Hall Ticket Number :										

R-11/R-13

Code: 1GC32

II B.Tech. I Semester Supplementary Examinations November 2016

Engineering Mathematics

(Common to EEE & ECE)

Max. Marks: 70 Time: 3 Hours

Answer *any* ***five*** questions
All questions carry equal marks (14 Marks each)
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1. a) Solve the following system of equations by Gauss elimination method $2x_1+2x_2+4x_3=18$, $x_1+3x_2+2x_3=13$, $3x_1+x_2+3x_3=14$. 10M

   b) Given the matrix $A=\begin{pmatrix}1 & 7 & 5\\ 0 & 2 & 9\\ 0 & 0 & 5\end{pmatrix}$, find the Eigen values of A, A^2, A^{-1}. 4M

2. Using Runge-Kutta method of fourth order, solve $\frac{dy}{dx}=\frac{y^2-x^2}{y^2+x^2}$ given $y(0)=1$ at $x=0.2, 0.4$. 14M

3. a) Fit a straight line for the following data

x	1	2	3	4	5	6
y	6	4	3	5	4	2

   7M

   b) Calculate correlation coefficient 'r' for the following data

x	50	60	70	90	100
y	65	51	40	26	8

   7M

4. a) Form a partial differential equation by eliminating the arbitrary function 'f' from $z=f(x^2+y^2)$. 7M

   b) Solve the partial differential equation $pxy+pq+qy=yz$ using Charpit's method. 7M

5. a) Obtain the Fourier series for $f(x)=\left(\frac{® - x}{2}\right)^2 in\ 0<x<2®$. 7M

   b) Find the half-range sine series for $f(x)=x(® - x)$ in $(0,®)$ and deduce $\frac{1}{1^3}-\frac{1}{3^3}+\frac{1}{5^3}-\frac{1}{7^3}+\ldots$ 7M

6. Find the Fourier transform of $f(x)=\begin{cases}1-x^2 & if\ |x|\le 1\\ 0 & if\ |x|>1\end{cases}$. Hence prove that $\int_0^{\infty}\frac{\sin s - s\cos s}{s^3}\cos\left(\frac{s}{2}\right)ds=\frac{3®}{16}$. 14M

7. a) From the following data of the marks obtained by 60 students of a class, calculate the arithmetic mean, median and mode.

Marks	20	30	40	50	60	70
No. of students	8	12	20	10	6	4

   7M

   b) A random variable x has the following probability function:

x	0	1	2	3	4	5	6	7
y	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2+K$

   (i) Find the value of 'K'
   (ii) Evaluate P(X<6),P(X≥6)
   (iii) Evaluate P(0<X<5) 7M

8. a) The mean and variance of a binomial variable X with parameters n and p are 16 and 8.Find P(X≥1) and P(X>2). 7M

   b) In a Normal distribution, 7% of the items are under 35 and 89% are under 63.Determine the mean and variance of the distribution. 7M

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Hall Ticket Number :										

R-11 / R13

Code: 1G236

II B.Tech. I Semester Supplementary Examinations November 2016

Electrical Circuit Theory

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any* **five** questions.
All Questions carry equal marks (14 Marks each)

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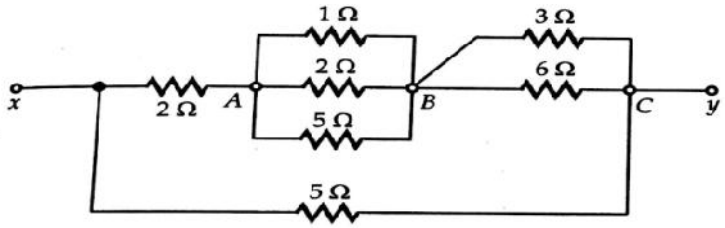
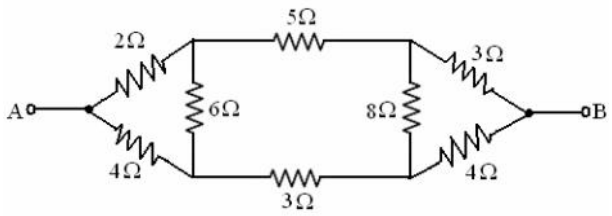
1. a) Explain in detail the Voltage and Current relationship in R, L and C elements. What are meant by independent and dependent sources? Give examples. 7M

   b) Find the equivalent Resistance across the terminals X-Y for the circuit shown below?



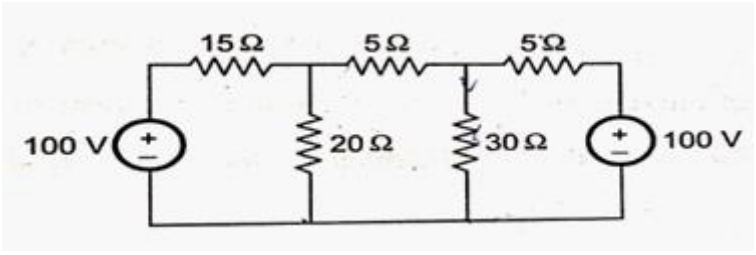
7M

2. a) Find the Resistance across the terminals 'A-B' for the circuit as shown in the following figure.



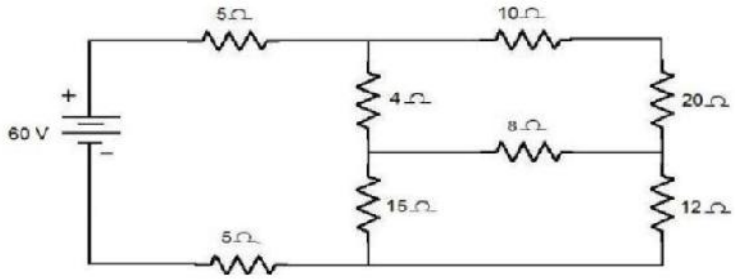
7M

   b) Find the current through 30Ω resistance using Nodal analysis?



7M

3. a) In the network shown below, find the current delivered by the battery.



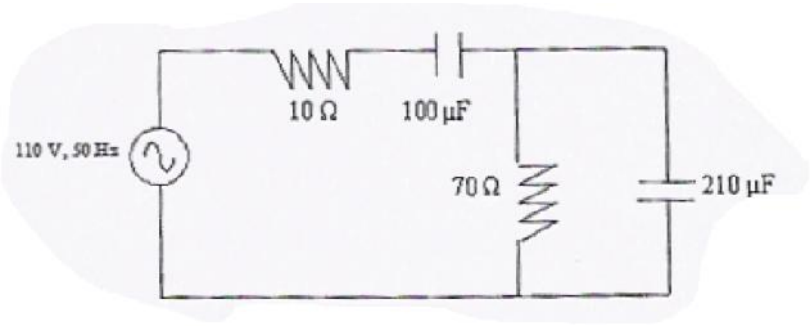
7M

   b) State the properties of series R-L-C Resonance circuit and obtain the Resonance frequency? 7M

4. a) A Circuit consists of resistance of 15 ohms, a capacitance of 200μF and inductor of 0.05H all in series. If the supply of 230V, 50Hz is applied to the ends of the circuit, Calculate : (**i**) Current in the coil (**ii**) Potential difference across each element (**iii**) Draw the Phasor diagram. 7M

   b) Derive the relation between self inductance, Mutual Inductance and Coefficient of Coupling. 7M

5. a) Determine the total impedance, total current and phase angle for the following circuit



7M

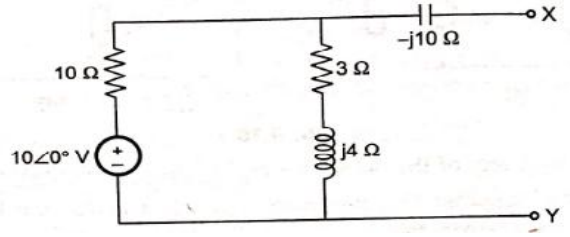
   b) A series connected RLC circuit has R = 4 Ohms and L = 25mH
   (i) Calculate the value of C that will produce a quality factor of 50
   (ii) Find ω_1, ω_2 and Bandwidth 7M

6. a) Define the band width and derive the expression for bandwidth of series resonating circuit and its relation with Q factor. 7M

   b) A coil of resistance 10 Ω and inductance 0.1 H is connected in series with a 150 μF capacitor across 200V,50 Hz supply. Calculate (i) Inductive reactance, Capacitance reactance, impedance, current and power factor. (ii) resonant frequency and Quality factor 7M

7. a) State and explain Telligen's and Compensation Theorem. 7M

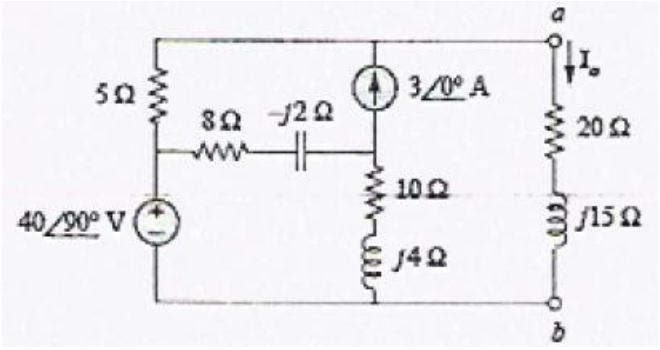
   b) Obtain the Thevenin's equivalent of network shown below between the terminals X-Y?



7M

8. a) State Maximum Power Theorem and derive the condition for Maximum Power Transferred from Source to the resistive load? 7M

   b) Find the current I_o for the circuit shown in the following figure by using Norton's Theorem.



7M

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Hall Ticket Number :										

R-11/R-13

Code: 1G331

II B.Tech. I Semester Supplementary Examinations November 2016

Electronic Circuits

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any* ***five*** questions
All questions carry equal marks (**14 Marks** each)

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1. a) State and prove Miller's Theorem 4M
   b) Given a single stage transistor amplifier with h-parameters h_{ie}=1.1kΩ ,h_{fe}=50,h_{oe}=25μA/V and h_{re}=2.5*10^{-4} .Calculate A_I,A_V,A_{Vs} ,R_I and R_o for CC transistor configuration with R_S=R_L=10 kΩ 10M

2. a) i. Explain the concept of Bootstrapping. 3M
      ii. What is the effect of coupling and bypass capacitor on the frequency response of RC coupled amplifier. 5M
   b) Derive the expression for A_i and R_i of bootstrapped darlington circuit. 6M

3. a) Derive the expression for Common Emitter short circuit gain A_i as a function of frequency 7M
   b) A transistor has h_{ie}=6kΩ h_{fe}=224 at I_C =1MA with f_T=80MHz and $C_{b'c}$=12pF.Determine g_m, $r_{b'e}$ and $c_{b'e}$ at room temperature. 7M

4. a) Classify the amplifier based on feedback topology and give their block diagrams. How the input and Output impedances are affected in each case. 6M
   b) Draw the current series feedback amplifier and analyze the circuit to calculate A_{if} , A_{vf}, R_{if} and R_{of} if R_C= 1KΩ, R_e =100Ω, C_e =10μF, R_s =100Ω, R_1 =30KΩ, R_2 =20KΩ, h_{fe} =50, h_{ie} =1.1KΩ and h_{oe} =h_{re} =0 8M

5. a) State the stability condition in terms of Bode plots 3M
   b) What are the Barkhusain conditions of oscillations in electronic systems? What is their significance? 4M
   c) With a neat circuit diagram, explain the operation of Colpitts oscillator using BJT and find an expression for its frequency of oscillation? 7M

6. a) Explain the working of complementary symmetry class B push pull amplifier. What are its advantages 7M
   b) A push pull class B A.F power amplifier supplies maximum of 0.5W to a 8Ω loudspeaker through an ideal transformer having Centre tap. Each of the two identical transistors used in the circuit has $V_{CE(sat)}$=0.6V. Assuming V_{CC}=12V, calculate suitable turns ratio and power dissipated per transistor. 7M

7. a) State the applications of tuned amplifiers 3M
   b) What is a stagger tuned amplifier? Explain its working? 5M
   c) What is the effect of cascading on single and double tuned amplifiers bandwidth and obtain the expression. 6M

8 a) Explain the operation of transistorized series regulator? 5M
   b) Define Line and Load Regulation 5M
   c) Explain various IC voltage regulators 4M

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Hall Ticket Number :										

R-11 / R-13

Code: 1G332

II B.Tech. I Semester Supplementary Examinations November 2016

Pulse and Digital Circuits

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer any ***five*** questions
All Questions carry equal marks (14 Marks each)

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1. a) Define linear wave shaping? Discuss the response of RC low-pass circuit with step and pulse inputs along with output waveforms. 8M
   b) A 1KHz square wave output from an amplifier has rise time tr = 200ns and percentage of tilt is 10%, determine lower and upper frequencies. 6M

2. a) Explain the RC differentiator with input and output waveforms. 7M
   b) What is an attenuator? Define clamping theorem? 7M

3. a) Explain how transistor acts as a switch? Draw the characteristics and explain 7M
   b) What do you mean by delay time of a transistor? What are the factors contribute to it? 7M

4. a) Draw a neat diagram of bi-stable multivibrator using transistor and explain its working with help of timing diagrams 7M
   b) Explain Schmitt trigger circuit with neat waveforms. Derive expressions for UTP and LTP 7M

5. a) What is meant by boot strapping? Explain the principle of operation and working of a bootstrap sweep circuit with the help of neat diagrams. 6M
   b) What are the different methods of generating a time base waveform? Explain them briefly 8M

6. a) What is meant by sampling gates? Explain the working of four diode sampling gate with help of neat circuit diagram. 7M
   b) Draw the circuit of an emitter coupled bi-directional sampling gate and explain in detail 7M

7. a) Explain the method of pulse synchronization of relaxation devices with examples 6M
   b) Explain the principle of synchronization in sweep circuits and describe how frequency division synchronization is done in astable relaxation circuits with the help of neat diagrams 8M

8. a) Explain DTL and RTL circuits with suitable circuit diagrams 8M
   b) Explain the working of TTL-NAND with suitable circuit diagram 6M

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Hall Ticket Number :										

R-11 / R-13

Code: 1G333

II B.Tech. I Semester Supplementary Examinations November 2016

Random Variables and Random Processes

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer any ***five*** questions
All Questions carry equal marks (14 Marks each)
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1. a) What is Baye's theorem? Explain. 7M
   b) What is Poisson Distribution? Explain in brief. 7M

2. a) Write short notes on Moments about origin and Moments about mean 7M
   b) A random variable X has the density function $f_X = 1/a\ e^{-b1x1}$ $-\infty \le x \le \infty$
   Find E[X], $E[X^2]$ 7M

3. a) State and prove properties of joint CDF 7M
   b) If the function $f_{XY} = be^{-2x} \cos(y/2)$: $0 \le x \le 1$
   $0 : 0 \le y \le \pi$
   0: elsewhere
   Where 'b' is a positive constant is valid joint density function, find 'b'. 7M

4. a) Discuss transmission of Random process through linear system. 7M
   b) Explain the spectral characteristics of system response. 7M

5. a) Derive the expression for bandwidth of noise system. 7M
   b) Derive the expression for effective input noise temperature? 7M

6. a) Explain about different types of random process. 7M
   b) Explain about time averages and ensemble averages of random process. 7M

7. a) State and prove the properties of Auto-correlation Function. 7M
   b) State and prove the properties of Cross-correlation Function 7M

8. a) State and prove the properties of Power spectral density. 7M
   b) Find the Power spectral density of a random process $z(t)= x(t) + y(t)$, where x(t) and y(t) are zero mean , individual random process. 7M

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