Code : 1G331

R11

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations June/July 2014

Electronic Circuits

(Electronics & Communication Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE of the following
All questions carry equal marks (14 Marks each)

***

1. a) List out the characteristics of CB amplifier and mention their typical values. Draw the basic CB amplifier circuit and its equivalent h-parameter model. Derive an expression for its R_i and R_o. 7M

   b) In a single stage CB amplifier circuit, $R_E = 20K$,$R_C = 10K$, $V_{EE} = -20V$, $V_{CC} = 20V$, $R_L = 10$ K and $R_S = 0.5$ K. Find A_I , R_i, R_o, A_V . 7M

2. a) Compare emitter follower and Darlington emitter follower configurations in respect of: 7M
   (i) Current gain.
   (ii) Input impedance
   (iii) Voltage gain
   (iv) Output impedance.

   b) If four identical amplifiers are cascaded each having $f_L = 100$ Hz, determine the overall lower 3 dB frequency. Assume non- interacting stages. 7M

3. Derive all components in the Hybrid - π model in terms of h-parameters in CE Configuration. 14M

4. a) What is the relationship between the transfer gain with feedback A_f and that without feedback A. 7M

   b) Define (i) Negative feedback 7M
   (ii) Positive feedback
   (iii) The amount of feedback in decibels.

5. a) Draw and explain the circuit of a Wien bridge oscillator. 7M

   b) Give the two Barkhausen conditions required in order for sinusoidal oscillations to be Sustained. 7M

6. a) Derive an expression for the output power of a class A large-signal amplifier. 7M

   b) Show that the maximum conversion efficiency of the idealized class B push-pull circuit is 78.5 percent. 7M

7. Draw the circuit diagram of a Double tuned amplifier and derive the expression for 3-dB bandwidth. 14M

8. a) What is Voltage regulator? Explain with the help of neat circuit diagram how zener diode is used as a shunt voltage regulator? 7M

   b) List the operating ratings and electrical characteristics of **IC 723**. 7M

***

Code : 1GC32 **R11**

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations June/July 2014

Engineering Mathematics

(Common to EEE & ECE)

Time: 3 hours **Max Marks: 70**

Answer any FIVE of the following
All questions carry equal marks (14 Marks each)

* * * * *

1. a) Solve the system x+y+z=6 , x+2y+2z=14, x+4y+7z=30.

   b) Reduce A to normal form and find its rank of $A=\begin{pmatrix}1 & 2 & 3 & 4\\ 2 & 1 & 4 & 3\\ 3 & 0 & 5 & -10\end{pmatrix}$

2. Solve $y'=y^2+x, y(0)=1$. Using Taylor's series method ,compute y(0.1),y(0..2) and y(0.3)

3. Using R-K method of 4th order ,solve $\frac{dy}{dx}=\frac{y^2-x^2}{y^2+x^2}$,y(0)=1.Find y(0.2) and y(0.4).

4. a) Fit a straight line to the following data

Year x	1961	1971	1981	1991	2001
Production y	8	10	12	10	16

   And find expected production in 2006.

   b) Find the curve of best fit of the form $y=ae^{bx}$ to the following data by the method of least squares

x	1	5	7	9	12
y	10	15	5	15	21

5. a) Eliminating the arbitrary functions ϕ_1 and ϕ_2 from $z=\phi_1(x+iy)+\phi_2(x-iy)$.

   b) Obtain the partial differential equation arising from $\phi(x+y+z, x^2+y^2+z^2)=0$

6. a) Find the Fourier series to represents f(x)=$|x|$ *when* $-\pi<x<\pi$ and deduce that

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

   b) Find the half range sin series for the function f(x)=x , *when* $0<x<\pi$

7. a) Find Fourier sin and cosine transform of f(x)=$\frac{e^{-ax}}{x}$

   b) Find finite Fourier sin and cosine transform of f(x)=2x when *when* $0<x<2\pi$

8. a) Find the maximum n such that the probability of getting no head in tossing in fair coin in n times is greater than 0.1.

   b) In a normal distribution 31% of the item are under 45 and 8% are over 64 .Find the mean and variance of the distribution.

Code : 1GC34

R11

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations June/July 2014

Environmental Science

(Common to ECE & IT)

Time: 3 hours **Max Marks: 70**

Answer any FIVE of the following
All questions carry equal marks (14 Marks each)

* * * * *

1.	a)	Define the term Environment, Ecology and Environmental Studies.	7M
	b)	Write about the impacts of Industrialization on human Environment.	7M
2.	a)	Explain the applications of Solar Energy.	7M
	b)	Give a brief account of Hydrological Cycle.	7M
3.	a)	Explain the Environmental effects of over exploitation of mineral resources.	7M
	b)	Write a short note on (i) Biological Magnification (ii) Dissolve Oxygen Demand.	7M
4.	a)	Give an account of sources, effects and control measures of marine pollution.	7M
	b)	Explain the effects of Oil Pollution.	7M
5.	a)	Give the characteristic features of Grass Land Eco System.	8M
	b)	Write a short note on Ecological Pyramids.	6M
6.	a)	Write about common plant and animal species of India.	6M
	b)	Give an account Endemic and Endangered Species with examples.	8M
7.	a)	Write about Water Shed Management. Give the success story of any Water Shed Management in the country.	8M
	b)	Explain the effects of Dams on Environment and People.	6M
8.	a)	Discuss the role of IT in the protection of Environment and human health.	7M
	b)	Explain the family welfare programs.	7M

***

Code : 1G332

R11

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations June/July 2014

Pulse and Digital Circuits

(Electronics & Communication Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE Questions from the following
All questions carry equal marks (14 Marks each)

*** * * * ***

1.	a)	Derive the expression for percentage tilt of a square wave output of RC high pass circuit.	7M
	b)	Explain the response of a low pass circuit to an exponential input.	7M
2.	a)	State and prove clamping circuit theorem.	7M
	b)	Explain the operation of a two level diode clipper with the help of circuit diagram.	7M
3.	a)	Explain the transistor as a switch and define rise time, storage time, fall time and turn off time.	7M
	b)	Discuss the switching times of a junction diode.	7M
4.	a)	Design a astable multivibrator with frequency 1KHz, h_{fe}=50, $I_{C\ sat}$=5mA, $V_{CE\ sat}$=0.2v, V_{CC}=12v. Assume R_1=R_2.	7M
	b)	Explain the operation of a Schmitt trigger circuit and derive the expressions for UTP and LTP.	7M
5.	a)	Draw the circuit diagram of transistor bootstrap sweep circuit and explain its working with the help of waveforms.	7M
	b)	What is a linear time base generators? Give its applications.	7M
6.	a)	Explain the operation of UJT relaxation oscillator.	7M
	b)	Explain the frequency division by an astable multivibrator with a circuit and waveforms.	7M
7.	a)	Explain the working of two diode sampling gate with a neat diagram.	7M
	b)	Compare the unidirectional and bidirectional sampling gates.	7M
8.	a)	Compare the RTL and DTL logic families in terms of Fan out, propagation delay, power dissipated per gate and noise immunity.	7M
	b)	Why totem pole is used in DTL? Draw the circuit diagram and explain a DTL gate with totem pole.	7M

****

R11

Code : 1G333

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations June/July 2014

Random Variables and Random Processes

(Electronics & Communication Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE Questions from the following
All questions carry equal marks (14 Marks each)

* * * * *

1. a) Explain the concept of Total probability and Bayes theorem. 8M
   b) A lot of 100 semiconductor chips contain 20 that are defective. Two chips are selected at random, without replacement, from the lot. 6M
      i. What is the probability that the second one selected is defective given that the first one was defective.
      ii. What is the probability that both are defective?
2. a) State and Prove the Chebyshev inequality. 6M
   b) A random variable X can have values {-4, 1, 2, 3, 4} each with probability 1/5. Find i) the mean ii) the variance of the random variable $Y = 3X^3$ 8M
3. a) Find a constant b (in terms of a) so that the function 8M

$$f_{X,Y}(x,y) = \begin{cases} be^{-(x+y)}, & 0 < x < a, 0 < y < \infty \\ 0, & elsewhere \end{cases}$$ is a valid joint density function.

   b) Explain the joint characteristic function. 6M
4. a) A WSS random process X(t) with auto-correlation function $R_{XX}(\tau) = e^{-\alpha|\tau|}u(\tau)$, where α is a real constant, is applied to the input of an LTI system with impulse response $h(t) = e^{-\beta t}u(t)$, where β is a real constant. Find the auto-correlation function of the output $Y(t)$ of the system. 7M
   b) Derive the relationship between the power density spectrums of the input and the output of an LTI system. 7M
5. a) Define Band pass, Band Limited and Narrow Band Processes and list out the properties of Band Limited processes. 8M
   b) Write short note on Noise Bandwidth. 6M
6. a) Explain the concept of stationary random process. 8M
   b) Explain the mean-ergodic and the correlation-ergodic processes. 6M
7. a) State and prove the properties of cross correlation function. 7M
   b) Write short note on Gaussian and Poisson random processes. 7M
8. a) Explain the power spectral density and list out its properties. 8M
   b) If $R_{XY}(\tau) = e^{\alpha|\tau|}u(\tau)$, Find. $S_{XY}(\omega)$ 6M

***

Code : 1G236

R11

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations June/July 2014

Electrical Circuit Theory

(Electronics & Communication Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE of the following
All questions carry equal marks (14 Marks each)

* * * * *

1. a) Explain ideal and practical voltage and current sources. 7M

   b) Determine the voltage drop across the 10 ohm resistor in the circuit shown in figure 1(b). 7M

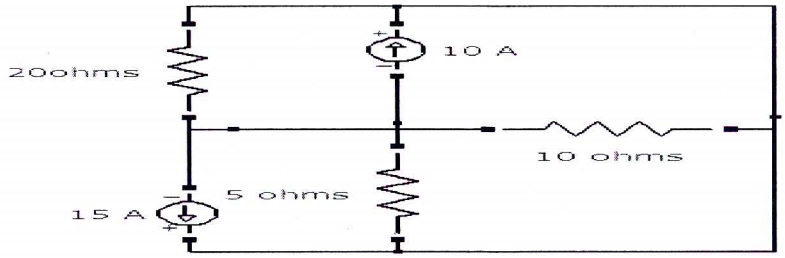

Figure 1(b)

2. a) Define 4M

   i)Node ii) Mesh iii)Super mesh iv) Super node .

   b) Determine the node voltages V_1 , V_2,V_3 in the circuit using nodal analysis in figure2(b). 10M

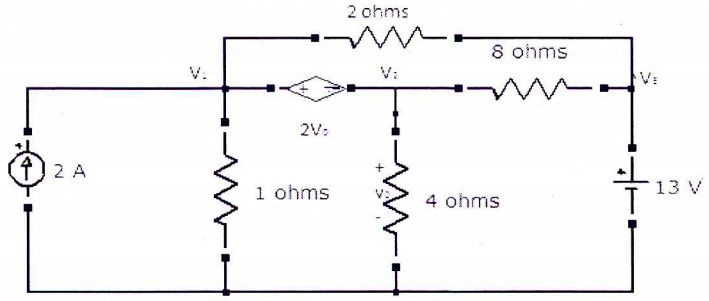

Figure 2(b)

3. a) Explain the importance of the sinusoidal waveforms. 4M

   b) Determine Form factor for the waveform in figure 3(b). 10M

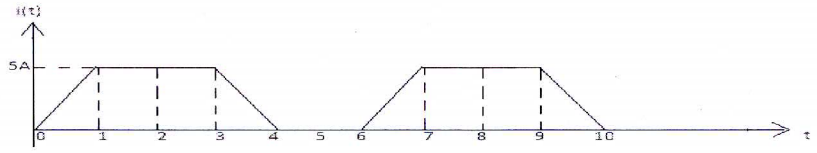

Figure 3(b)

4. a) Give the expression for frequency and current at resonance in parallel RLC circuit. 6M

   b) Find the complex power absorbed by the following elements shown in figure 4(b). 8M

   i) 1 Ohm Resistor ii) -j10 ohm resistor iii) 5+j10 ohm impedance

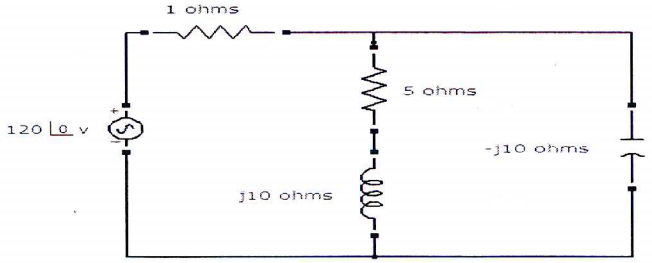

Figure 4(b)

5. a) Derive the expression for i(t) for RL series connected circuit when excited by a sinusoidal source. 8M

b) In circuit 5(b) the Switch t is closed at t=0 find the initial conditions for voltage across the capacitor, i_1, i_2,di_1/dt and di_2/dt. 6M

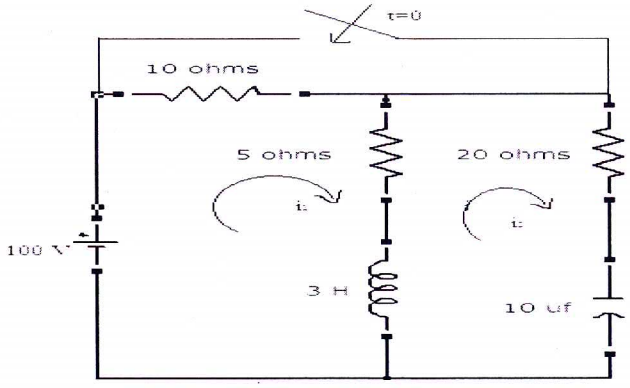

Figure 5(b)

6. Two coupled coils with L_1=0.02H, L_2=0.01H and K=0.5 are connected in four different ways, series aiding, series opposing, parallel aiding and parallel opposing. What are the four equivalent inductances? Derive any formulae used. 14M

7. a) State and explain super position theorem. Is super position theorem valid for power? Substantiate your answer. 8M

b) For the circuit shown in figure 7(b) determine Thevenin's equilent circuit. 6M

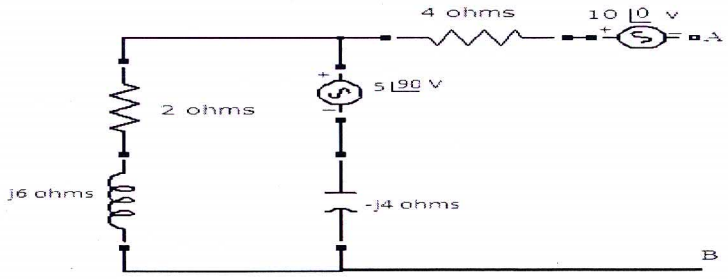

Figure 7(b)

8. a) State and explain Reciprocity theorem. 6M

b) Determine the ammeter reading When connected to 5 ohm resistor as shown in figure 8(b) using compensation theorem, the internal resistance of the ammeter is 1.5 ohm. 8M

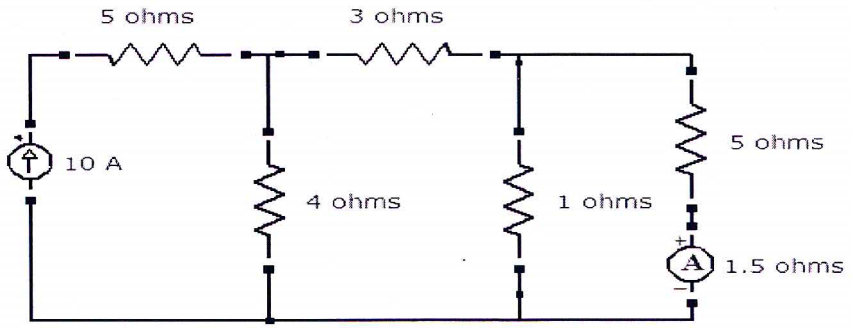

Figure 8(b)

***