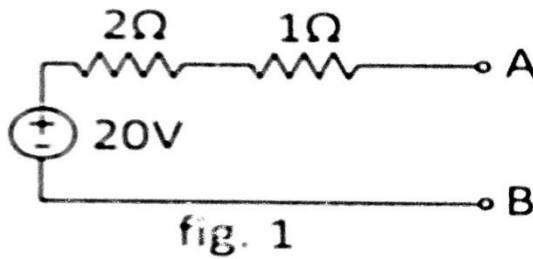
N.B   1. Q.1 and Q.6 are compulsory.
        2. Solve any two from Q.2 Q.3, Q.4 and Q.5.
        3. Solve any two from Q.7 Q.8, Q.9 and Q.10.
        4. Figures to the right indicates full marks.
        5. Assume suitable data, if necessary.

Section A

Q.1   Solve any five: 10
        a) Which law is used to solve a circuit by mesh analysis?
        b) Convert given circuit into equivalent current source as shown in fig.1

fig. 1

        c) Write formulae for delta to start transformation.
        d) With an example, write tie set schedule.
        e) How to achieve resonance in series RLC circuit.
        f) In parallel resonance, equivalent impedance is called dynamic impedance, why?
        g) How to decide reference node in nodal analysis?

Q.2   a) For the circuit shown in fig.2, write mesh equations.   07

fig. 2

1
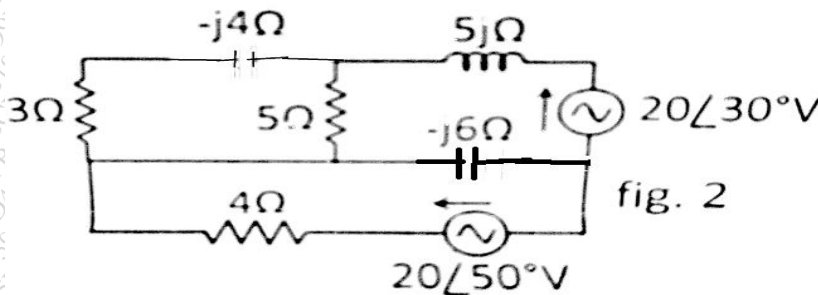
b) In the network shown in fig.3, determine V_a and V_b by node analysis. 08
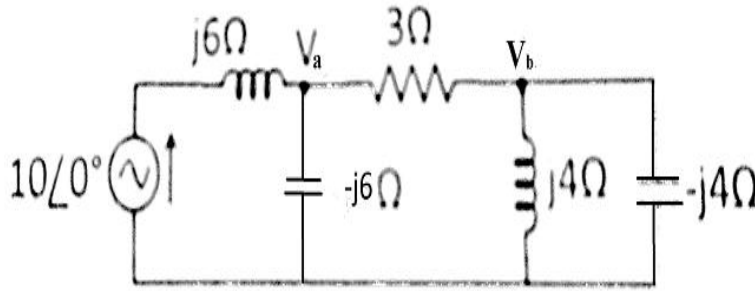

fig. 3

Q.3 a) For given graph in fig. 4, write tie set matrix and obtain network equilibrium equation in matrix form using KVL. 08
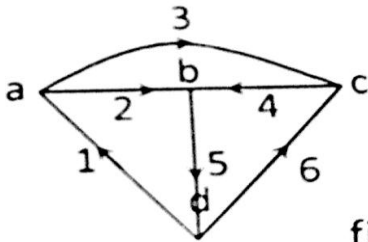
fig. 4

b) Draw the oriented graph for incidence matrix. 07

$$A = \begin{bmatrix} 1 & 1 & 0 & 0 & 0 & 0 \\ 0 & -1 & 1 & -1 & 0 & 0 \\ -1 & 0 & -1 & 0 & -1 & 0 \end{bmatrix}$$

Q.4 a) A series RLC circuit consists of 50Ω resistance, 0.2H inductance and $10\mu F$ capacitor with applied voltage of 20V. Determine resonant frequency. Find Q factor, compute the lower and upper frequency limits and also find bandwidth of the circuit. 08

b) For the circuit shown in fig.5, determine the value of R_c for which given circuit resonates. 07

fig. 5

2

Q.5   Write short note on the following (any three)   15
        a) Compare series and parallel resonance
        b) Mutual inductance
        c) Network equilibrium equations in matrix form
        d) Principle of duality

Section B
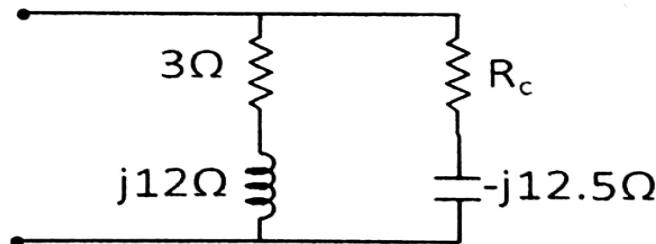
Q.6   Solve any five: 10
        a) Write Z-parameters in terms of ABCD parameters
        b) State Superposition theorem.
        c) State Reciprocity theorem.
        d) Why Y-parameters are called short circuit parameters.
        e) What are the image parameters?
        f) Differentiate filter on the braising of frequency parameters
        g) Draw equivalent circuit for transmission lines.

Q.7   a) Determine the value of current through $(2 + 3j)\Omega$ using Thevenins theorem for fig.6.   08

fig. 6
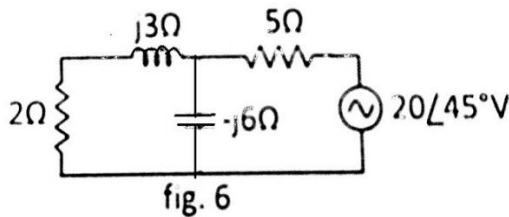
        b) State and prove Millman's theorem.   07

Q.8   a) Show that total equivalent transmission parameters is equal to matrix multiplication of   08
           transmission parameters of individual two port network for cascade connected to two port
           network.

        b) What are different two port network parameters? Explain any one type in details.   07

Q.9   a) Derive relation between Decible and Neper.   07

        b) Design a low pass filter (both π and T-sections) having cut-off frequency of 2KHz to operate 08
           with a terminated load resistance of 500Ω

Q.10   Write short note on the following (any three)   15
        a) Transmission lines
        b) Parameter of filters
        c) Compensation theorem
        d) H-parameters

3

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-396
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (ECT/E&C/IE) (CGPA)
Analog Communication Engineering
(REVISED)

[Time: Three Hours]   [Max.Marks: 80]

Please check whether you have got the right question paper.

N.B
1. Question no.1 question no.6 are compulsory
2. Attempt any two questions from remaining in each section.
3. Figure to right indicate full marks.
4. Assume suitable data if necessary

Section A

Q.1   Solve any five.   10
    a) What is VSB?
    b) Draw the waveform of PAM, PPM & PWM .
    c) What is SSB signal? State types of SSB generation.
    d) What is sampling theorem?
    e) What is fly wheel effect?
    f) Define modulation index of AM. What happen if modulation greater than 1 .
    g) The broadcast radio transmitter radiates 11KW when the modulation index is 60% calculate carrier power.
    h) State functions of RF amplifiers.

Q.2   a) Derive the expression for instantaneous AM modulated signal. Draw spectrum for AM signal.   08

    b) What is need of modulation? Explain in detail.   07

Q.3   a) What are generation methods of FM? Explain any one in detail.   08

OR
    Explain filter method of SSB-SC generation in brief.   08

    b) Derive mathematical expression of FM wave.   07

Q.4   a) What is low & high level modulation? Explain it in detail with block diagram.   08

OR
    Derive expression for total radiated power in terms of modulation index.   08

    b) Draw & explain block diagram of AM radio receiver.   07

1

Q.5   Write short note (any three)   15
     a) ISB system
     b) Pre-emphasis & De- emphasis
     c) Balanced modulator
     d) Multiplexing & Demultiplexing
     e) Narrow hand and wideband FM
     f) Image frequency & its rejection.

Section B

Q.6   Solve any five questions.   10
     a) Explain concept of double spotting.
     b) Define noise. Give any four type of noise.
     c) Define AGC and state its type.
     d) Define Bandwidth and beam width of antenna.
     e) What is the function of amplitude limiter?
     f) What are the source of noise?
     g) Draw the block diagram of FM radio receiver.

Q.7   a) Explain image frequency and its rejection How to avoid image frequency in AM receiver? 08

     b) Draw and explain super heterodyne receiver.   07

Q.8   a) What type of mixers used in AM receiver? Explain any one in detail.   08

     b) Explain noise calculation in detail   07

Q.9   a) Explain space wave propagation in detail.   08

     b) What is ionosphere? Explain reflection of sky wave in ionosphere.   07

Q.10   Write short note on (any three)   15
     a) Dipole antenna
     b) Slop detector
     c) If amplifier
     d) MUF
     e) Yaggi Uda T.V. Antenna.

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-339
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (EC/ECT/E&C)
Embedded Systems
(REVISED)

[Time: Three Hours]   [Max.Marks: 80]

Please check whether you have got the right question paper.

N.B
1) Q.No.1 & Q.No.6 are compulsory.
2) Solve any 2 questions from remaining from each section.
3) Assume suitable data wherever necessary.
4) Figures to right indicate full marks.

Section A

Q.1   Solve any 2 questions from following.   10
  a) Define embedded system & explain its applications.
  b) Explain in brief ARM nomenclature and core extensions.
  c) Discuss on chip WDT in ARM processor.

Q.2   a) Compare RISC and CISC processor and 3-stage pipelining in ARM family.   08
        b) Discuss in detail common design metrics and its optimization in embedded system.   07

Q.3   a) Explain with neat diagram CAN protocol discussing its message format.   08
        b) Explain in detail with neat diagram about ARM core architecture.   07

Q.4   a) Discuss MSR, MRS and SWAP instruction in ARM core.   08
        b) Write an ARM7 based program to transfer 16 bytes of data from one memory array to another   07
           memory array.

Q.5   Write short notes on:-(Any Three)   15
  a) Load Store Instruction.
  b) On-chip times in ARM7
  c) CPSR and SPSR.
  d) ARM Bus architecture.

Section B

Q.6   Answer any two from the following.   10
  a) Explain memory management in RTOS.
  b) Explain RTOS kernel architecture.
  c) State difference between Desktop OS and RTOS.

Q.7   a) Write an embedded C program with neat interfacing diagram to blink 4 LED's connected to   08
           port1 with small delay.
        b) Explain in brief need of interfacing and interfacing techniques in embedded system.   07

1

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Q.8   a) Define and give classification of semaphore and explain need of semaphore.   08

        b) Define RTOS and compare its services with traditional operating system.   07

Q.9   a) Explain porting RTOS in detail.   08

        b) Explain in detail μcos-II service functions.   07

Q.10   Write short notes on:(Any Three)   15
  a) ARM based Smart Card.
  b) Task state and task scheduling.
  c) Features and use of μcos-II.
  d) Mail boxes.

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-395
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EC/ECT/IEC/E&C)
Communication Engineering
(OLD)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B
1. Question no.1 question no.6 are compulsory
2. Solve any two from remaining question from each section.
3. Figure to right indicate full marks.
4. Assume suitable data if necessary

Section A

Q.1   Solve any five   10
a) What is mean by intermediate frequency? Give its typical values for AM and FM.
b) State formula for modulation index of AM and FM.
c) Define flywheel effect in modulation.
d) What are the different method of suppressing carrier & unwanted side bands?
e) Define selectivity and sensitivity.
f) Define angle modulation? Where it is used?
g) What is function of balanced modulator?

Q.2   a) Derive expression for total radiated power in terms of modulation index and total radiated   08
          current of AM wave.

        b) Explain ISB with Block diagram.   07

Q.3   a) Explain the direct method for generation of FM signal. State the limitations of direct   08
          method of FM generation.

        b) Derive and explain mathematical expression of FM wave.   07

Q.4   a) Explain image frequency and its rejection. How to avoid image frequency in AM receiver?   08

        b) Draw the circuit diagram of delayed AGC and explain the function with appropriate wave   07
          forms.

Q.5   Write short note on (any three)   15
a) Comparison of AM & FM and PM
b) Tracking
c) Phase shift method of SSB Generation
d) VSB
e) Noise and its type.

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Section B

Q.6 Solve any five questions. 10
- a) State the sampling theorem
- b) State different types of microphone
- c) Draw the internal structure of loud speaker
- d) Define TDM and FDM
- e) State the types of FM demodulator.
- f) What is function of mixer in receiver
- g) State the advantages of RF amplifier.

Q.7 a) Draw and explain the block diagram of FM receiver. 08

b) What are different SSB demodulator? Explain any one in detail. 07

Q.8 a) Draw the block diagram of differential PCM and explain the same in detail. 08

b) What are the different analog pulse modulation type? Explain any one in detail. 07

Q.9 a) Explain principle of optical & magnetic recording. 08

b) Explain Horn type loudspeaker . 07

Q.10 Write short note on (any three) 15
- a) Amplitude limiter
- b) PA system
- c) Carbon microphone
- d) Baffles & enclosures
- e) Tone control system

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-431
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (ECT/E&C/IE) (CGPA)
Data Structure and Linux
(REVISED)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B
(i) Q. No.1 and Q. No.6 are compulsory.
(ii) Attempt any two questions from Q.2 to Q.5 and from Q.7 to Q.10 of each section.
(iii) Figure to the right indicate full marks.

Section A

Q.1   Attempt any FIVE of the following   10

(a) Explain queue Full and queue empty condition.
(b) Differentiate between static and dynamic memory allocation.
(c) What is stack? Explain role of top.
(d) What is inorder traversal? Give an example.
(e) Give applications of queue.
(f) Define priority queue. What are types of priority queue?
(g) What is recursion? Give an example.
(h) Give linked representation of binary tree.

Q.2   (a) Write C program for stack using array.   08
       (b) What is array? Write C program to input elements into array and then print all the elements. 07

Q.3   (a) Explain Following algorithms,   08
       (i) Insert a node at the beginning and at the end of doubly linked list
       (ii) Deleting a node from doubly linked list

       (b) Construct the binary tree from given following traversals.   07
       Pre-order   ABDHECFG
       In-order   DHBEAFCG

Q.4   (a) Show how to represent polynomials using linked list. Add A and B using linked 08
       representation.
       $A = 5X^4 + 2X + 3$
       $B = 6 X^5 + 3X^4 + 2X^2 + 1$

       (b) Write array as an ADT.   07

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Q.5   (a) Consider Following circular queue capable of accommodating maximum six elements   08
Rear = 4, front = 2
Queue : ___,   L,M,N,___,___
(__ is used to denote empty memory cell)
Describe the queue as the following operations take place,
(i) Add O
(ii) Add P
(iii) Delete two letters
(iv) Add Q,R,S
(v) Delete one letter

    (b) What is graph? Explain different graph representation techniques.   07

Section B

Q.6   Attempt any FIVE of the following   10

    (a) What is the purpose and advantage of quick sort?
    (b) Consider the situation in which assignment operation is very costly. Which sorting algorithm should be used so that the number of assignment operations is minimized in general?
    (c) What is external sorting algorithm?
    (d) Enlist types of shell in Linux.
    (e) Give any Four major application areas in Linux.
    (f) Differentiate between GUI and CLI
    (g) Give four differences between Linux OS and Windows OS.
    (h) Discuss File naming conventions in Linux

Q.7   (a) With example, explain algorithm for selection sort.   08
    (b) With suitable diagram, explain Linux file system tree.   07

Q.8   (a) Explain various commands used for user group management in Linux   08
    (b) With neat labeled diagram, explain Linux architecture   07

Q.9   (a) Explain history of Linux in brief Also mention major application areas of Linux.   08
    (b) Explain seven file attributes associated with Linux file.   07

Q.10   (a) Explain quick sort algorithm with an example.   08
    (b) Explain different file handling commands in Linux with an example.   07

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-430
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EC/ECT/IEC/E&C)
Data Structure
(OLD)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B   i) Que. No.1 & Q. No.6 are compulsory.
                ii) Attempt any two questions from Q.2 to Q.5 and any two questions
                from Q.7 & Q.10.

Section A

Q.1   Answer any five   10

        (i)   What is data structure?
        (ii)   Define linked list
        (iii)   Explain one dimensional array with example
        (iv)   What is function?
        (v)   What is searching?
        (vi)   What is push?
        (vii)   What is queue?
        (viii) How to delete element from link list.

Q.2   (a) Define ADT and explain with an example.   08
        (b) Explain application of stack.   07

Q.3   (a) Write an algorithm to convert infix expression to postfix expression.   08
        (b) Explain different operation on singly linked list.   07

Q.4   (a) Explain doubly linked list.   08
        (b) What is structure explain with example.   07

Q.5   Write short notes on (any three)   15
        1) Stack
        2) Circular Queue
        3) Applications of linked lists
        4) Operation on linked list

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Section B

Q.6   Answer any five   10

      i)   Explain graph with example?
      ii)   What is height of tree?
      iii)   What is shortest path?
      iv)   Explain binary tree
      v)   What is sorting?
      vi)   What is selection sort?
      vii)   What is tree explain with example?
      viii) Explain heap sort

Q.7   (a) Explain BFS with an example.   08
      (b) Explain tree traversal   07

Q.8   (a) Explain binary search tree   07
      (b) Sort the following numbers using heap sort   08
          23 55   46 35 10 90 84 31

Q.9   (a) Explain application of tree.   07
      (b) Explain bubble sort with an example.   08

Q.10   Write short notes on (any three)   15
          (a) B trees
          (b) Operation on binary tree
          (c) Prim's algorithm
          (d) Spanning tree

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Total No. of Printed Pages:02

SUBJECT CODE NO:- H-170
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EC/ECT/IEC/E&C)
Digital Logic Design
(REVISED)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B   i.   Question No.1 from section A and Question No.6 from section B are
                    compulsory.
            ii.   From the remaining, solve two questions from each section.
            iii.   Figures to the right indicate full marks.

Section A

Q.1   Solve any five questions of the following.   10

        a) Give the classification of integrated circuits according to the number of gates.
        b) What are bipolar families?
        c) Define combinational circuits with example.
        d) Define k-map. What is don't care condition?
        e) Explain in brief significance of BCD to 7-segment decoder.
        f) Define encoder & decoder.
        g) Define figure of merit.
        h) Explain Minterm & Maxterm.

Q.2   a) Design a full subtractor using logic gates.   08
        b) Explain operation of Transistor Transistor Logic (TTL).   07

Q.3   a) Reduce the following expression using k-map and implement.   07
            $$F(A,B,C,D) = \Sigma m(2,3,8,10,11,12,14,15)$$
        b) Simplify the logic function using the Quine-McCluskey method   08
            $f(A,B,C,D) = \Sigma m(1,3,7,11,15) + d(0,2,5)$

Q.4   a) Design a full adder using 8:1 multiplexer.   08
        b) Explain parallel adder IC 7483.   07

Q.5   Write short notes on (any three)   15

            i.   BCD to seven segment decoder.
            ii.   Comparator
            iii.   Demultiplexers
            iv.   ECL(Emitter Coupled Logic)
            v.   Characteristics of digital ICs.

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Section B

Q.6   Solve any five of the following.   10

        a) State applications of flip flop.
        b) Compare synchronous & asynchronous counter.
        c) Explain Race-around condition.
        d) How D-flip-flop works?
        e) Define sequential logic circuit with an example.
        f) Compare static and dynamic RAM.
        g) What is architecture in VHDL?
        h) Explain truth table of SR-flip flop.

Q.7   a) Explain operation of JK flip flop using NAND gates.   07
        b) Design 4-bit asynchronous up-down counter.   08

Q.8   a) Explain operation of universal shift-register.   07
        b) Clarify the following term: 08
            i.   State diagram
            ii.   State table
            iii.   State assignment
            iv.   State reduction

Q.9   a) Compare EPROM and EEPROM.   07
        b) Briefly explain three basic modeling styles provided by VHDL.   08

Q.10   Write short notes on (any three)   15

        i.   Mealy machine
        ii.   Memory classification
        iii.   Ring counter
        iv.   Data objects in VHDL
        v.   IC 7490.

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Total No. of Printed Pages:03

SUBJECT CODE NO: H-135
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EC/ECT/IEC/E&C)
High Speed Analog Devices
(REVISED)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.
N.B   1) Q.1 and Q.6 are Compulsory.
             2) Attempt any two remaining questions from each section.
             3) Assume Suitable data if necessary.

SECTION – A

Q.1   Solve any five of the following.   10

       i)   Draw Precision full wave rectifier.
       ii)   List any four application of AD847.
       iii)   Enlist the specification of IC AD8001.
       iv)   What do you mean by free running, capture and lock range.
       v)   Draw the schematic of non inverting amplifier.
       vi)   Compare ideal and practical characteristics of op-amp.
       vii)   Define CMRR and PSRR.
       viii) For the instrumentation amplifier determine the value of R_G if the gain required is 100,
              the values of various resistances are $R_1 = 100k\Omega, R_2 = 200k\Omega$ and $R_F = 670k\Omega$.

Q.2   a) What is virtual ground? Explain building blocks of operational amplifier in detail.   08

       b) The 741 Op-Amp having following parameter is connected as a non inverting amplifier with   07
           $R1 = 1K\Omega \& Rf = 10K\Omega$ A $= 200,000$, Ro $= 75\Omega$, Ri $= 2M\Omega$, Fo $= 5HZ$, supply voltage
           $= \pm15V, O/P$ voltage swing $= \pm13V$. Calculate the values of Af, Rif, Rof, Ff.

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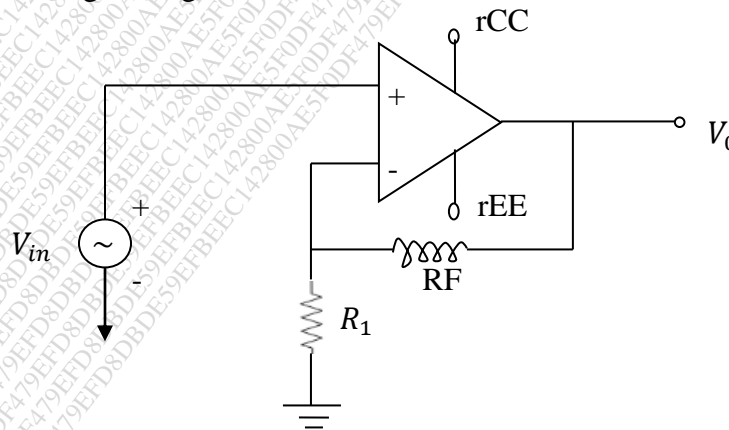
Q.3   a)   Explain the operation of precision full wave rectifier with circuit diagram and waveforms.   07

         b)   Explain the operating principle of PLL and also application of PLL as a Frequency Synthesizer.   08

Q.4   a)   Explain CFB model and Bode plot in detail of CFB op-amp.   08

         b)   Give the Noise comparisons between CFB and VFB op-amps.   07

Q.5   Write Short Note on <u>any three</u>   15

         i)   Sample and Hold Circuit

         ii)   Binary waited D-A converter.

         iii)   Scaling and averaging amplifier.

         iv)   V to F Converter.

SECTION – B

Q.6   Solve <u>any Five</u>   10

         i)   Give the relation between sampling rate, resolution and architecture.

         ii)   List any four unique features of HBT.

         iii)   List the material used for high speed devices circuits?

         iv)   Draw the diagram of Pipelined ADC's.

         v)   Explain need of high speed devices and circuits.

         vi)   Give the comparison between successive approximation and pipelined ADC's.

Q.7   a)   Explain in detail principle and operation of high electron mobility transistors.   08

         b)   Explain in detail the principle of operation and benefits of hetero junction BJT for high speed applications.   07

Q.8   a) Explain High performance video line drivers.   08

        b) What is bandwidth flatness? Explain the optimizing feedback network for maximum bandwidth flatness.   07

Q.9   a) List types of ADC. Explain the Successive approximation ADC's in detail.   07

        b) Explain high speed ADC applications in ultrasound.   08

Q.10   Write Short Note on (<u>Any Three</u>)   15

        i)   Cable drivers and receivers.

        ii)   ADC application in software radio.

        iii)   Construction of HEMT.

        iv)   Pipeline ADC.

        v)   High speed clamping amplifiers.