3E1709

Roll No. _____ Total No of Pages: 4

3E1709
B. Tech. III Sem. (Old Back) 2006-07, 07-08 and 08-09
Examination Feb. 2014
Electrical & Electronics (Common in EC, AI, EI and EX)
3EX3 CIRCUIT ANALYSIS AND SYNTHESIS

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

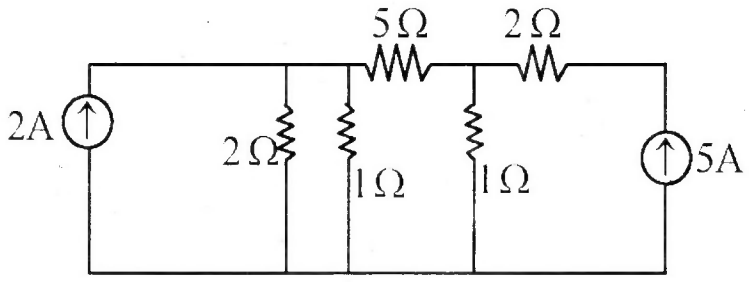
*Attempt any **five questions,** selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.*

Use of following supporting material is permitted during examination.

1. _____ 2. _____

UNIT – I

Q.1 (a) State the thevenin's theorem. Find the power loss in the 5Ω resistor using thevenin's theorem for given figure. [2+8=10]



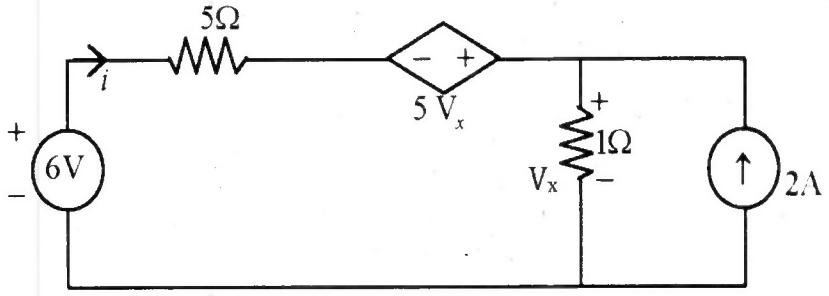
(b) Explain the term self inductance & mutual inductance. Derive the expression of total inductance for series & parallel connections of two inductors (L_1 & L_2) [6]

300

OR

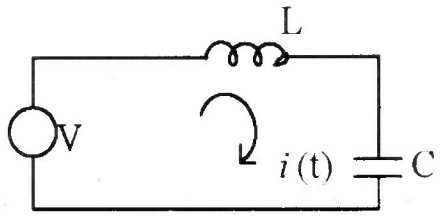
Q.1 (a) What do you understand by maximum transfer theorem? Explain its utility by using suitable example. [8]

(b) Find the value of current i for below mentioned circuit by using superposition theorem. [8]



UNIT – II

Q.2 (a) In a series LC circuit the supply voltage being $V = V_{max} \cos t$. Find i(t) at t = 0+ following switching at t = 0 with Zero initial conditions. Assume L = 1H, C = 1F. [8]

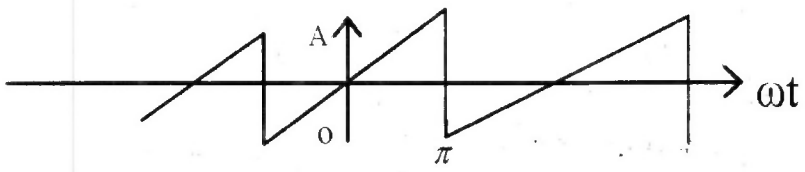


(b) Explain the final value theorem. Also find the value of function

$f(t) = e^{-t} (\sin 3t + \cos 5t)$ [8]

OR

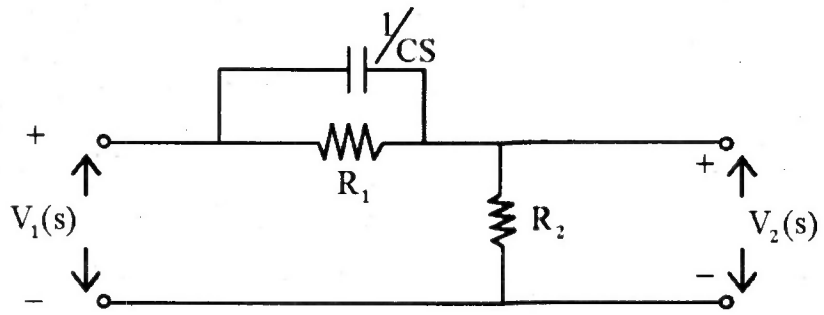
Q.2 (a) Drive the Fourier expansion of the given waveform. [8]



(b) Derive the expression for transient response in series RC circuit with sinusoidal exitation. [8]

UNIT – III

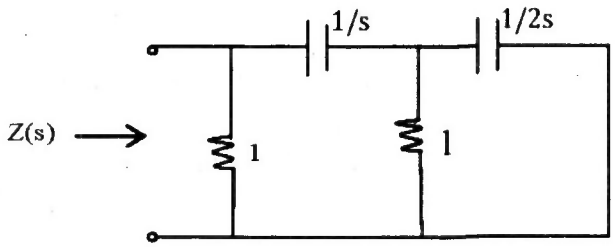
Q.3 (a) Obtain the transfer function $\frac{V_2(S)}{V_1(S)}$ for given circuit. [8]



(b) Check the stability of function $P(s) = s^4 + 2s^3 + 4s^2 + 12s + 10$ by using Routh-Hurtwitz criterion. [8]

OR

Q.3 (a) Derive the driving point impedance of the network shown below. [8]



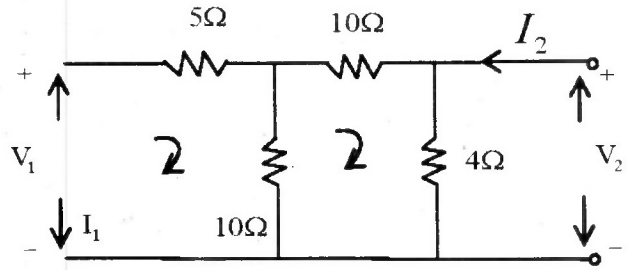
(b) Find the pole zero plots of following function.

$$z(s) = \frac{s^2 - 7s + 10}{s^2 + s + 50} \quad ; \quad y(s) = \frac{50}{s^2 + 2s + 2}$$ [4+4=8]

UNIT – IV

Q.4 (a) Generate the relation of h – parameters with z, y & ABCD parameters. [8]

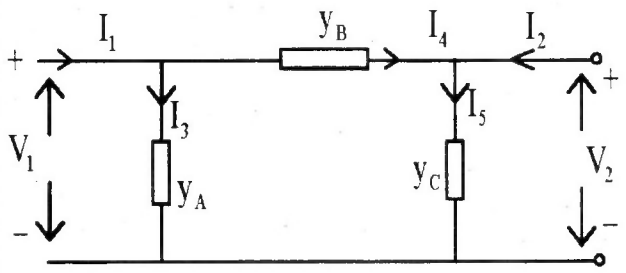
(b) Find the z parameters of given network. [8]



OR

Q.4 (a) Explain the condition of reciprocity and symmetry in two port z – parameter representation. [8]

(b) Draw the y – parameter model for following π circuit. [8]



UNIT – V

Q.5 (a) Find the first order and second order foster form of $z(s) = \dfrac{2(s^2+1)(s^2+9)}{s(s^2+4)}$ [8]

(b) Check whether the polynomial f(s) is Hurtwitz or not.
$f(s) = s^3 + 4s^2 + 2s + 8$ [8]

OR

Q.5 (a) Synthesize the caver – I network for function $z(s) = \dfrac{s^5+5s^3+3s}{s^4+3s^2+1}$ [8]

(b) Check the positive realness of function $f(s) = \dfrac{s^2+10+4}{s+2}$. [8]

303

BASE

Roll No. _____ Total No of Pages: 6

3E1402
B. Tech. III Sem. (Old Back) 2006-07, 07-08 and 08-09
Examination Feb. 2014
Electronics & Instrumentation
3EI3 CIRCUIT ANALYSIS

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions,** selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.*

Use of following supporting material is permitted during examination.

1._____ 2._____

UNIT-I

Q.1 (a) Write the short note on: state and prove Tellegen's theorem with an example. [8]

(b) State and explain Reciprocity Theorem, obtain the Thevenin's equivalent circuit for the network of figure-1

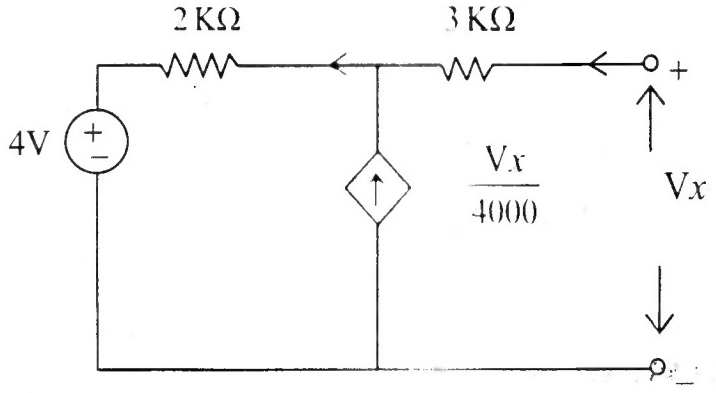
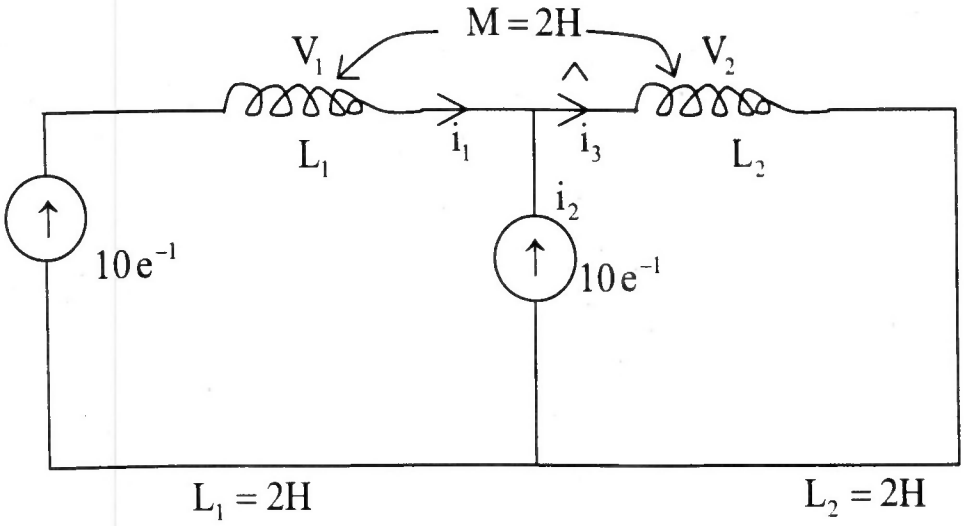


Fig : 1

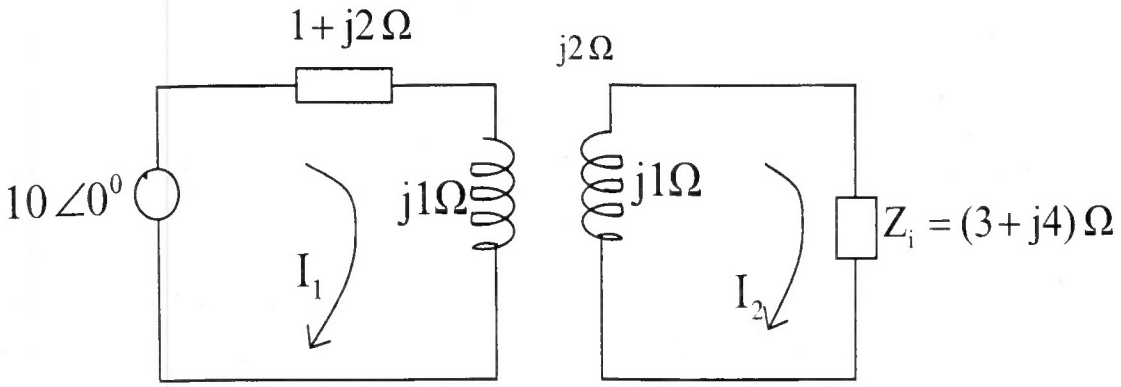
OR

Q.1 (a) Find V_1 and V_2 in the given circuit - [6]



(b) Discuss in brief on "conductivity coupled equivalent circuits for mutual inductance". [4]

(c) Find the current supplied by the voltage source in the circuit shown in figure. [6]



Fig

UNIT-II

Q.2 (a) Determine i(t) of the network in fig(b) and sketch the wave form for the pulse input voltage as shown in the fig(a) with zero initial conditions. Plot output wave form. [8]

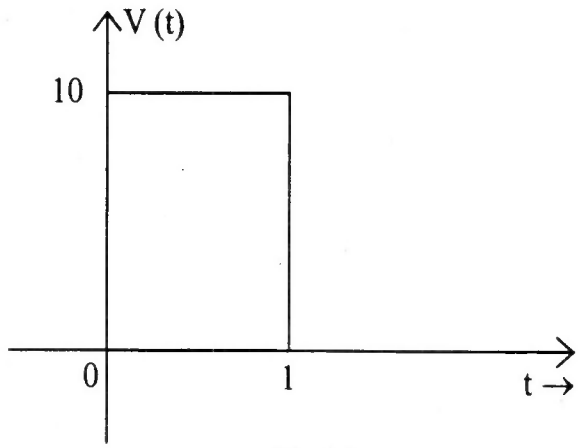
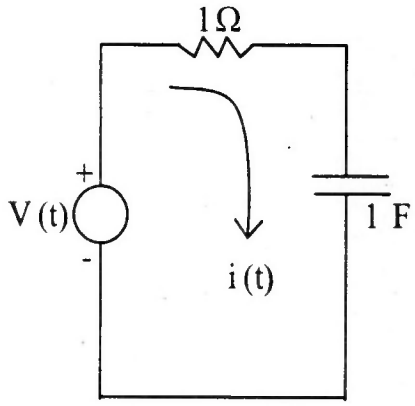


Fig (a)



(b) Analyse a series R – L circuit for sinusoidal input. [8]

OR

Q.2 (a) Obtain the current i for all values of t in the circuit shown in fig below - [8]

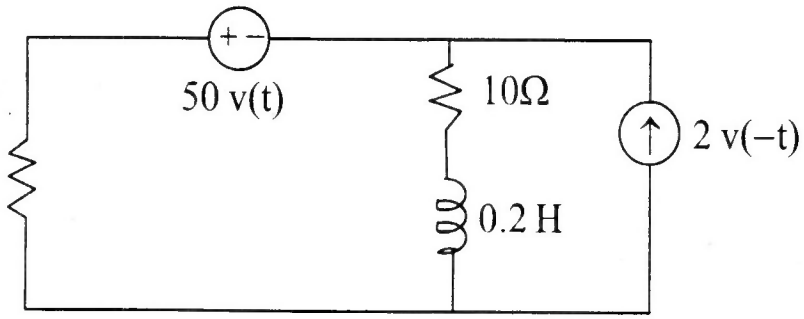
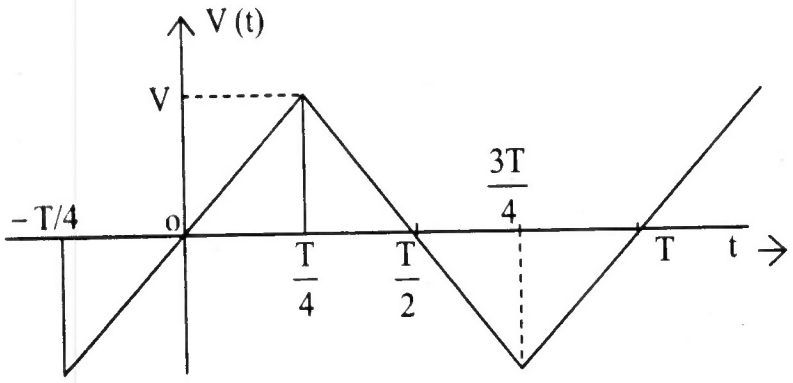


Fig.

(b) Obtain the fourier series of the wave form shown below - [8]

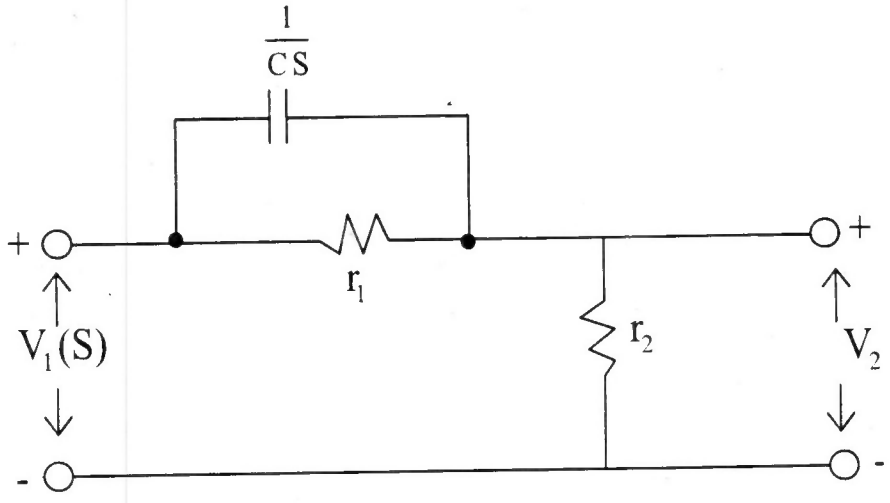


UNIT-III

Q.3 (a) Apply Routh – Hurwitz criterion to the following Poly-nominal to check stability:

$$P(S) = S^4 + 2S^3 + 4S^2 + 12S + 10$$ [8]

(b) Find Z_{in} (S) and voltage transfer function in the given circuit. [8]



OR

Q.3 (a) State various restrictions on location of pole and zeros in driving point functions.[8]

(b) The transform voltage V(S) of a network is given by $V(S) = \frac{4S}{(S+2)(S^2+2S+2)}$

Plot its pole – zero diagram and hence obtain V(t). [8]

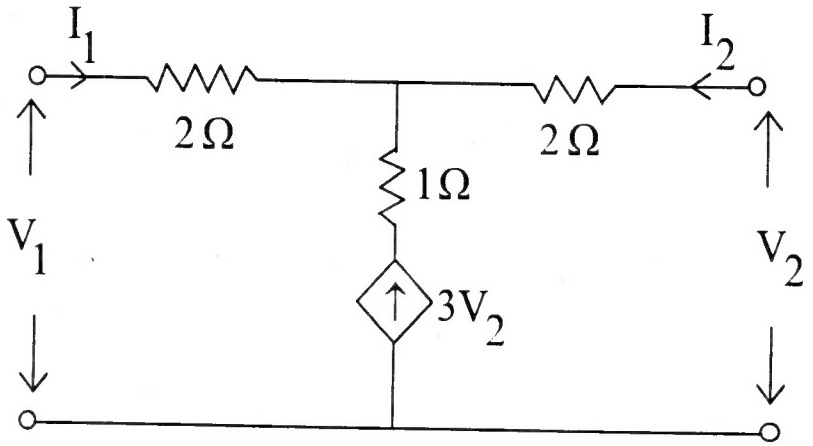
UNIT-IV

Q.4 (a) Define Image impedance. Derive relationship between image parameters and open circuit and short circuit impedances. [8]

(b) Derive the condition of reciprocity for two port networks. [8]

OR

Q.4 (a) Find Y – parameter of the given network - [8]



(b) Derive the expression when two port networks are connected in series. [8]

UNIT-V

Q.5 (a) Find the networks for the given function in Foster and Cauer form.

$$Z(S) = \frac{(S+1)\ (S+3)}{(S+2)\ (S+6)}$$ [10]

(b) Realize the networks function -

$Y(S) = \frac{6\ (S+2)\ (S+4)}{S(S+3)}$ in an R C network in Cauer form. [6]

OR

Q.5 (a) What is the physical significance of a positive real function? Describe the properties of positive real functions. Check the following admittance or impedance functions for positive realness.

(i) $Z(S) = \frac{(S^2+2S)}{(S^2+10S+9)}$

(ii) $Y(S) = \frac{(S^2+4)(S^2+16)}{S(S^2+12)}$ [8]

(b) The driving point impedance of a one port L C network is given by -

$$Z(S) = \frac{8(S^2+4)\ (S^2+25)}{S\ (S^2+16)}$$

Obtain the first and second foster form of equivalent network. [8]

309

3E1493

Roll No. _____ Total No of Pages: 4

3E1493

B. Tech. III Sem. (Old Back) 2006-07, 07-08 and 08-09 Examination Feb. 2014

Electrical & Electronics (Common in EC, AI, EI and EX)

3EX3 CIRCUIT ANALYSIS AND SYNTHESIS

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

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UNIT – I

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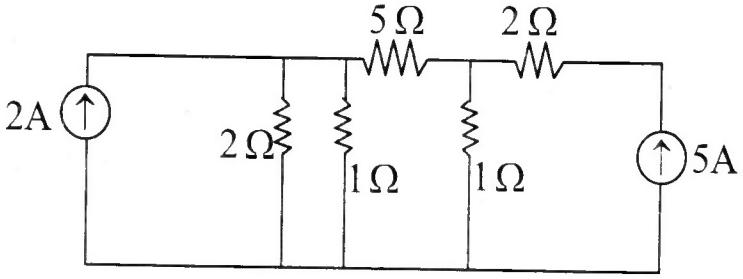

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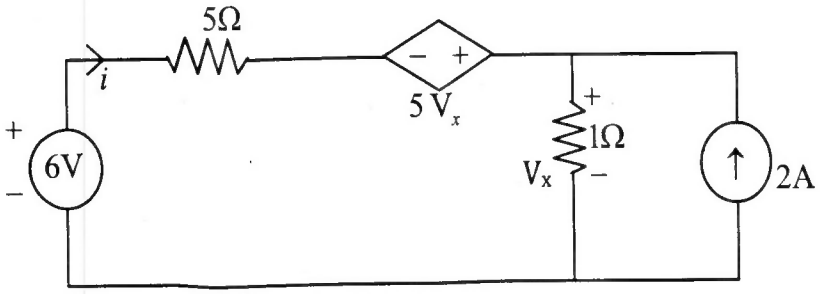
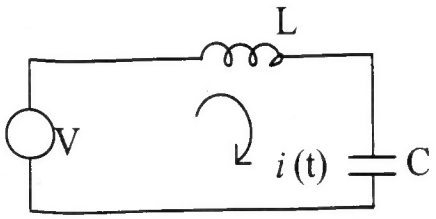


UNIT – II

Q.2 (a) In a series LC circuit the supply voltage being $V = V_{max}$ Cos t. Find i(t) at t = 0+ following switching at t = 0 with Zero initial conditions. Assume L = 1H, C = 1F. [8]



(b) Explain the final value theorem. Also find the value of function

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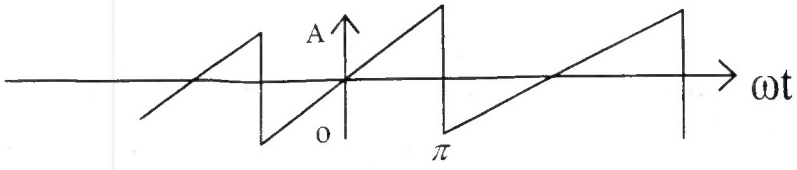

(b) Derive the expression for transient response in series RC circuit with sinusoidal exitation. [8]

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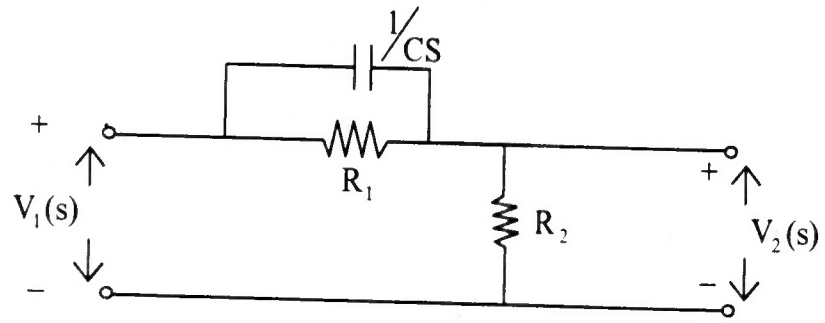

(b) Check the stability of function $P(s) = s^4 + 2s^3 + 4s^2 + 12s + 10$ by using Routh-Hurtwitz criterion. [8]

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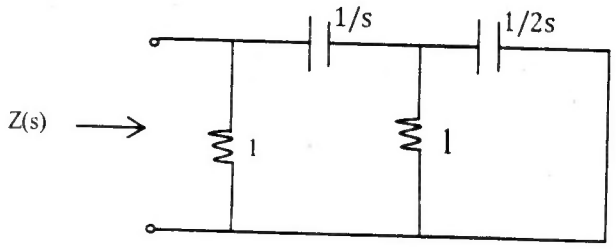
Q.3 (a) Derive the driving point impedance of the network shown below. [8]



(b) Find the pole zero plots of following function.

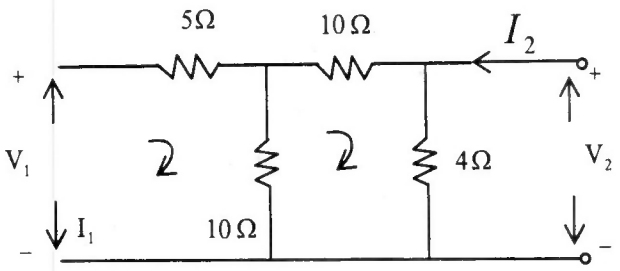
$$Z(s) = \frac{s^2 - 7s + 10}{s^2 + s + 50} \quad ; \quad y(s) = \frac{50}{s^2 + 2s + 2}$$ [4+4=8]

[60]

UNIT – IV

Q.4 (a) Generate the relation of h – parameters with z, y & ABCD parameters. [8]

(b) Find the z parameters of given network. [8]



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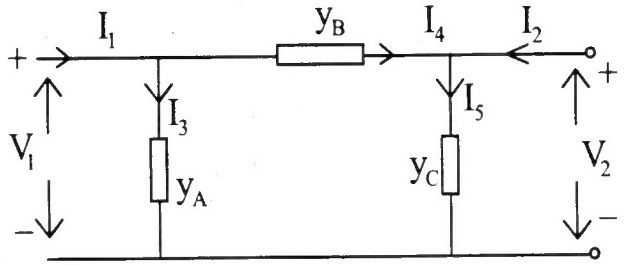
(b) Draw the y – parameter model for following π circuit. [8]



UNIT – V

Q.5 (a) Find the first order and second order foster form of $z(s) = \frac{2(s^2+1)(s^2+9)}{s(s^2+4)}$ [8]

(b) Check whether the polynomial f(s) is Hurtwitz or not.
$f(s) = s^3 + 4s^2 + 2s + 8$ [8]

OR

Q.5 (a) Synthesize the caver – I network for function $z(s) = \frac{s^5+5s^3+3s}{s^4+3s^2+1}$ [8]

(b) Check the positive realness of function $f(s) = \frac{s^2+10+4}{s+2}$. [8]

313

3E1494

Roll No. _____ Total No of Pages: 3

3E1494
B. Tech. III – Sem. (Old Back) 2006-07, 07-08 and 08-09
Exam. Feb. 2014
Electronics & Communication
3EC4 ELECTRONIC MEASUREMENTS & INSTRUMENATION

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.*

Use of following supporting material is permitted during examination.

1._____ 2._____

UNIT-I

Q.1 Discuss the following errors by giving suitable examples.

(i) Systematic errors.

(ii) Random errors.

Also give the means adopted to minimize these errors. [16]

OR

Q.1 Describe Gaussion Error analysis and Probable error in detail. [16]

313

3E1494

Roll No. _____ Total No of Pages: 3

3E1494

B. Tech. III – Sem. (Old Back) 2006-07, 07-08 and 08-09

Exam. Feb. 2014

Electronics & Communication

3EC4 ELECTRONIC MEASUREMENTS & INSTRUMENATION

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

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(i) Systematic errors.

(ii) Random errors.

Also give the means adopted to minimize these errors. [16]

OR

Q.1 Describe Gaussion Error analysis and Probable error in detail. [16]

UNIT-II

Q.2 (a) Explain the working of successive approximate type digital voltmeter with suitable diagrams. [8]

(b) Give the advantages of Electronic voltmeter over conventional type voltmeter. [8]

OR

Q.2 (a) With the help of block diagram explain the working of vector impedance meters. [8]

(b) How & why are the grounding & shielding used in electronic instruments. [8]

UNIT-III

Q.3 (a) Explain the working of CRT with suitable diagram. Discuss the focussing arrangement. [8]

(b) Explain the functions of various controls on the front pannel of a CRO. [8]

OR

Q.3 (a) Explain the measurement of frequency using CRO. [8]

(b) Expalin storage & sampling oscilloscopes. [8]

UNIT-IV

Q.4 (a) Discuss in detail the circuit operation of wein Bridge oscillator. [8]

(b) What is frequency synthesized signal generator? Describe it's circuit details. [8]

OR

Q.4 Write technical note on the following:

(i) Spectrum analyzer. [8]

(ii) Sweep frequency generator. [8]

UNIT-V

Q.5 (a) Explain the construction & principle of working of LVDT. [8]

(b) Explain the characteristics & application of thermistors. [8]

OR

Q.5 Write technical note on the following.

(i) Seismic Accelerometers. [4]

(ii) Load cell. [4]

(iii) Ultrasonic flow meters. [4]

(iv) Bourdon Tubes [4]

3E1471

Roll No. _____ Total No of Pages: 4

3E1471
B. Tech. III Sem. (Old Back) 2006-07, 07-08 and 08-09
Exam - Feb. 2014
Electronics & Instrumentation
3EI4 ELECTRICAL MEASUREMENTS

Time: 3 Hours **Maximum Marks: 80**
Min. Passing Marks: 24

Instructions to Candidates:-

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Use of following supporting material is permitted during examination.

1._____ 2._____

UNIT-I

Q.1 (a) Explain the different types of errors in watt meters and their compensation techniques. [8]

(b) Explain the calibration of single phase energy meter. [8]

OR

Q.1 (a) Explain the working principle of moving coil type instruments with their applications. [8]

(b) Discuss the following types of error in moving iron instruments -

(i) Error on account of stray magnetic field

(ii) Error on account of a change of frequency [8]

UNIT-II

Q.2 (a) Explain the construction and working of following CRO Probes - [8]

(i) Direct Probe.

(ii) Isolation Probe.

(b) Define the following of the CRO - [8]

(i) Blanking circuit.

(ii) Z-axis modulation.

OR

Q.2 (a) Explain the working of free running and triggered mode CRO with suitable diagram. [8]

(b) Explain the following of CRO - [8]

(i) Astigmation control

(ii) Source of synchronization

UNIT-III

Q.3 (a) Explain the loss of charge method for measurements of insulation resistances of cables. [8]

(b) Explain the construction and working principle of ohmmeter method for measurement of medium resistance. [8]

OR

Q.3 (a) What are the difficulties encountered in measurement of high resistances and explain the precautions in brief. [8]

(b) Explain the working principle of meggar with their range & applications. [8]

UNIT-IV

Q.4 (a) Draw and explain the phasor diagram of Schering bridge. [8]

(b) Explain the source of errors in bridge circuits? What are precautions used to minimize the errors. [8]

OR

Q.4 (a) Explain the circuit diagram of Anderson's bridge with phasor diagram. [8]

(b) Describe how an unknown capacitance can be measured with the help of De-sauty's bridge. [8]

UNIT-V

Q.5 (a) Explain the standardization of D.C. Potentiometers with proper circuit diagram. [8]

(b) Explain the working principle of coordinate type potentiometers. [8]

OR

Q.5 (a) Explain the working principle of polar type potentiometers. [8]

(b) How will you calibrate the Crompton's potentiometer? Explain its applications also. [8]

320

3E1472

Roll No. _____ Total No of Pages: 3

3E1472

B. Tech. III – Sem. (Old Back) 2006-07, 07-08 and 08-09
Examination Feb. 2014
Electronics & Instrumentation
3EI5 ELECTRICAL TECHNOLOGY

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

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Use of following supporting material is permitted during examination.

1._____ 2._____

UNIT-I

Q.1 (a) Explain the various types of DC generators with their voltage equation and application. [8]

(b) An 8-pole lap–wound DC generator armature has 960 conductors, a flux of 40mWb and a speed of 400 r,p.m. Calculate the e.m.f. generator on open circuit. If the same armature is wave wound, at what speed must it be driven to generate 400 V? [8]

OR

Q.1 (a) What is the need of starter in DC motor? Explain the construction and operating principle of three points starter. [8]

(b) The armature resistance of a 200V shunt motor is 0.4Ω and no-load current is 2A, when loaded and taking an armature current of 50A, the speed is 1200 r.p.m. Find approximately the no-load speed. [8]

UNIT-II

Q.2 (a) With a neat sketch describe the construction of squirrel cage and slip ring induction motor. [8]

(b) Explain the principle of operation of a three phase induction motor. [8]

OR

Q.2 (a) Explain torque slip characteristics of induction motor in details. [8]

(b) Describe the various methods of speed control of three phase induction motor. [8]

UNIT-III

Q.3 (a) Describe why synchronous motor is not self starting. [8]

(b) Explain various methods of starting of synchronous motors. [8]

OR

Q.3 (a) Explain the operation of a synchronous motor under [8]

(i) Constant load, varying excitation

(ii) Constant excitation, varying load.

(b) State the application of synchronous motors. Compare synchronous motor with induction motor drives. [8]

UNIT-IV

Q.4 (a) Differentiate between radial mains and ring mains distribution system with corresponding schematic diagrams. [8]

(b) Explain the roles of the following equipments used in sub – station. [8]

(i) Circuit breaker

(ii) Isolator

(iii) Protective relays.

OR

Q.4 (a) What are causes and effect of interfacing of power lines with telephones circuit?[8]

(b) Mention different types of insulators and conductor for transmission lines for different voltage ratings with neat diagrams. [8]

UNIT-V

Q.5 (a) Describe the possible causes and the effects of various faults in power system. [8]

(b) What are the advantages of static relays over electromagnetic relays? Explain in details. [8]

OR

Q.5 (a) With a diagram, explain the constructional and operational features of an over current relays. [8]

(b) Describe the basic operating principle of static relays. [8]

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3E1401

Roll No. _____ Total No of Pages: 7

3E1401

B. Tech. III Sem. (Reback) Examination Feb. 2014

Applied Electronics & Inst. Engg.

3AI2 Electronics Devices & Circuits (Old Scheme, Back)

Common for 3EI2 & 3AI2

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Unit of quantities used / calculated must be stated clearly.*

Use of following supporting material is permitted during examination.

1. NIL 2. NIL

UNIT – I

Q.1 (a) For a Hall sample shown in fig-1, calculate the values of R_H and Mobility μ_H

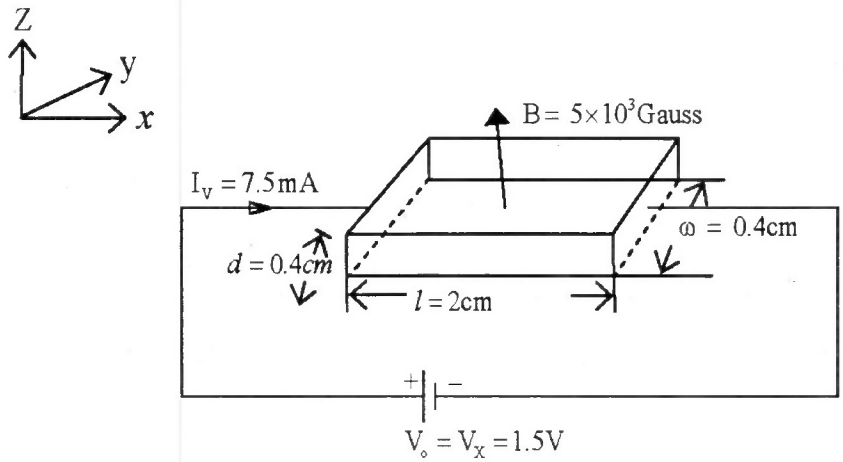

Fig .1

Assume the measured V_H = +6mv and $P_o = 9.76\times10^{14}$ cm^{-3} [8]

(b) What is Fermi level? How it shifts with -

(i) Temperature increase in intrinsic semiconductor

(ii) Doping decrease in n-type semiconductor

(iii) Temperature increase in Metal, and

(iv) Doping increase in P-type semiconductor. [4×2=8]

OR

Q.1 (a) A Ge sample is uniformly doped with 5×10^{16} atoms cm^{-3} of In. Assume all these atoms ionized at 290 K (room temperature) and $n_i = 2 \times 10^{13}$ cm^{-3}

(i) Calculate the electron and hole concentration in the sample

(ii) If the intrinsic concentration in Ge increases by 6 percent per °K rise in temperature, estimate the temperature at which sample becomes intrinsic.

[6×2=12]

(b) Define Mass action law for a semiconductor and show that it is function of temperature.

[4]

UNIT - II

Q.2 (a) A bridge type full wave rectifier uses four diodes and a transformer of ratio 230: 110 V. Forward resistance of each diode is 25 Ω and reverse resistance is infinite (∞). If the load is a pure resistance of 200Ω, find –

(i) Maximum value of current in the circuit

(ii) DC value of current through R_L

(iii) DC value of voltage across R_L

(iv) PIV across non conducting diodes. [4×3=12]

(b) Draw the electrical equivalent circuit of a semiconductor diode under -

(i) Static voltage condition, and

(ii) Dynamic voltage condition [2×2=4]

OR

Q.2 (a) Draw the output wave form in fig – 2

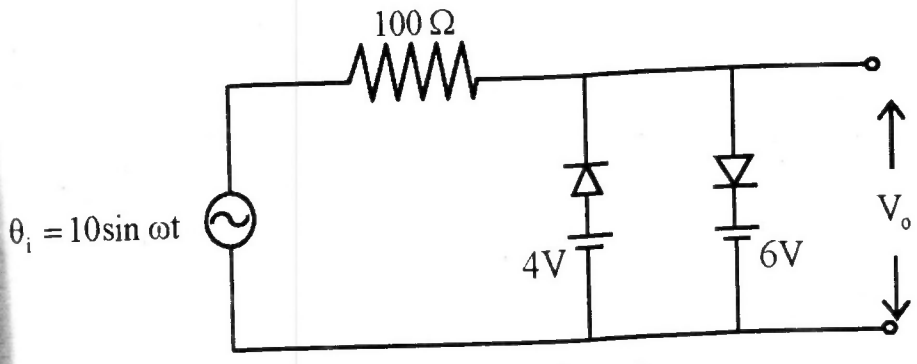

Fig. - 2

Assume the diode drop 0.7 volt under on condition. [8]

[80]

(b) Define the -

(i) Storage time

(ii) Transition time

(iii) Reverse recovery time

for a P_N Junction diode.

Also give the reasons for each and methods to reduce these times. [8]

UNIT – III

Q.3 (a) Explain the working of enhancement mode MOSFET. Draw its construction diagram. Show clearly the channel conditions under -

(i) Ohmic region,

(ii) Saturation region, and

(iii) Beyond saturation regions. [3+3+3×2=12]

(b) Explain the working difference between -

(i) Photodiode & solar cell, and

(ii) Thermistor and LDR [2×2=4]

OR

Q.3 (a) Draw the doping profile of emitter, base and collector region in a BJT. And discuss the effects of -

(i) Temperature on current gain β, and

(ii) Emitter current level on current gain α [4+2×2=8]

(b) Find the expression for pinch- off voltage in JFET. A P- channel JFET (Si) has

Channel doping $N_A = 6\times10^{15}$ cm $^{-3}$

Gate doping $N_D = 4.5\times10^{19}$ cm $^{-3}$

Channel length L = 4 μm (Micrometer)

Channel width w = 50 μm and

Channel opening 2a = 2 μm.

Calculate the pinch-off voltage for it.

Assume the hole Mobility $\mu_n = 350$ cm^2/ v-sec. [4+4=8]

UNIT – IV

Q.4 (a) Determine the operating point for a fixed biasing circuit shown in fig-4.

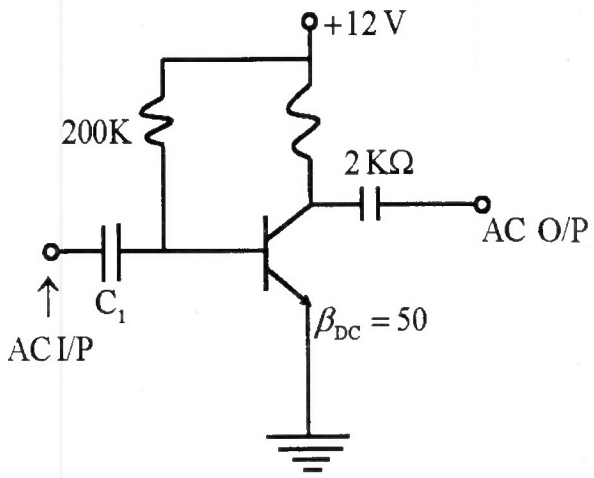

Fig. – 4

(b) Prove that the small signal model of JFET is given by $2_{ds} = g_m v_{gs} + \frac{V_{ds}}{r_{ds}}$

Draw its electrical model and modify the model at high frequency. [8]

OR

Q.4 (a) Draw the Ebers-Moll model of a BJT and compare it with h – parameter model. Draw the approximated version of those models. [8]

(b) Draw the channel conductance and transconductance of a JFET with gate to source voltage V_{gs} and show the voltage variable resistor behavior of JFET. [8]

UNIT – V

Q.5 (a) Draw the DC and AC equivalent circuit of a two stage RC coupled amplifier in (CE – CE) configuration. Also draw the frequency response of single stage and double stage RC coupled amplifier and show that gain × bandwidth product is constant. [8]

(b) Draw the amplifier circuit with bootstrapping. What is the advantage of it and how to improve the performance in Darlington Pair? [8]

OR

Q.5 (a)

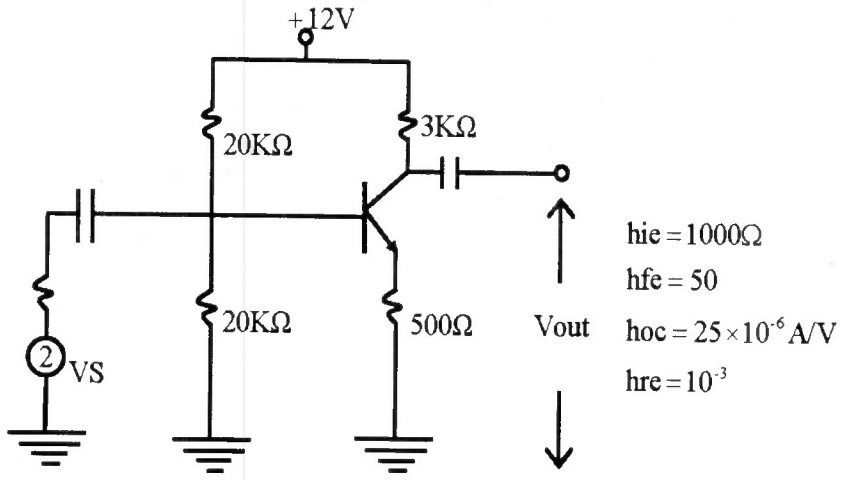

Fig. – 5

Determine the -

(i) Voltage gain A_v & A_{vs}

(ii) Input resistance R_i & R_{is}

for the amplifier shown in fig –5. [8]

(b) Find the expression for voltage gain and output resistance of Common Drain (CD) amplifier in JFET. [8]

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330

3E1704

Roll No. _____ Total No of Pages: 4

3E1704

B. Tech. III Sem. (Main/Back) Examination Feb. 2014

Electronics & Comm.

3EC1 Mathematics-III

Common for Ceramic (3CRE4), 3EC1, 3AI1, 3EI1 & 3BM1

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.*

Use of following supporting material is permitted during examination.

(Mentioned in form No. 205)

1._____ 2._____

UNIT-I

Q.1 (a) (i) Find the Laplace transform of: Sinhat. Cosat. [4]

(ii) Find the inverse Laplace transform of: $\frac{2S^2-1}{(S^2+1)(S^2+4)}$ [4]

(b) Use Laplace transform theory to solve:

$(D^2 + n^2)x = a \sin(nt + \alpha)$, $x(0) = x^1(0) = 0$. [8]

OR

Q.1 (a) If $L[f(t)] = \bar{f}(s)$, then show that:

$$L[t\,f(t)] = -\frac{d}{ds}\bar{f}(s),$$

Hence find inverse L.T. of: $\tan^{-1}\left(\frac{2}{s^2}\right)$. [3+5=8]

(b) Find the bounded solution $y(x,t), 0 < x < 1, t > 0$ of the boundary value problem

$$\frac{\partial y}{\partial x} - \frac{\partial y}{\partial t} = 1 - e^{-t},\ y(x,0) = x$$ [8]

UNIT-II

Q.2 (a) Find the Fourier series of:

$f(x) = \text{Sin } ax, -\pi < x < \pi$; 'a' being a fraction. [8]

(b) Find the Fourier series to represent:

$f(x) = x^2 - 2, -2 \leq x \leq 2$. [8]

OR

Q.2 (a) The following values of y give the displacement of a certain machine part for the rotation x of the flywheel,

x	:	0	$\frac{\pi}{3}$	$\frac{2\pi}{3}$	π	$\frac{4\pi}{3}$	$\frac{5\pi}{3}$
y	:	1.98	2.15	2.77	-0.22	-0.31	1.43.

Express y in a Fourier series upto the third harmonic. [8]

(b) (i) Show that $Z\left[\frac{1}{(n+2)!}\right] = z^2\left[e^{1/z} - 1 - z^{-1}\right]$. [4]

(ii) Find inverse z-transform of:

$$\frac{2z^2 + 3z}{(Z+2)(Z-4)}.$$ [4]

UNIT-III

Q.3 (a) Obtain the Fourier transform of: [8]

$F(x) = x^2$, for $|x| \le a$

$= 0$, for $|x| > a$.

(b) Find the Fourier Sine transform of:

$f(x) = e^{-x}$, $x \ge 0$.

Also, show that $\int_0^\infty \frac{x \sin m x}{x^2+1} dx = \frac{\pi}{2} e^{-m}, m > 0.$ [8]

OR

Q.3 (a) Use Fourier transform theory to solve: [10]

$$\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x^2}, t > 0$$

given that $u(x,0) = f(x) = \begin{cases} u_0, & |x| < a \\ 0, & |x| > a \end{cases}$.

(b) Find Fourier cosine transform of [6]

$f(x) = x$, for $0 < x \le 1$

$= 2 - x$, for $1 < x < 2$

$= 0$, for $x \ge 2$

UNIT-IV

Q.4 (a) Show that the function

$f(z) = \sqrt{(|xy|)}$

is not regular at the origin, although Cauchy -Riemann equations are satisfied at the point. [8]

(b) Evaluate the following integral by using Cauchy's integral formula:

$$\frac{1}{2\pi i} \int_C \frac{e^{zt}}{z^2+1} dz, t > 0$$

Where C is the circle $|z| = 3$. [8]

OR

Q.4 (a) Integrate $f(z) = x^2 + ixy$ form A (1, 1) to B (2, 4) along

(i) the straight line AB joining the two points; and

(ii) the curve c : $x = t, y = t^2$ [8]

(b) Show that under the transformation

$$W = \frac{z - i}{z + i},$$

real axis in the z-plane is mapped into the circle $|W| = 1$. What portion of the z-plane corresponds to the interior of the circle? [8]

UNIT-V

Q.5 (a) Expand

$$f(z) = \frac{1}{(z+1)(z+3)}$$

in a Laurent series valid for

(i) $1 < z < 3$ (ii) $|z| > 3$ (iii) $0 < |z + 1| < 2$. [8]

(b) Use contour integration to solve:

$$\int_0^{2\pi} \frac{d\theta}{(1 - 2p\sin\theta + p^2)}, \quad 0 < p < 1. \quad [8]$$

OR

Q.5 (a) Find the poles of the function:

$$f(t) = \frac{z+2}{(z+1)^2(z-2)};$$

Find order of each pole and the residue at it. [8]

(b) Use contour integration to show:

$$\int_0^{\infty} \frac{\sin mx}{x} dx = \frac{\pi}{2}, \quad m > 0. \quad [8]$$

3E1495

Roll No. _____ Total No of Pages: 4

3E1495
B. Tech. III Sem. (Main/Back) Examination Feb. 2014
Electronics & Comm.
3EC5 Electronics Materials and Processes

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Unit of quantities used / calculated must be stated clearly.*

Use of following supporting material is permitted during examination.

1. NIL 2. NIL

UNIT-I

Q.1 (a) Explain in brief, the Mechanism of: [4x2+4=12]

(i) Electron hopping polarization

(ii) Space Polarization

(iii) Ionic polarization

(iv) Electronic polarization.

Draw the curve of total polarizability with frequency that shows the frequency range of above polarization.

(b) Prove the Clausius Mossotti relation [4]

$$\frac{\in_r{}^x - 1}{\in_r{}^x + 2} = \frac{1}{3t_0} N\left(\alpha^*{}_e + \alpha_I{}^*\right)$$

Write at least one use of this relation.

OR

Q.1 (a) Prove that under AC condition the relative dielectric constant $(\in_r{}^*)$ will be complex. Find its expression in terms of applied frequency. Show the peak of dielectric loss on these curves. [8]

(b) Draw the PE loop for a ferroelectric material at different temperature. Using these curve explain the Spontaneous Polarization. Write the name of most well known ferroelectric materials. [8]

UNIT-II

Q.2 (a) Draw the variation of magnetic susceptibility with temperature for Dia, Fera, Ferro and Anti Ferro – magnetic materials. Show the Curie temperature on it and write the range of Curie temperature for common magnetic materials. [6+2=8]

(b) Why soft magnetic materials are useful to fabricate the core of AC machines. Draw the BH curve for soft & hard magnetic material on same axis for comparison. Show the stored energy maxima on these curves.

OR

Q.2 (a) The magnetic field strength in a piece of copper is 10^9 Ampere/m[illegible] If $X_e = -0.5 \times 10^{-5}$ for copper, then find the flux density and total magnetization [illegible]

(b) Explain the spontaneous magnetization with Domain theory. Why [illegible] magnetization disappear above a critical temperature?

UNIT-III

Q.3 (a) If an Intrinsic Semiconductor has resistivity = 50.5 Ω cm. Then what would be the resistivity if this sample is doped with phosphorus (with $N_D = 10^{15}/cm^3$)

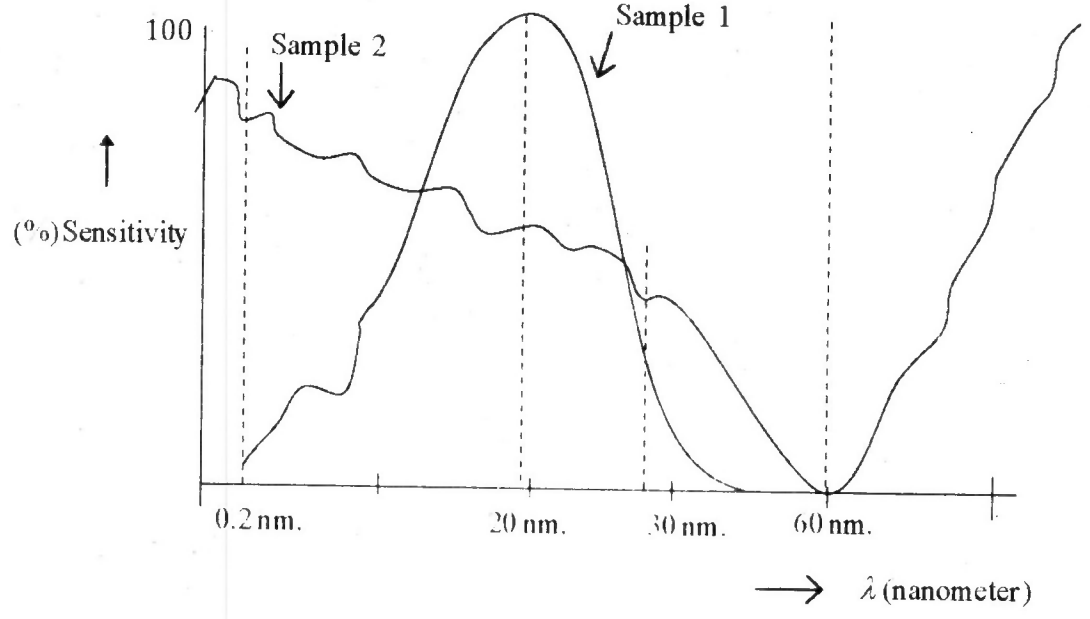
$$\left\{ assume \quad Hn = Hp = 1350 \ \frac{M^2}{V - sec.} \right\}$$ [10]

(b) What is mass action law under thermal equilibrium condition? State the validity of this law under doped semiconductor under biased condition $[\epsilon \neq 0]$ and under heated conditions. [3+3=6]

OR

Q.3 (a) How compound semiconductor is formed. If Band gap of Ga → 2ev and Band gap of As → 0.8ev than find the value of Band gap for a compositions Ga_xAS_{1-x} when x = 0.2, 0.6, 0.8, 0 and 1. [4+2x4=12]

(b) Calculate the value of energy gap when the diode responds as shown in following curve. [4]



UNIT-IV

Q.4 (a) Calculate the Fermi velocity and mean free path for a copper sample. if its Fermi energy is =3ev. [3+3=6]

(b) Prove that the conductivity of metal decrease with frequency as [6]

$$\sigma(\omega) = \frac{\sigma o}{1+\omega^2\tau^2}$$

(c) What are the basis to classify super conductor as type-I and type-II. [4]

OR

Q.4 (a) What is the BCS theory of superconductors. What is the behavior of a superconductor in magnetic fields? Define the critical field. [4+4+2=10]

(b) Draw the conductivity (σ) variation with temperature in semi conducter material. Also find the $\frac{d\sigma}{dT}$ for silicon sample when electron density varies as

$$n_i^2 = Ao\,\tau^3 \exp\left\{\frac{-Eq}{KT}\right\}. \quad [3+3=6]$$

UNIT-V

Q.5 (a) Write the difference between the mask picture obtained with negative PR and with Positive PR. Why negative PRs are super? [6]

(b) Write the range of air core, ferrite core inductors. [4]

(c) Write all steps in points to fabricate a multi side PCB. What is the SOI Technology is it suitable for PCB manufacturing. [6]

OR

Q.5 (a) How passive components are fabricated on an IC Chip circuit. Why deposition technique is most suitable to fabricate passive components on an IC chip. [4+4=8]

(b) Why electrolyte capacitors are polarized in nature? Give the range of ceramic, paper and electrolyte capacitors. [4+4=8]

3E1492

Roll No. _____ Total No of Pages: 7

3E1492

B. Tech. III Sem. (Main & Back) Examination Feb. 2014

Electronics & Communication Engineering

Common for Main of 3EC2, 3AI2, 3EI2 and 3BM2 & Back of 3BM2, 3EC2

Electronics Devices & Circuits

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

Attempt overall ***five questions*** *in all. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. Nil 2. Nil

UNIT-I

Q.1 (a) Prove that the no. of holes in valance band in a semi conductor is given by

$$P = N_V \exp\left\{-\frac{(\varepsilon_F - \varepsilon_v)}{KT}\right\}.$$ [8]

(b) A n-type silicon sample was doped with boron such that the minority level increase from $8x10^6/cm^3$ to $4x10^8/cm^3$. Find the number of boron atoms mixed per cube centimeters? (given ni = $1.5x10^{10}/cm^3$) [4]

(c) Draw the Position of Fermi level for silicon sample at

(i) room temp (300°K)

(ii) at 1000°C.

Assume the sample is intrinsic and its Bandgap is 1.1 ev [4]

OR

Q.1 (a) Find the rate of change of Conductivity with temperature $\left(\frac{d\sigma}{dT}\right)$ for intrinsic Silicon sample. [6]

(b) What is Mass action law? State its validity under following conditions

(i) Under very heavy doping

(ii) Under very high temperature

(iii) For degenerate and non degenerate Semiconductor. [3x2=6]

(c) Draw the energy banddiagram for following structure under open circuit Conditions

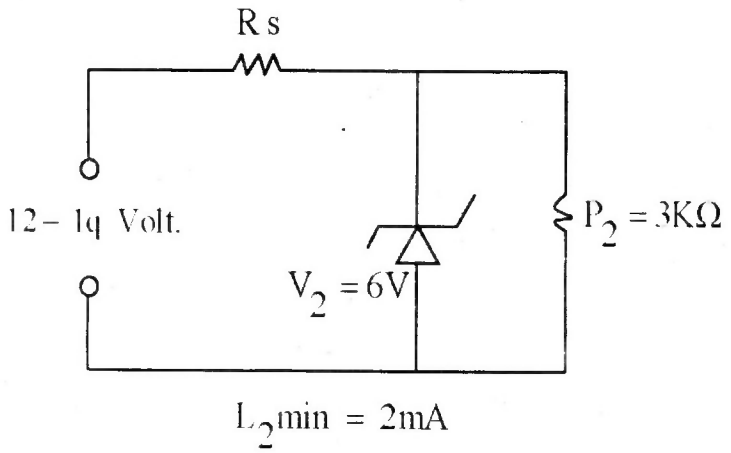
(i) P^+N Junction.

(ii) Cu (Metal)-n-type (Si) Junction.

{Assume ψm(cupper) = 4.5ev. $\psi_{silicon}$ = 3.98ev} [2x2=4]

UNIT-II

Q.2 (a) Find the value of resistance Rs for get Constant Voltage across the load. [6]



(b) Differentiate between Zener breakdown and Avalanche breakdown Variation with temperature increment. If V_2 =8 volt then why it would be an Avalanche type?

[3+3=6]

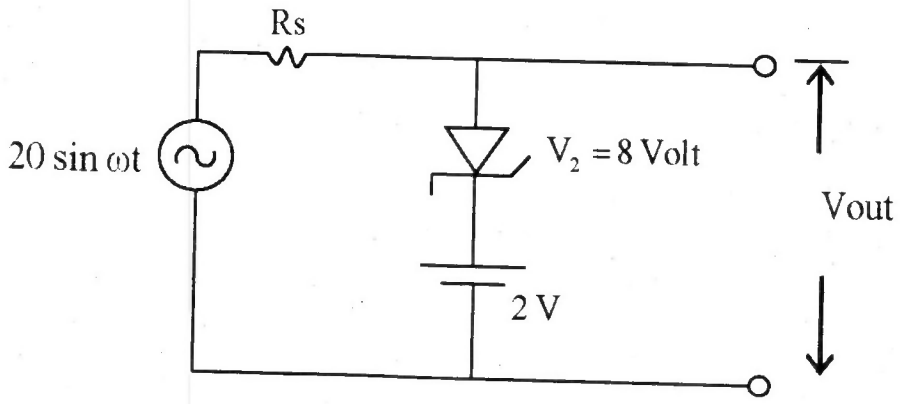
(c) Design a full wave bridge rectifier for giving 12 volt DC output from AC mains of 220V, 50Hz.

[4]

OR

Q.2 (a) Draw the Voltage Doubler circuit and explain its working. [6]

(b) Draw the o/p Voltage [6]



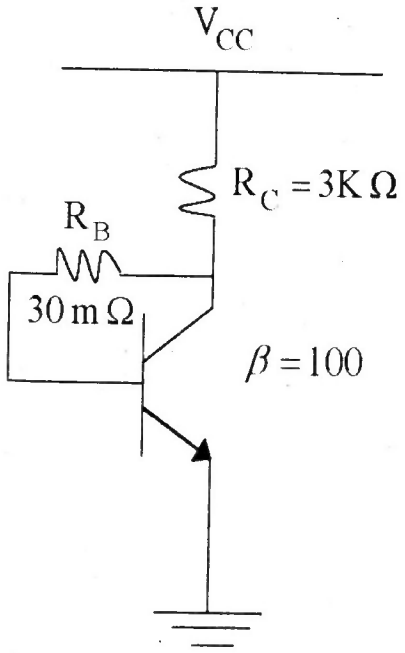
(c) Prove that the total depletion width for a step graded diode is given by [4]

$$w = W_o \{V_o + V_{RB}\}^{1/2}$$

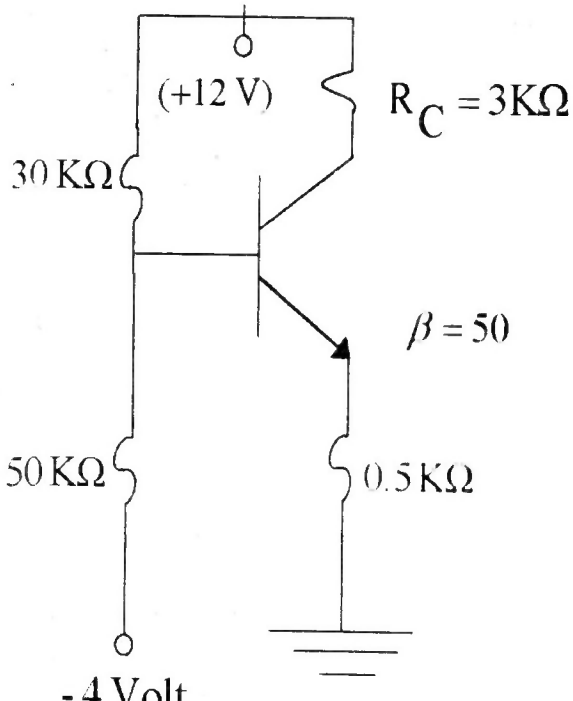
UNIT-III

Q.3 (a) Find the stability factor

(i) $\frac{\partial I_c}{\partial \beta}$ and (ii) $\frac{\partial I_c}{\partial I_{CBO}}$ for following bias circuit [4+4=8]



(b) Find the operating Point (V_{CE}, I_c I_B) for following circuit. [8]



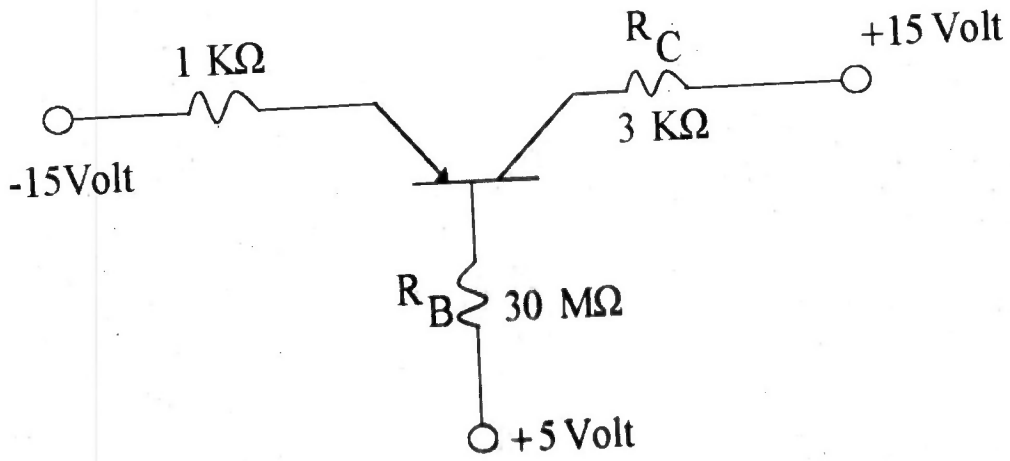
OR

Q.3 (a) Draw the circuit for

(i) I_{co} Compensation

(ii) V_{BE} Compensation with temperature. So the operating Point does not disturb. [4+4=8]

(b) Find the load line and operating points for following circuit. [8]



UNIT-IV

Q.4 (a) Draw the Voltage transfer characteristic for following [3+3=6]

(i) Enhancement mode n- Channel MOSFET.

(ii) Depletion mode P-channel MOSFET.

(b) Draw the g_m with Vgs for FET.

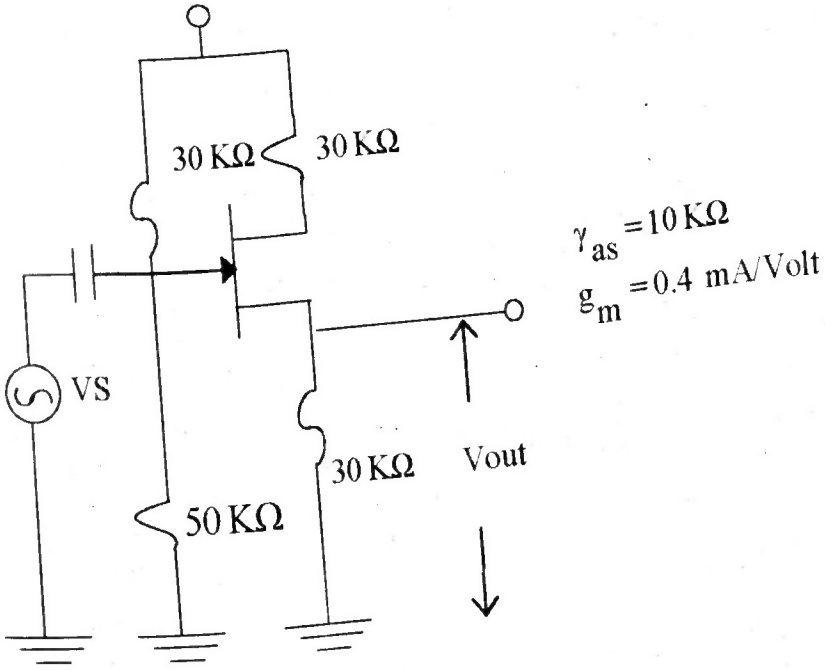
If I_{dss}= 40mA for a n-Channel FET and its channel doping is $N_D = 12x10^{14}/cm^3$ and its dimensions are a =20μm, w=100μm then Calculate the value of g_m for Vgs = 3Volt.

(Assume $Er=11.8E_0$). [2+8=10]

OR

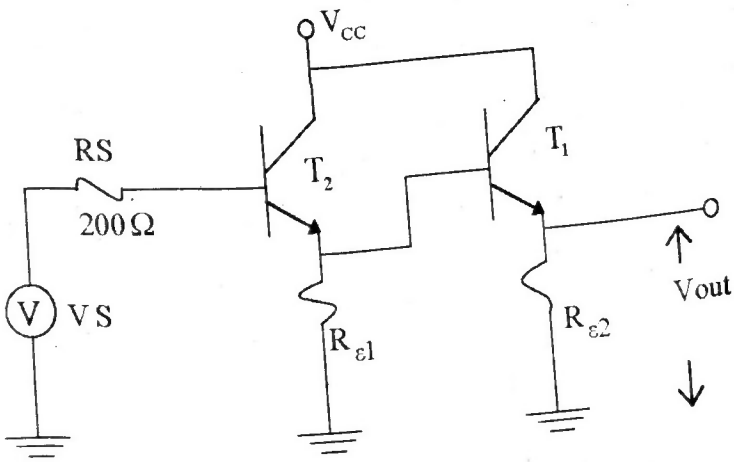
Q.4 (a) Draw the Self bias circuit for a FET and Draw its bias line on its transfer characteristic and locate the operating point. [3+3=6]

(b) Find the Voltage gain and output resistance for following amplifier. [5+5=10]



UNIT-V

Q.5 (a) Find the Overall Voltage and Current gain for following amplifier



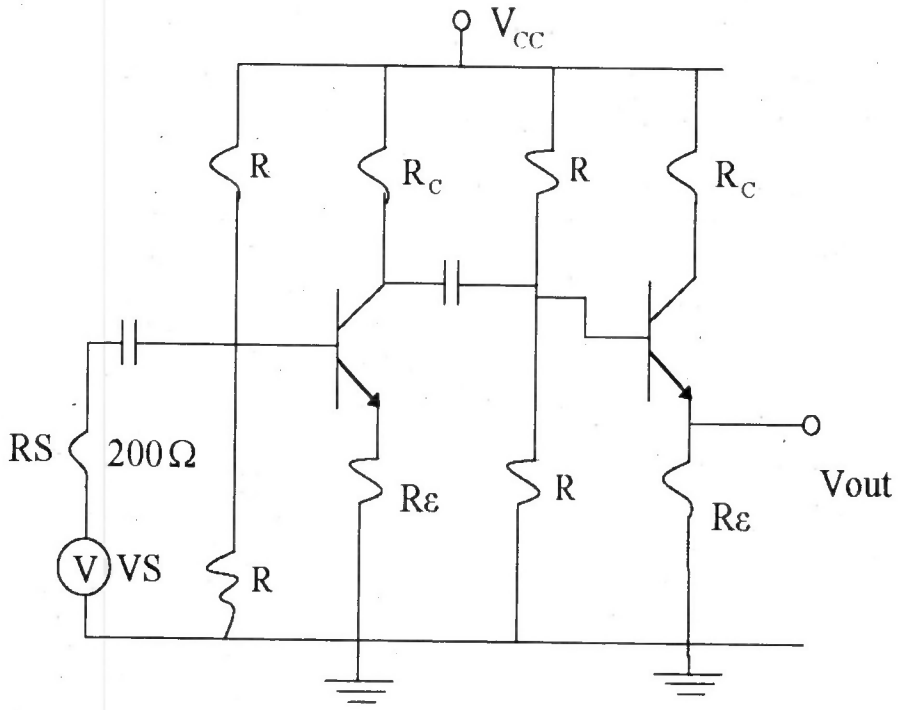
Also find the overall Ri & Ris of above multistage amplifier. [4+4+4=12]

[560]

(b) What is Miller theorem and its Dual. Find the input & output impedance for common impedance in terms of current & Voltage gain. [2+2=4]

OR

Q.5 (a) Draw the AC equivalent and its Overall Voltage current gain for following Amplifier. [5+5=10]



hte = 80

hie = 1KΩ

R = 20 KΩ

R_C = 3 KΩ

R_ε = 1 KΩ

(b) Draw the frequency response of a single and double stage Amplifier on same axis. Define the 3-dB bandwidth on it how the gain X BW product charge in case of cascaded Amplifier. [6]

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345

3E1496

Roll No. _____ Total No of Pages: 4

3E1496

B. Tech. III – Sem. (Main & Back) Examination Feb. 2014

Electronics & Communication Engineering

Common For 3EC6, 3EI 6 and 3BM6 Main & Back

Data Structures & Algorithms

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Unit of quantities used / calculated must be stated clearly.*

Use of following supporting material is permitted during examination.

1._____ 2._____

UNIT-I

Q.1 What do you mean by complexity? Describe time and space complexity with suitable example. What are the difficulties in estimation of time complexity? [16]

OR

Q.1 How are linked lists represented in memory? Write an algorithm to insert a node at the end of circular link list. [16]

UNIT-II

Q.2 Derive an expression to calculate the address of an element stored in 3-D matrix represented as row-major matrix. [16]

OR

Q.2 What is an array? Describe different types of an array. Write an algorithm to insert an element in the array. [16]

UNIT-III

Q.3 Convert the following infix expression into equivalent postfix expression using stack.

(A) A + (B * C - (D/E - F) * G) * H

(B) (A + B) * C ↑ (D - E) + F - G

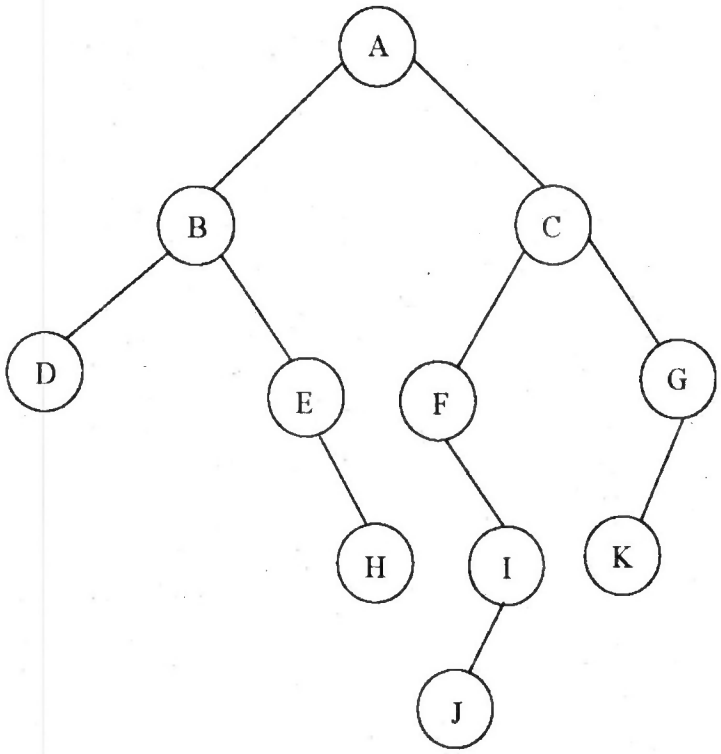
Where, ↑ means 'Raise to' [16]

OR

Q.3 Write an algorithm to insert an element in the circular queue and delete an element from the circular queue with suitable example. [16]

UNIT-IV

Q.4 Write an algorithm to traverse the binary tree in post-order. Traverse the following tree inorder, preorder and postorder form. [16]



OR

Q.4 What do you mean by binary search tree? Insert the following elements in binary search tree. [16]

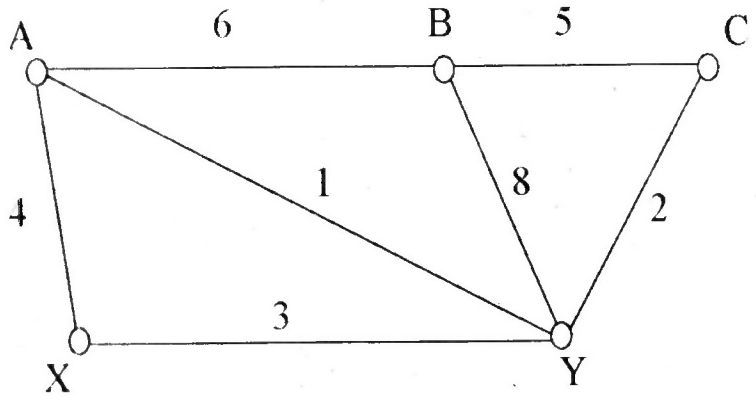
8, 6, 40, -3, -8, 20, 5, 39, 26

UNIT-V

Q.5 Write an algorithm to sort N elements of an array using insertion sort with suitable example. [16]

OR

Q.5 Define the term graph. Explain different ways to represent the weighted and unweighted graph. Draw the minimum spanning tree for the following graph. [16]



3E1449

Roll No. _____ Total No of Pages: 3

3E1449

B. Tech. III Sem. (Main/Back) Examination Feb. 2014

Food Technology

3FD6.3 Applied Electronics

Common with 3CH6.3

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Unit of quantities used / calculated must be stated clearly.*

Use of following supporting material is permitted during examination.

1._____ 2._____

UNIT-I

Q.1 (A) Compare the CB, CE & CC configurations of a transistor & derive the relationship between current gain α and β. [8]

(B) Explain the characteristics of 3- terminal IC regulator. Explain the protection used in 78XX. [8]

OR

Q.1 (A) Explain 2- Stage RC coupled amplifier & sketch frequency response. [8]

(B) Draw the functional diagram of IC 317 regulator. [8]

UNIT-II

Q.2 Sketch the ckt using operational amplifier. [16]

(i) Differentiator

(ii) Non- inverting Amplifier

(iii) Logarithmic amplifier

(iv) Scaling Amplifier

OR

Q.2 What are the factors affecting the OP-AMP [16]

(i) Input offset Voltage

(ii) Slew Rate

(iii) CMRR

(iv) Input bias

UNIT-III

Q.3 (A) Implement the expression using a multiplexer -

$F(A, B, C, D) = \sum m(0, 2, 3, 6, 8, 9, 12, 14)$ [8]

(B) Convert an S-R flip – flop to a J-K flip flop. [8]

OR

Q.3 (A) With neat sketch, explain ripple counter. [8]

(B) What is race around condition? Explain master – slave flip flop. [8]

UNIT IV

Q.4 (A) Explain the working of R12R register ladder D/A converter with suitable diagram. [8]

(B) Explain the principle of operation of a dual slope ADC. [8]

OR

Q.4 (A) Describe in detail the successive approximation method of A/D converter. [8]

(B) Explain the operation of 4-bit binary weighted D/A converter. [8]

UNIT- V

Q.5 (A) Write the different addressing modes used in 8086. [8]

(B) Write short note on serial and parallel ports of IBM compatible PC. [8]

OR

Q.5 (A) Explain software architecture of 8086 with suitable diagram. [8]

(B) Write an assembly language program for integer division of 8 bit to 8- bit. [8]

474

3E1403

Roll No. _____ Total No of Pages: 4

3E1403

B. Tech. III Sem. (Main/Back) Examination Feb. 2014

Applied Electronics

3AI4 Digital Electronics

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five question**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Unit of quantities used / calculated must be stated clearly.*

Use of following supporting material is permitted during examination.

1. NIL 2. NIL

UNIT – I

Q.1 (a) What range of number can be represented in [16]

(i) 8 – bit BCD

(ii) 8 – bit 2's complement form

(iii) 8 – bit sign magnitude form.

(iv) 8 – bit unsigned magnitude from.

(b) Perform the following decimal subtraction for use with the 8421 BCD code

(i) 54610 – 42910

(ii) 42910 – 54610

OR

(a) Define with examples [16]

(i) Weighted and non – weighted codes.

(ii) Alphanumeric & Gray code

(b) Simplify the following

(i) $X\overline{Y} + \overline{X}Y + YX + \overline{XY}$

(ii) $\overline{\overline{XYZ} + \overline{\overline{XY}} + YZ}$

UNIT – II

Q.2 (a) Write short note on interfacing of logic families. [16]

(b) Define the following characteristics of digital IC's

(i) Power dissipation (ii) Fan – In

(iii) Propagation Delay (iv) Noise margin

OR

(a) Compare the characteristic of following logic families i.e., RTL, ECL, TTL & CMOS. [16]

(b) Explain the working of open collector TTL with suitable diagram.

UNIT – III

Q.3 (a) Find the simplified SOP form using tabular method [16]

$f(A\ B\ C\ D) = \sum m(0, 1, 2, 8, 10, 11, 14, 15) + d(9, 12)$

(b) Minimize the 4 – Variable Boolean function using K – map.

$f(A\ B\ C\ D) = \sum m(0, 1, 2, 3, 5, 7, 8, 9, 11, 14)$

OR

Define the following terms

(i) May and min term [4]

(ii) Positive or Negative logic [4]

(iii) Encoder and decoder [4]

(iv) Universal gate [4]

UNIT – IV

Q.4 (a) Design the full adder using the Half adder. [16]

(b) Write short note on Diode switching matrix.

OR

(a) Design the BCD to 7 – segment encoder and explain its working. [16]

(b) Implement the following function with a multiplexers.

$F(A, B, C, D) = \sum (0, 1, 3, 4, 8, 9, 15)$

UNIT – V

Q.5 (a) What is race around condition? How does master – slave flip flop solve this problem? Explain [16]

(b) Explain the working of shift and buffer registers.

OR

(a) What are various types of triggering of flip – flops? Explain them in detail. [16]

(b) Design & explain the Ring counter.

478

3E1405

Roll No. _____ Total No of Pages: 3

3E1405
B. Tech. III Sem. (Main/Back) Examination Feb. 2014
Applied Electronics
3AI6 Data Structures & Algorithms (M/B)

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

Attempt any five questions. Selecting one question from each unit. All Questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Unit of quantities used / calculated must be stated clearly.

Use of following supporting material is permitted during examination.

1. NIL 2. NIL

Q.1 (a) What in the significance of space and time Complicity? Explain. [8]

(b) What is big O notation? Which function in faster $\sqrt{n}$ or log n? [8]

OR

Q.1 (a) Out of the sorting techniques studied by you, which sorting techniques are O (n^2) and which are O (n log n)? [8]

(b) Explain Omega and theta notation? [8]

Q.2 (a) Write an algorithm to insert the element X after a given node in a doubly linked list. [8]

(b) Write a function to merge the two lists. [8]

OR

Q.2 (a) Explain the representation of array and linked list in memory. [8]

(b) Write short notes on: [4+4]

(i) Circular linked list

(ii) Multiple linked list.

Q.3 (a) Write an algorithm for multiplication of sparse matrices [6]

(b) How is stock useful in function call and Return? [5]

(c) Convert the following expression into post fix expression: [5]

A + (B * C – (D/E ↑ F)/G) * H

OR

Q.3 (a) Explain the tower of Hanoi problem using recursion. [8]

(b) Write an algorithm for addition of two polynomials. [8]

Q.4 (a) A binary tree T has 9 nodes. The in order and pre order traversal of T yield the following sequence of nodes:

In Order	E	A	C	K	F	H	D	B	G
Pre Order	F	A	E	K	C	D	H	G	B

Draw the tree T [10]

(b) Differentiate between Binary Search Tree and Indexed Binary Search Tree. [6]

OR

Q.4 (a) What do you mean by AVL tree? Insert the following list of data in an AVL tree:

48, 62, 66, 69, 74, 77, 100, 0, 4, and 62 [8]

(b) Write short notes on:

(i) Minimum spanning tree

(ii) Binary tree [4+4]

Q.5 (a) Suppose an array A Contains 9 elements as follows:

88, 44, 55, 22, 99, 33, 77, 66

Sort this array using bubble sort. Show all intermediate steps. [6]

(b) Differentiate between:

(i) Heap sort and Merge sort

(ii) BFS and DFS [5+5]

OR

Q.5 (a) Which is the belles sorting method among.

Radix, Bubble, Selection, Quick, and Insertion and Why? [6]

(b) Write short notes on:

(i) Heap

(ii) Krushkal's Algorithm. [5+5]

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3E1406

Roll No. _____ Total No of Pages: 4

3E1406

B. Tech. III Sem. (Main/Back) Examination Feb. 2014

Applied Electronics & Inst. Engg.

3AI4 Digital Electronics

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.*

Use of following supporting material is permitted during examination.

1._____ 2._____

UNIT-I

Q.1 (a) Convert the following: [6]

(i) $3\ A\ 7_{16}$ into the Gray number

(ii) 2598.675_{10} to hex.

(b) Perform on the decimal subtraction in BCD by the 9's complement method- [4]

679.6 – 885.9

(c) Perform the subtraction in 8421 code using the 10's complement method- [4]

206, 4 – 507.6

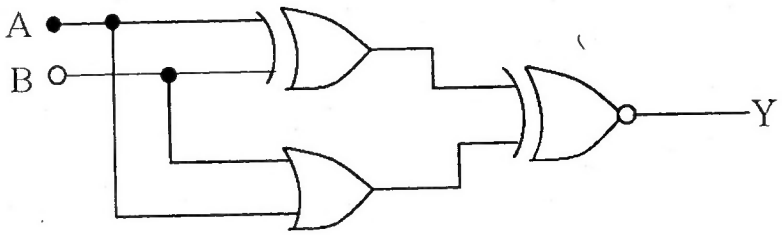
(d) If 16_{10} = 100b, find the value of b. [2]

OR

Q.1 (a) Reduce the expression $f = A\left[B + \bar{c}\ \overline{(AB + A\bar{c})}\right]$ [4]

(b) Show that $A \oplus B = A\bar{B} + \bar{A}B$ and construct the corresponding logic diagrams. [6]

(c) Redraw the circuit after simplification - [6]



UNIT-II

Q.2 (a) Define following in brief - [12]

(i) Propagation delay

(ii) Fan out

(iii) Power dissipation

(iv) Noise Margin

(v) Voltage and current parameters

(vi) Speed power product

(b) Draw the circuit diagram of two input TTL NAND Gate with totem pole. [4]

OR

Q.2 (a) With the help of a neat circuit diagram explain the working of - [16]

(i) a CMOS Inverter

(ii) a two input CMOS NOR gate

UNIT-III

Q.3 Obtain the minimal POS expression for the following using Quine McCluskey method.

[16]

$f = \pi M (0,1,4,5,9,11,13,15,16,17,25,27,28,29,31) .d (20, 21, 22, 30)$

OR

Q.3 (a) Find the minimal expressions for the multiple output functions. [16]

$f1(x1, x2, x3, x4) = \pi M (3, 4, 5, 7, 11, 13, 15). d (6, 8, 10, 12)$

$f2(x1, x2, x3, x4) = \pi M (2, 7, 9, 10, 11, 12, 14, 15) .d (0, 4, 6, 8)$

UNIT-IV

Q.4 (a) Implement the following logic function using an 8x1 Mux. [8]

$f(A, B, C, D) = \Sigma m (1, 3, 4, 11, 12, 13, 14, 15)$

(b) Draw and explain the 4-Bit parallel subtractor. [8]

OR

Q.4 Design a 4-bit Binary to Gray Code Converter. Use K-map, also draw the logic diagram. [16]

UNIT-V

Q.5 (i) Explain the following for the flip flops - [12]

(a) Race around condition in flip flop

(b) J.K master-slave flip flop

(c) Excitation table for flip flop

(ii) Draw circuit diagram of serial-in, parallel-out shift register. [4]

OR

Q.5 Design a Modulo-9 Synchronous Counter Using T flip flops. [16]

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485

3E1404

Roll No. _____ Total No of Pages: 3

3E1404

B. Tech. III – Sem. (Main & Back) Examination Feb. 2014

Applied Elect. & Inst. Engineering

3AI 5 Basic Electrical Electronics Measurements

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

Attempt overall five Questions in all. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1._____ 2._____

Q.1 (a) Explain the method for measurement of capacitance at high frequencies using resonance method. [8]

(b) Write down the basic requirements for proper indication by indicating type instruments. [8]

OR

Q.1 (a) Explain the different torques for the indicating type instruments. [8]

(b) Explain the shielding and grounding techniques of indicating type instruments. [8]

Q.2 (a) A dynamometer ammeter is fitted with two fixed coils having a total resistance of 3.0 Ω and a total inductance of 0.12 H, and a moving coil of resistance 30 Ω and an inductance of 0.003 H. calculate the error in reading when the instrument is calibrated with d.c. and used on a.c. 50 Hz with moving coil shunted directly across the field coils. [10]

(b) Explain the working of self balancing potentiometer. [6]

OR

Q.2 (a) A co-ordinate type potentiometer is used for determination of impedance of a coil and the results obtained are:

Voltage across a 1.0 Ω resistor in series with the coil: + 0.238 V on in –phase dial and - 0.085 V on quadrature dial.

Voltage across a 10:1 potential divider used with the coil: + 0.3375 V on in-phase dial and + 0.232 V on quadrature dial.

Calculate the resistance and reactance of the coil. [10]

(b) Discuss about the sources of error in a moving iron instruments and explain them. [6]

Q.3 (a) What is the importance of the value of Q – factor. Explain the construction & working of Q-meter. [8]

(b) Explain the measurement of self inductance by Anderson's bridge with neat diagram. [8]

OR

Q.3 (a) What are the precautions are to be taken in the measurement of High resistances. Explain the working of Kelvin's double bridge. [10]

(b) Explain the frequency measurement technique using Wien's bridge method. [6]

Q.4 Explain the following with suitable diagram:-

(a) Characteristics & specification of FET'S DC Voltmeters. [8]

(b) True RMS Reading electronic voltmeters. [8]

OR

Q.4 (a) Explain the construction and working of electronic voltmeters using rectifiers. [8]

(b) Explain the working of Peak to Peak type A.C. Voltmeters. [8]

Q.5 (a) Explain the importance of CRO probes. Discuss about the classification & working of CRO probes. [8]

(b) Explain the construction & working of triggered mode CRO. [8]

OR

Q.5 (a) Explain the working of Dual trace CRO with suitable diagram. [8]

(b) Explain the Electro static focussing of cathode rag oscilloscope. [8]
