(DEC 211)

B.Tech. DEGREE EXAMINATION, DECEMBER 2012.

(Examination at the end of Second Year)

Electronics and Communications

Paper I – MATHEMATICS – III

Time : Three hours Maximum : 75 marks

Answer Question No. 1 compulsorily. (15 × 1 = 15)

Answer ONE question from each Unit. (4 × 15 = 60)

1. (a) Write Drichlet's conditions for Fourier series.

(b) Write the complex form of Fourier series.

(c) Write shifting property of Fourier transform.

(d) State Fourier integral theorem.

(e) What do you meant by transcendental equation?

(f) What do you meant by diagonally dominant principle?

(g) Find the Fourier sine transform of $e^{-|x|}$.

(h) Write the Fourier transform of the nth derivative of a function $f(x)$.

(i) Evaluate $\Delta^2(ab^x)$.

(j) Define averaging operator (μ).

(k) What do you meant by inverse interpolation?

(l) Define initial value problem.

(m) Write Gauss - Forward interpolation formula.

(n) Classify the equation $\frac{\partial^2 u}{\partial x^2} + 4\frac{\partial^2 u}{\partial x \partial y} + 4\frac{\partial^2 u}{\partial y^2} - \frac{\partial u}{\partial x} + 2\frac{\partial u}{\partial y} = 0$.

(o) Write Simpsons 3/8 rule.

UNIT I

2. (a) Find the Fourier series expansion for $f(x)$, if

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

Hence deduce that $\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+\ldots..=\frac{\pi^2}{8}$.

(b) Find the complex form of the Fourier series of $f(x)=e^{-x}$ in $-1\le x\le 1$.

Or

(c) Obtain the first three coefficients in the Foureir cosine series for y, where y is given in the following table :

x:	0	1	2	3	4	5
y:	4	8	15	7	6	2

(d) Find the half - range cosine series for the function $f(x)=(x-1)^2$ in the interval $0<x<1$.

UNIT II

3. (a) Express the function $f(x)=\begin{cases}1, & |x|\le 1\\ 0, & |x|>1\end{cases}$ as a Fourier integral. Hence evaluate $\int_0^\infty \frac{\cos\lambda x.\sin\lambda}{\lambda}d\lambda.$

(b) Find the Fourier sine transform of $e^{-|x|}$. Hence show that $\int_0^\infty \frac{x\sin\lambda x}{1+x^2}dx=\frac{\pi e^{-\lambda}}{2}, \lambda>0$.

Or

(c) Use Newton - Raphson method to obtain a root, correct to 3 decimal places, of the equation $x + \log x = 2$.

(d) Solve the system of equations by iterative method

$83x + 11y - 4z = 95$

$7x + 52y + 13z = 104$

$3x + 8y + 29z = 71$.

UNIT III

4. (a) Find the number of men getting wages between Rs. 10 and Rs. 15 from the following table :

Wages in Rs:	0–10	10–20	20–30	30–40
Frequency :	9	30	35	42

(b) Use stirlings formula to find y_{28}, given that $y_{20} = 49225$, $y_{25} = 48316$, $y_{30} = 47236$, $y_{35} = 45926$, $y_{40} = 44306$.

Or

(c) Find polynomial $f(x)$ which takes the values

x:	0	1	2	5
$f(x)$:	2	3	12	147

(d) For what value of x is the following tabulated function a minimum

x:	0.2	0.3	0.4	0.5	0.6	0.7
y:	0.9182	0.8975	0.8873	0.8862	0.8935	0.9086

UNIT IV

5. (a) Evaluate $\int_0^{\pi} t.\sin t dt$ using trapezoial rule.

(b) Given that $\frac{dy}{dx} = \frac{x^2}{y^2+1}$, $y(0) = 0$. Use Picard's method to obtain y for $x = 0.25$, 0.5 and 1.0 correct to three decimal places.

Or

(c) Given that $\frac{dy}{dx} = y - x$, $y(0) = 2$. Use Runge - kutta method of fourth order to find $y(0.1)$ and $y(0.2)$, correct to three decimal places.

(d) Solve $\frac{dy}{dx} = 1 + xy$, $y(0) = 1$ using Taylor series method and compute $y(0.1)$ correct to 4 decimal places.

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(DEC 212)

B.Tech. DEGREE EXAMINATION, DECEMBER 2012.

(Examination at the end of Second Year)

Electronics and Communications

Paper II — CIRCUIT THEORY

Time : Three hours Maximum : 75 marks

Answer Question No. 1 compulsory. (15 × 1 = 15)

Answer ONE question from each Unit. (4 × 15 = 60)

1. Answer the following :

(a) Define current devision rule.

(b) Define link.

(c) Define form factor.

(d) Write any two advantages of 3-ϕ system.

(e) Explain Millman's theorem.

(f) Explain about nodal analysis.

(g) Explain about source transformation.

(h) What is final value theorem?

(i) Define 'Q' factor.

(j) State superposition theorem.

(k) Define time constant.

(l) Define resonance. What is the condition resonance for an series RLC circuit.

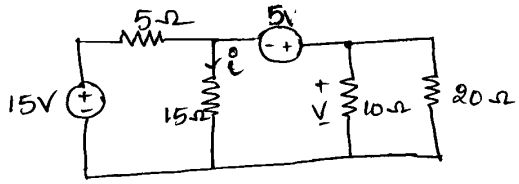
(m) Explain about power factor.

(n) What is the significance of 'J' notation?

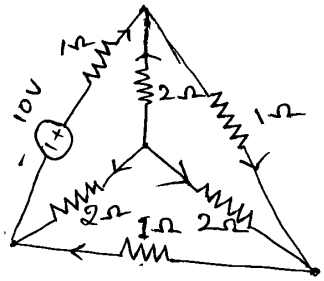
(o) Find the laplace transform of $f(t) = t \sin 2t$.

UNIT I

2. (a) Find V and i using mesh analysis for the following circuit.

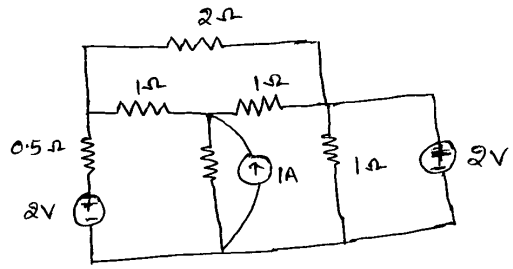


(b) For the circuit Draw the graph and write down the tie set matrix.

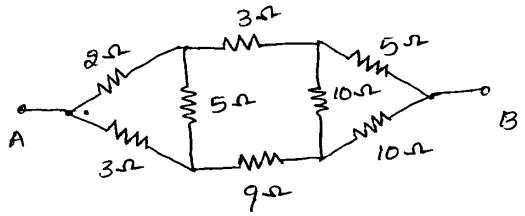


Or

(c) For the circuit determine current through $2\,\Omega$ resistor.

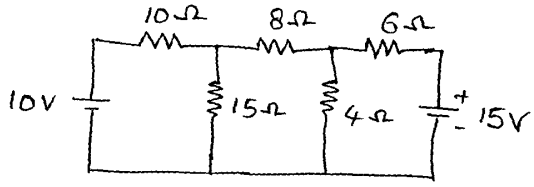


(d) Find the voltage to be applied across AB in order to drive a current of 5A, into the circuit by using star-delta-transformation.

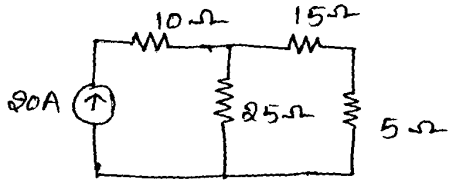


UNIT II

3. (a) Obtain current through 8Ω resistance using thevenins theorem for the circuit.

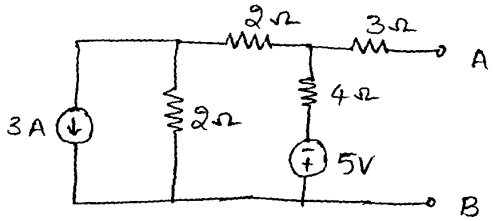


(b) Find the voltage across 5Ω and verify reciprocity theorem.



Or

(c) Find the value of R_L to be connected between the terminals AB for maximum power transfer.

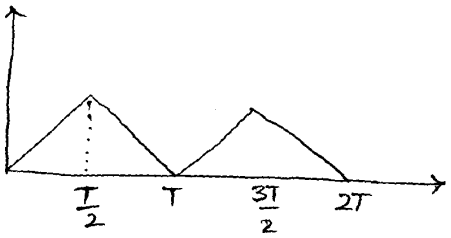


(d) Find the following for the triangular waveform :

(i) RMS value

(ii) Average value

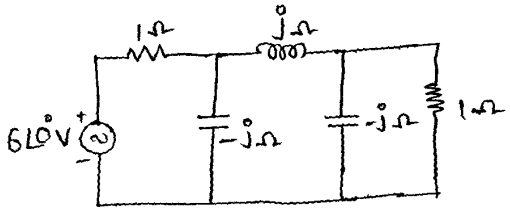
(iii) Form factor.



UNIT III

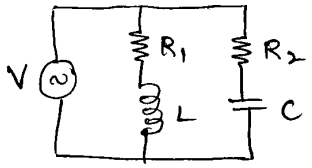
4. (a) For a series RLC circuit, Derive the relationship between Bandwidth, resonance frequency and quality factor.

(b) Find i using Norton's theorem.

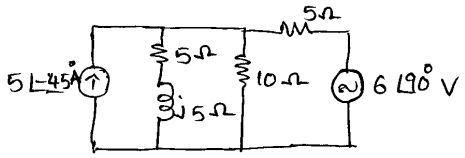


Or

(c) Find the resonant frequency of the circuit.



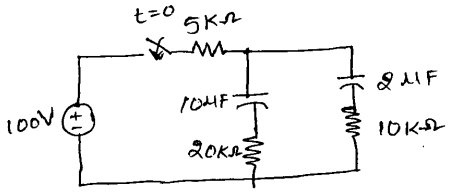
(d) Find current i in 10 Ω resistance using Millman's theorem.



UNIT IV

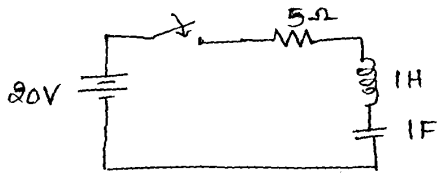
5. (a) Three impedances $4\angle 30^\circ\ \Omega$, $5\angle -20^\circ\ \Omega$, $10\angle 0^\circ\ \Omega$ are connected in star and are supplied from 50 V, 50 Hz 3ϕ source. Obtain line currents and power drawn by each impedance.

(b) Find $i(t)$ using laplace transform. If switch is closed at t = 0.



Or

(c) In a series RLC circuit, A DC voltage is applied at t = 0 obtain $i(t)$ using differential equation approach.



(d) A balanced $3-\phi$ star connected load draws 10 kW from 3-ϕ balanced system of 400 V, 50 Hz. While the line current is 75 A find the circuit element of the load?

(DEC 213)

B.Tech. DEGREE EXAMINATION, DECEMBER 2012

(Examination at the end of Second Year)

Electronics and Communications

Paper III — ELECTRONIC DEVICES

Time : Three hours Maximum : 75 marks

Answer Question No.1 compulsorily (15 × 1 = 15)

Answer ONE question from each Unit (4 × 15 = 60)

1. (a) What is pure intrinsic semiconductor?

(b) Explain abart force in magnetic field.

(c) State Mass-action law.

(d) Write the applications of Zener diode.

(e) Explain Avalanche breakdown.

(f) What is a thyristor?

(g) Explain the early effect.

(h) Explain thermal runaway.

(i) Write the comparison of MOSFET with JFET.

(j) Write the applications of U.J.T.

(k) Define Hall effect.

(l) What is meant by diffusion current in a semiconductor?

(m) Write the applications of transistor.

(n) Explain photo transistor.

(o) List out the advantages of LCD.

UNIT I

2. (a) Derive the equation for magnetic deflection in a CRT.

(b) Derive the continuity equation in semiconductor.

Or

3. (a) Draw the energy band diagram of a PN junction and explain.

(b) Derive the conductivity equation for N-type and p-type semiconductor.

UNIT II

4. (a) Explain V-I characteristics of a PN junction diode.

(b) Explain the principle behind the varactor diode and list out its applications.

Or

5. (a) Explain about LED and write the advantages and disadvantages.

(b) Explain the term diffusion capacitance C_D of a forward bias diode.

UNIT III

6. (a) For common emitter-bipolar junction transistor configuration, analyse the input and output characteristics.

(b) Derive the relationship between α, β and γ.

Or

7. (a) Draw a fixed bias circuit and derive an expression for the stability factor.

(b) Draw and explain of an NPN junction transistor CB configuration.

UNIT IV

8. (a) Draw the V-I characteristics of a DIAC and explain its working principle.

(b) Describe the working principle of an SCR with V-I characteristic.

Or

9. (a) Explain the working of n-channel enhancement type MOSFET.

(b) Write short note on UJT.

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(DEC 214)

B.Tech. DEGREE EXAMINATION, DECEMBER 2012

(Examination at the end of Second Year)

Electronics and Communications

Paper IV — EMF THEORY

Time : Three hours Maximum : 75 marks

Answer Question No.1 compulsorily. (15 marks)

Answer ONE question from each Unit. (4 × 15 = 60)

1. (a) Write the wave equation $\overline{E}$ and $\overline{H}$ in free space. (2)

(b) Write the point form of Maxwell's equation in static fields. (2)

(c) State Helmholtz theorem. (1)

(d) Define Coulomb's law. (1)

(e) Define Biot-Savart's law. (1)

(f) Explain about polarization. (2)

(g) Define skin depth. (1)

(h) Mention the properties of uniform plane wave. (2)

(i) What are the different types of charge distributions and give an example for each one? (3)

UNIT I

2. (a) Derive an expression for static electric field due to infinite sheet of charge using Coulomb's law.

(b) Derive the Laplace equation for static electric field.

Or

3. (a) Obtain the expression for stored energy density in Electrostatic field.

(b) State and prove Gauss' law.

UNIT II

4. (a) Obtain the magenetic boundary conditions.

(b) Planes $Z = 0$ and $Z = 4$ carry current $K = -10\,\bar{a}_x$ A/m and $K=10\,\bar{a}_x$ A/m respectively. Determine $\overline{H}$ at (1,1,1).

Or

5. (a) Using Ampere's circuit law, find $\overline{H}$ due to infinitely long straight conductor.

(b) Explain the concept of scalar and vector magnetic potentials.

UNIT III

6. (a) Express Maxwell's equations in phasor form and time varying fields.

(b) Given $\overline{E} = \sin(\omega t - \beta z)\ \bar{a}_y$ V/m in free space. Determine $\overline{D}$ and $\overline{B}$.

Or

7. (a) Discuss about inconsistency of Ampere's law and displacement current density.

(b) What are the different ways of EMF generation? Explain with the governing equation.

UNIT IV

8. (a) State and prove Poynting theorem.

(b) Determine the intrinsic impedance in free space for a uniform plane wave.

Or

9. (a) Derive an expression for reflection coefficient in parallel polarization.

(b) Determine propagation constant and phase velocity of uniform plane wave in good conductor materials.

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(DEC 215)

B.Tech. DEGREE EXAMINATION, DECEMBER 2012.

(Examination at the end of Second Year)

Electronics and Communications

Paper V — DIGITAL ELECTRONICS

Time : Three hours Maximum : 75 marks

Answer Question No. 1 compulsorily. $(15 \times 1 = 15)$

Answer ONE question from each Unit. $(4 \times 15 = 60)$

1. (a) Define Flip-Flop.

(b) Convert gray code 101011 into its binary equivalent.

(c) Write the truth table of EX-NOR gate.

(d) Write the main advantages of ECL gate.

(e) Obtain the dual of the Boolean expression $F = AB + ABC'$.

(f) Explain Demultiplexer.

(g) Draw master slave JK Flip-Flop.

(h) Explain about shift register.

(i) Explain sequential logic circuits.

(j) What are the limitations of K-map?

(k) Write the applications of seven segment display decoder.

(l) Using 10's complement, subtract $(3250)_{10}$ from $(72532)_{10}$.

(m) Write about priority encoder.

(n) Which is the fastest among IC logic families?

(o) What are universal gases?

UNIT I

2. (a) Convert the following number

(i) $(41.6875)_{10}$ to binary

(ii) $(1001001.011)_2$ to Decimal

(iii) $(2AC5.D)_{16}$ to octal.

(b) Simplify the following Boolean expression to a minimum number of literals

(i) $F = A'C + ABC + AC'$

(ii) $F = (x'y' + z)' + z + xy + wz$

(iii) $A = (A' + C)(A' + C')(A + B + C'D)$.

Or

3. (a) Simplify the Boolean function using K-maps.

$F(A, B, C, D) = \sum m(0,1,2,8,10,11,14,15)$.

(b) Prove that AND-OR network is equivalent to NAND-NAND network.

UNIT II

4. (a) Implement a full adder circuit with a multiplexers.

(b) A combinational circuit is defined by the following three functions $F_1 = x'y + xyz'$, $F_2 = x' + y, F_3 = xy + x'y'$. Design a circuit with a decoder and external gates.

Or

5. (a) A receiver with even parity Hamming code is received the data as 1110110. Determine the correct code.

(b) Explain Encoder and write the truth table of octal to Binary Encoder.

UNIT III

6. (a) What is race-around problem in JK Flip-Flop? Explain how is eliminated in master slave JK Flip-Flop.

(b) Design mod–10 counter using T Flip-Flop.

Or

7. (a) Compare synchronous and Asynchronous.

(b) Draw and explain about-Edge-Trigged D-Flip-Flop.

UNIT IV

8. (a) Explain about Transistor – Transistor logic. Also mention the types of output configuration.

   (b) Explain various logic families.

Or

9. (a) Design a BCD to Excess-3 code converter and Impliment using PLA.

   (b) Explain the function of programmable Array logic.

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(DEC 216)

B.Tech. DEGREE EXAMINATION, DECEMBER 2012.

(Examination at the end of Second Year)

Electronics and Communications

Paper VI — DATA STRUCTURES USING C

Time : Three hours Maximum : 75 marks

Answer Question No. 1 compulsorily. (15 × 1 = 15)

Answer ONE question from each Unit. (4 × 15 = 60)

1. (a) Define an Array.

(b) Define sorting.

(c) Define list.

(d) Define stack.

(e) Define queue.

(f) Define Searching.

(g) Define Traversing.

(h) Define Sibling.

(i) Define full binary tree.

(j) Define Generation.

(k) Define AVL tree.

(l) Define depth of tree.

(m) Define merging.

(n) What is Hashing?

(o) Define level of tree.

UNIT I

2. (a) Explain about various operation in single linked list.

(b) Explain the concept of circular linked lists.

Or

(c) Write procedures of various operations in C for double linked list.

(d) Write a program that implements single linked list.

UNIT II

3. (a) Explain various operations involved in stack with a C program.

(b) Write a procedure for converting infix to post fix.

Or

(c) How can implement queue in constructing linked list?

(d) Write a 'C' procedure that evaluating post fix expression.

UNIT III

4. (a) Explain the concept Quick sort.

(b) Write a 'C' program for bubble sort.

Or

(c) Explain about selection sort.

(d) Explain about Heap sort.

UNIT IV

5. (a) Explain about Binary search.

(b) Explain about Hashing methods.

Or

(a) Explain about Binary tree traversals.

(b) Explain about Binary search tree.

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(DEC 221)

B.Tech. DEGREE EXAMINATION, DECEMBER 2012.

(Examination at the end of Second Year)

Electronics And Communications

Paper I — MATHEMATICS — IV

Time : Three hours Maximum : 75 marks

Answer Question No. 1 compulsorily. (15 × 1 = 15)

Answer ONE question from each Unit. (4 × 15 = 60)

1. (a) State Cauchy's–Riemann equations.

(b) Define analytic function.

(c) Define harmonic function.

(d) State Cauchy integral theorem.

(e) Define circle of convergence.

(f) Define isolated singularity.

(g) Define simple pole.

(h) Write the poles of $f(z) = \dfrac{z-3}{z^2+2z+5}$.

(i) Write Cauchy's integral formula.

(j) State Residue theorem.

(k) Find the value of $\int_{-1}^{1} p_0(x)dx$.

(l) Write Legendre's differential equation.

(m) Write the Bessel's function of the first kind of order η.

(n) Write Rodrigue's formula.

(o) State orthogonality of Bessel's function.

UNIT I

2. (a) Determine the analytic function whose real part is $e^{2x}[x \cos 2y - y \sin 2y]$.

(b) If $f(z)$ is an analytic functions of z, prove that $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right)\left|Rf(z)\right|^2 = 2\left|f'(z)\right|^2$.

Or

(c) State and prove Cauchy Riemann equations is Polar form.

(d) Find the analytic function

$f(z) = u(r, \theta) + iv(r, \theta)$

such that $v(r, \theta) = r^2 \cos 2\theta - r \cos \theta + 2$.

UNIT II

3. (a) Evaluate $\oint_C \frac{\sin \pi z^2 + \cos \pi z^2}{(z-1)(z-2)} dz$ where $c : |z| = 3$.

(b) Expand $f(z) = \frac{z}{(z+2)(z+1)}$ about $z = -2$.

Or

(c) Expand $\frac{1}{z^2 - 3z + 2}$ is the region.

(i) $|z| > 2$

(ii) $0 < |z - 1| < 1$.

(d) Evaluate $\oint_C (z - a)^n dz$, where n is an integer $\neq -1$ and $C : |z - a| = r$.

UNIT III

4. (a) Using residue theorem, evaluate

$$\oint_C \frac{z-3}{z^2+2z+5}\,dz$$, where C is the circle $|z+1+i|=2$.

(b) Solve is series of the equation

$$x(1-x)\frac{d^2y}{dx^2} - (1+3x)\frac{dy}{dx} - y = 0$$

Or

(c) Evaluate $\oint_C \tan z\,dz$, where $C : |z| = 2$.

(d) Solve in series $x\frac{d^2y}{dx^2} + \frac{dy}{dx} + xy = 0$

UNIT IV

5. (a) Show that $J_n(x) = \frac{x}{2n}[J_{n-1}(x) + J_{n+1}(x)]$.

(b) Express the function $f(x) = x^3 - 5x^2 + x + 2$ in terms of Legendre's polynomials.

Or

(c) Prove that

$(2n+1)xp_n(x) = (n+1)p_{n+1}(x) + np_{n-1}(x)$.

(d) Show that

$$\int_{-1}^{2} x^2 p_{n-1} p_{n+1} dx = \frac{2n(n+1)}{(2n-1)(2n+1)(2n+3)}.$$

(DEC 222)

B.Tech. DEGREE EXAMINATION, DECEMBER 2012

(Examination at the end of Second Year)

Electronics and Communications

Paper II — ELECTRONICS CIRCUITS – I

Time : Three hours Maximum : 75 marks

Answer Question No.1 compulsorily. (15 × 1 = 15)
Answer any ONE question from each Unit. (4 × 15 = 60)

1. (a) What is the PIV of diodes in Bridge rectifier?

(b) Explain L-section and π-section filters.

(c) Draw approximate hybrid model for a transistor in CE.

(d) Explain Miller's theorem.

(e) Sketch Cascade amplifier in CE-CB configuration.

(f) What is gain bandwidth product?

(g) For a Cascade amplifier of two stages, gain of stage 1 is 20 dB and gain of second stage is 30 dB. Then what is overall gain?

(h) Explain FET amplifiers.

(i) What are the factors that affect high frequency response of RC coupled amplifer?

(j) Define β cut-off frequency at high frequency in a transistor.

(k) What are the advantages of Half wave and Full wave rectifier?

(l) Define α, β, γ of a transistor.

(m) Explain emitter follower.

(n) Define figure of merit.

(o) What is the need of coupling and bypass capacitors?

UNIT I

2. (a) Draw the circuit diagram of CLC filter and derive ripple factor and efficiency.

(b) Explain the operation of Bridge rectifier circuit with neat input and output waveform.

Or

3. (a) Derive the ripple factor and percentage regulation of half wave rectifier.

(b) What are the advantages of Bridge rectifier over centre tapped full wave rectifier?

UNIT II

4. (a) Explain about Boot strapped Darlington pain.

(b) Derive the expression for A_{VS}, A_{IS}, R_i, R_o of transistor amplifier using CB configuration.

Or

5. (a) Draw and explain about emitter coupled amplifier.

(b) Draw the h-parameter equivalent circuits for CE and CC amplifier and derive various parameters.

UNIT III

6. (a) Draw and explain of single stage CE amplifier.

(b) Explain in detail about CE short circuit current gain with resistive load.

Or

7. (a) Why CC amplifier is called as emitter or followed and explain its behaviour at high frequencies?

(b) Derive the expression for CE short circuit current gain A_i as a function of frequency.

UNIT IV

8. (a) Explain the principle operation of RC coupled and its frequency response.

   (b) Explain about common source, common drain and common gate amplifier at low frequencies and compare them.

Or

9. (a) Explain effect of emitter bipass capacitor on overall response.

   (b) Analyse FET amplifier at high frequency.

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(DEC 223)

B.Tech. DEGREE EXAMINATION, DECEMBER 2012

(Examination at the end of Second Year)

Electronics and Communications

Paper III — TRANSMISSION LINES & WAVES

Time : Three hours Maximum : 75 marks

Answer Question No.1 compulsorily. (15 marks)
Answer ONE question from each Unit. (4 × 15 = 60)

1. (a) State the important properties of the infine line. (2)

(b) Define wave length of the line. (2)

(c) Define node and antinode. (2)

(d) Give two applications of smitch chart. (2)

(e) Write the expression for phase velocity in uniform plane wave. (2)

(f) Find the cut-off frequency for $T_{E_{10}}$ mode. (2)

(g) What is the guide wave length in strip type of Transmission line? (2)

(h) What types of Transmission mode is possible in strip type of Transmission line? (1)

UNIT I

2. (a) Derive the expression for α and β for continuous load line.

(b) What are the various types of distortion lines?

Or

3. (a) Derive the expression for insertion loss of a line.

(b) Write a note on Telephone cable.

UNIT II

4. (a) Explain briefly properties of Smith chart.

   (b) Write the applications quaterwave line.

Or

5. (a) Explain in detail single stub matching on a line.

   (b) Explain in briefly standing wave ratio.

UNIT III

6. Derive an expression for attenuation 'α' in parallel plane guides.

Or

7. Write notes on :

   (a) TE wave

   (b) TM wave

   (c) TEM wave

UNIT IV

8. (a) Discuss the field distribution in Transverse plane.

   (b) Write a short note on Asymmetric strip transmission line.

Or

9. Derive the TM_{mn} modes in a Lossy circuit waveguide, their cutoff frequencies and velocity of propagation.

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(DEC 224)

B.Tech. DEGREE EXAMINATION, DECEMBER 2012

(Examination at the end of Second Year)

Electronics and Communications

Paper IV — NETWORK ANALYSIS AND SYNTHESIS

Time : Three hours Maximum : 75 marks

Answer Question No.1 compulsorily. (15 × 1 = 15)
Answer ONE question from each Unit. (4 × 15 = 60)

1. (a) Define pole of a Transfer function.

(b) What is Network function?

(c) Define attenuation constant.

(d) What is Constant-K filter?

(e) What is cut-off frequency?

(f) What is attenuator?

(g) Define equalizer.

(h) What is symmetrical networks?

(i) What is image constant?

(j) What is an inverse Network?

(k) What is a High-Pass filter?

(l) What is an Immittance?

(m) What is minimum phase Network?

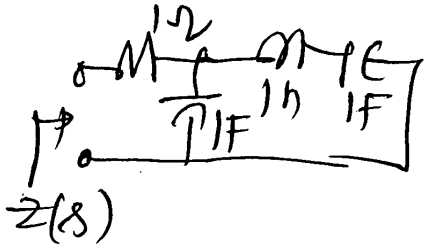
(n) Define filter.

(o) What is characteristic impedance?

UNIT I

2. (a) Draw the pole-zero plot of $z(s) = \dfrac{s(s+5)}{(s+2)(s+8)}$.

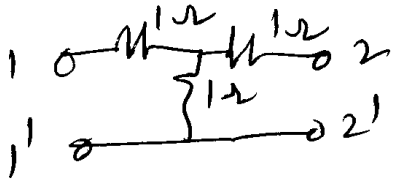
(b) Find $z(s)$ of the following :



Or

(c) What are the properties of poles and zeros?

(d) Find z-parameters of the following :



UNIT II

3. (a) What is the classification of filters?

(b) Design a constant-K low pass filter with f_c = 1000 hz and R_0 = 600 Ω.

Or

(c) Design an m-derived LPF with f_α = 1100 hz, R_0 = 600 Ω, f_c = 1000 hz.

(d) Define cutoff frequency, passband, stopband with respect to filters.

UNIT III

4. (a) Describe about lattice and bridge attenuators.

(b) Explain about constant-resistance equalizer.

Or

(c) Derive equations of π, T attenuators (symmetrical).

(d) What is an equalizer? Explain about Full shunt equalizer.

UNIT IV

5. (a) What are the properties of positive real functions?

(b) Find caner forms of $z(s) = \frac{s(s+2)}{(s+1)(s+3)}$.

Or

(c) Find Foster forms of $z(s) = \frac{(s^2+1)(s^2+16)}{(s^2+4)(s^2+9)}$.

(d) What are the properties of RC impedance functions?

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(DEC 225)

B.Tech. DEGREE EXAMINATION, DECEMBER 2012.

(Examination at the end of Second Year)

ELECTRONICS AND COMMUNICATIONS

Paper V — ELECTRICAL TECHNOLOGY

Time : Three hours Maximum : 75 marks

Answer Question No. 1 Compulsorily. (15 marks)

Answer ONE question from each Unit. (4 × 15 = 60)

1. (a) Write DC generator principle.

(b) What are the applications of DC shunt motors?

(c) What do you mean by Back Emf?

(d) Define Regulation.

(e) Draw the phasor diagram under load conditions.

(f) What are the parameters we will get from OC and SC test?

(g) Draw the troque-slip characteristics of induction motor.

(h) What is the fractional Horse power motor?

(i) What is the principle of stepper motor?

(j) What are the applications of synchronous machines?

(k) What do you mean by optimistic method?

(l) Draw the load characteristics of DC series generator.

(m) Write the EMF equation of the transformer.

(n) Define synchronous impedence.

(o) What is slip?

UNIT I

2. (a) Discuss the various methods of speed control of a DC motor.

(b) A 2-pole DC shunt motor operating from a 200V supply takes a full load current of 35A drawn from the supply. The no load current being 2A. The filed resistance is 5000 and the armature resistance is 0.6 calculate the efficiency of the motor on full load.

Or

3. (a) Describe armature reaction in a DC machine? What are its effects?

(b) Explain Torque equation and load characteristics of DC series motor.

UNIT II

4. (a) Describe the principle of operation of transformer.

(b) Derive the condition for maximum efficiency of single phase transformer.

Or

5. (a) For prederbe mining the efficiency of a single phase transformer, explain with neat circuit diagrams the tests to be conducted on it.

(b) What are the various losses in a transformer? How these losses can be minimized.

UNIT III

6. (a) Explain the methods of starting of 3 phase induction motors.

(b) "Single phase induction motor is not self starting". Explain.

Or

7. (a) Derive the expression for developing torque in a 3 phase induction motor and find the condition for maximum torque.

(b) Draw the torque-speed characteristics of poly phase induction motor and clearly indicate the effect of change in motor resistance.

UNIT IV

8. (a) Describe the principle of operation of Alternator.

(b) Explain the effect of winding distribution and chording on the generated voltage of an Alternator.

Or

9. Write a short notes on

(a) Stepper motors

(b) Methods of starting of synchronous machines

(c) Three-point starter.

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(DEC 226)

B.Tech. DEGREE EXAMINATION, DECEMBER 2012.

(Examination at the end of Second Year)

Electronics and Communications

Paper VI — SIGNALS AND SYSTEMS

Time : Three hours Maximum : 75 marks

Answer Question No. 1 compulsorily. $(15 \times 1 = 15)$

Answer ONE question from each Unit. $(4 \times 15 = 60)$

1. (a) Define Impulse function.

(b) Define Deterministic and Non Deterministic signals.

(c) Show that the signal $x(t) = \sin 15\pi t$ is a periodic signal.

(d) Define energy signal.

(e) State the associative property of LTI system.

(f) State one property of power Spectral Density.

(g) Give the characterisation of an Ideal Filter.

(h) Give the representation of Fourier Integral.

(i) Explain classification of Noise.

(j) Define Sher Noise.

(k) Define Noise temperature.

(l) What is meant by orthogonal function?

(m) What is meant square error?

(n) What is Random Variable?

(o) Give the expression for Energy Spectral Density (ESD).

UNIT I

2. (a) State and prove sampling theorem.

(b) Explain Arising.

Or

(c) Give the properties of Fourier's transform.

(d) Find Fourier's transform of the following signals

(i) $x(t) = A \sin(2\pi \phi_c t) u(t)$

(ii) $x(t) = f(t) \cos(2\pi f_c t + \phi)$.

UNIT II

3. (a) State and explain the properties of LTI system.

(b) Check the following system for linearity.

(i) $y(t) = 5 \sin x(t)$

(ii) $y(t) = fx(t) + 5$.

Or

(c) State and prove Parsevals theorem.

(d) Write a note on Power Spectral Density and its properties.

UNIT III

4. (a) Define Noise figure. Explain mathematically how the first stage determine the overall noise figure in a cascaded amplifier.

(b) Derive the expression for Noise figure of are amplifier.

Or

(c) Explain the noise in circuits with multiple sources.

(d) Write a short note on Thermal Noise.

UNIT IV

5. (a) Explain the Axious of Probability.

(b) Write a note on Total Probability and Bayes Theorem.

Or

(c) Define Exgodic Process. Explain the difference between Exgodic process and stationary process.

(d) A Random variables 'X' has the density function

$$f(x) = \begin{cases} \frac{1}{4} & \text{for} -2 < x < -2 \\ 0 & \text{else where} \end{cases}$$

Obtain :

(i) $p(x < 1)$

(ii) $p(|x| > 1)$

(iii) $p(2x + 3 > 5)$.

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(DME 227/DCE 227/DEC 227)

B.Tech. DEGREE EXAMINATION, DECEMBER 2012.

(Examination at the end of Second Year)

Electronics and Communications

Paper VII — ENVIRONMENTAL SCIENCE

Time : Three hours Maximum : 75 marks

Answer question No.1 Compulsory. (15 × 1 = 15)

Answer ONE question from each unit. (4 × 15 = 60)

All questions carry equal marks.

1. (a) What are the Biotic and Abiotic components of the Environment?

(b) What is meant by Eutrophication?

(c) What is the composition of Biogas?

(d) Define the term soil erosion.

(e) Distinguish between the terms Detrivores and decomposers.

(f) What are the hot spots of biodiversity in India?

(g) Distinguish between National Parks and Zoological parks.

(h) Define Water pollution.

(i) What are the reasons for landslides?

(j) Mention few water conservation measures.

(k) What are acid rains?

(l) What is the significance of stratospheric ozone?

(m) Define the term 'Health'.

(n) What is WHO?

(o) What is AIDS?

UNIT I

2. (a) What is the importance of Forests?

   (b) What are the benefits and problems of dams?

Or

3. (a) What are the effects of modern agriculture?

   (b) Mention the various energy resources. Explain the advantages of non-conventional sources of energy.

UNIT II

4. (a) Distinguish between Food chain and Food web.

   (b) Explain Desert Ecosystem.

Or

5. (a) Define genetic, species and ecosystem diversity. Explain the values of biodiversity.

   (b) Explain the various ex-situ and in-situ measures of biodiversity conservation.

UNIT III

6. (a) What are the causes, effects and control measures of Air pollution?

Or

7. (a) Explain resettlement and rehabilitation of people; its problems and concerns.

   (b) Write the Salient features of Forest Conservation Act.

UNIT IV

8. Write short notes on

   (a) Man's impact on environment

   (b) Sanitation and Public Health.

Or

9. Write about:

   (a) Chipko movement

   (b) Narmada Bchao Andolan.

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