Hall Ticket Number :										

R-11/R-13

Code : 1GC34

II B.Tech. I Semester Supplementary Examinations May/June 2016

Environmental Science

(Common to ECE & IT)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

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1. Define environment. Explain the components and scope of environmental studies. 14M

2. a) Write notes on effect of mining on forest and tribal people. 7M
   b) Justify the necessity of developing non-conventional sources of energy. 7M

3. a) What are the various ways by which land is degraded? 7M
   b) Discuss role of an individual in conservation of natural resources. 7M

4. a) Write about solid waste management of urban waste. 8M
   b) Discuss the effects and control measures of thermal pollution. 6M

5. a) What is ecosystem? Classify ecosystems. 5M
   b) Discuss in brief about producers, consumers and decomposers. 9M

6. a) Differentiate between genetic diversity and species diversity. 6M
   b) Write about biodiversity at local, global and national levels. 8M

7. a) What is rainwater harvesting? Classify the rainwater harvesting methods. 8M
   b) What is sustainable development? What are the important? 6M

8. Discuss in brief.
   a) Family welfare programme in India. 7M
   b) Environment and human health. 7M

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Hall Ticket Number :										

Code : 1GC32

R-11/R-13

II B.Tech. I Semester Supplementary Examinations May/June 2016

Engineering Mathematics

(Common to EEE & ECE)

Max. Marks: 70 **Time: 03 Hours**

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

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1. a) Determine the Rank of the Matrix $A=\begin{bmatrix} 6 & 1 & 3 & 8 \\ 4 & 2 & 6 & -1 \\ 10 & 3 & 9 & 7 \\ 16 & 4 & 12 & 15 \end{bmatrix}$ by reducing it to the Normal form 7M

   b) Describe the System of equations are consistent and solve them completely $3x+3y+2z=1$; $x+2y=4$; $10y+3z=-2$; $2x-3y-z=5$. 7M

2. a) Evaluate Real root of the Equation $x e^{x}-\cos x=0$ using Newton Raphson Method. 7M

   b) Compute $y(0.1)$ and $y(0.2)$, if $y(x)$ is the solution of initial value problem $y^{1}=xy+y^{2}$, $y(0)=1$ by the Runge-Kutta Method 7M

3. a) Fit a Straight line $y=ax+b$ to the data $y(1961)=8$, $y(1971)=10$, $y(1981)=12$, $y(1991)=10$, $y(2001)=16$ and Find the expected production in 2006, where x represents years and y represents production in thousand tones. 7M

   b) Obtain the Rank Correlation coefficient for the following data

X	68	64	75	50	64	80	75	40	55	64
Y	62	58	68	45	81	60	68	48	50	70

   7M

4. a) Form a partial differential equation by eliminating the arbitrary functions $f(x)$ and $g(y)$ from $z=yf(x)+x\,\mathrm{g(y)}$. 7M

   b) Solve $\frac{\partial u}{\partial x}=2\frac{\partial u}{\partial t}+u$, where $u(x,0)=6e^{-3x}$ by the Separation of variables method. 7M

5. Expand $f(x)=x\sin x, 0<x<2®$ as a Fourier Series. 14M

6 a) Find the Fourier Cosine Transform of $e^{-ax}\sin ax$. 7M

   b) Evaluate the Integrals (i) $\int_{0}^{\tilde{}}\frac{\cos px}{a^{2}+p^{2}}dp$ (ii) $\int_{0}^{\tilde{}}\frac{p\sin px}{a^{2}+p^{2}}dp$ by Fourier Transform Technique. 7M

7. a) For a continuous Random Variable X, show that $E(aX+b)=aE(X)+b$ and $Var(aX+b)=a^{2}Var(X)$ where a and b are constants. 7M

   b) For the continuous probability function $f(x)=kx^{2}e^{-x}$, when $x\geq 0$, find (i) k (ii) Mean (iii) Variance 7M

8. Out of 800 Families with 5 Children each, How many would you expect to have (i) 3 Boys (ii) 5 Girls (iii) Either 2 or 3 Boys (iv) At least one Boy ? Assume equal probabilities for Boys and Girls. 14M

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Hall Ticket Number :										

Code : 1G236

R-11/R-13

II B.Tech. I Semester Supplementary Examinations May/June 2016

Electrical Circuit Theory

(Electronics & Communication Engineering)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

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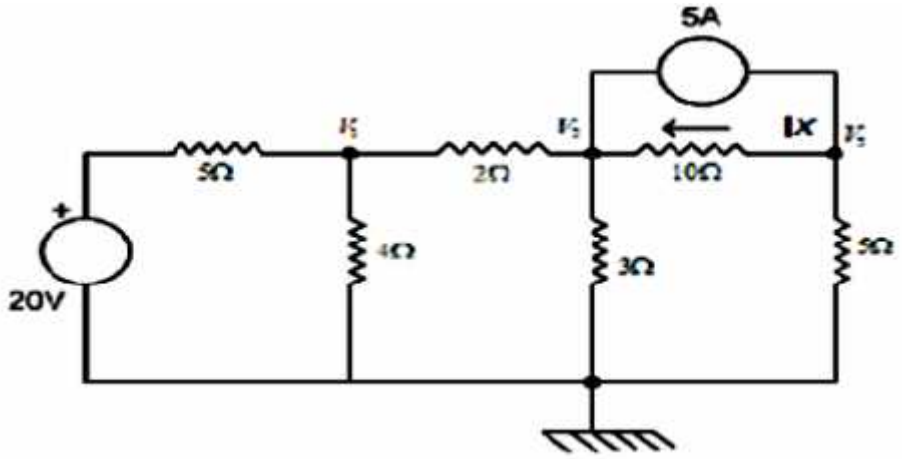
1. a) Three resistors 12 ohm, 18 ohm and 36 ohm are connected in parallel. This parallel circuit is connected in series with a resistor 'R'. The whole circuit is connected to supply of 60 Volt and it is found that power developed in 12-ohm resistor is 48 watts. Determine the value of R and total power. 8M

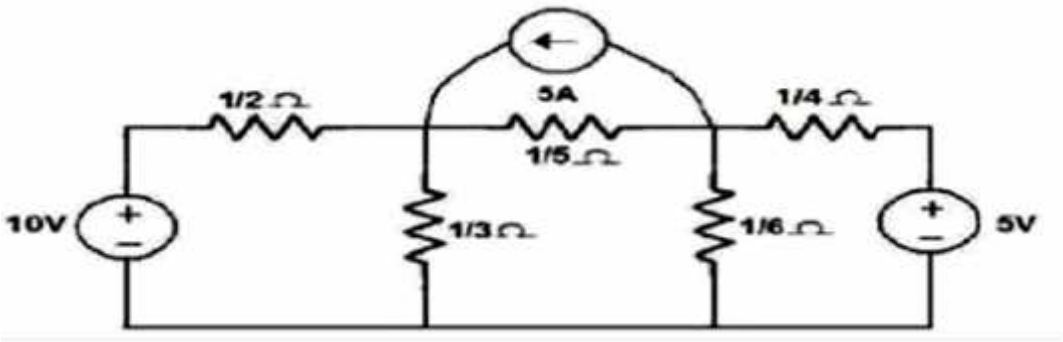
   b) Differentiate between ideal sources and practical sources 6M

2. a) Find the node voltages *V*1, V2 and V3 in the network of fig, And find the current I*x*.



7M

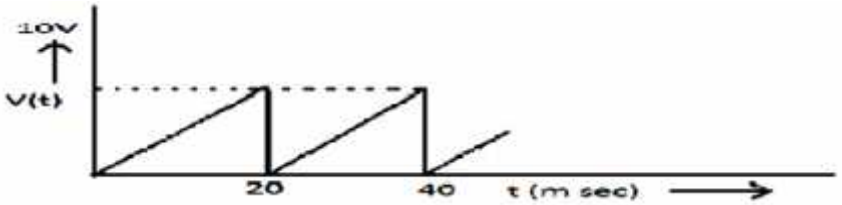
   b) For the mesh-current analysis, explain the rules for constructing mesh impedance matrix and solving the matrix equation [Z]I = V



7M

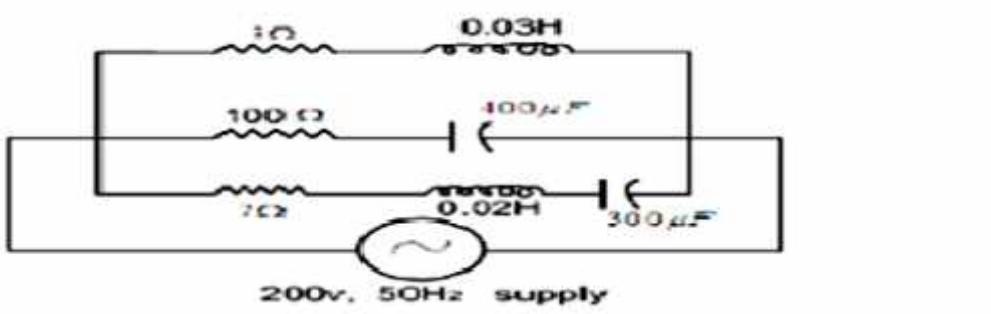
3 a) Define power factor. What is its Importance in a.c. Circuits? 7M

   b) A saw tooth voltage as shown in figure is applied to a capacitor of C= 30micro Farad. Find the capacitor current



7M

4. a) A sinusoidal 50Hz voltage of 200v supplies the three parallel circuits as shown in figure Find the current in each circuit and the total current. Draw the vector diagram



8M

b) Derive bandwidth for a series RLC circuit as a function of resonant frequency 6M

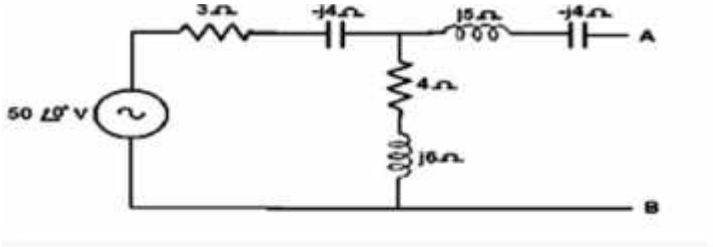
5. a) A balanced three phase star connected load with impedance 8+j6 ohm per phase is connected across a symmetrical 400V three phase 50Hz supply. Determine the line current, power factor of the load and total power 7M

b) With a neat circuit and phasor diagram explain the three-phase power measurement by two-wattmeter method and derive the expression for Power Factor. 7M

6. a) What is mutual inductance? Derive an expression for the mutual inductance between two magnetically coupled coils having self-inductances L1 and L2 respectively 6M

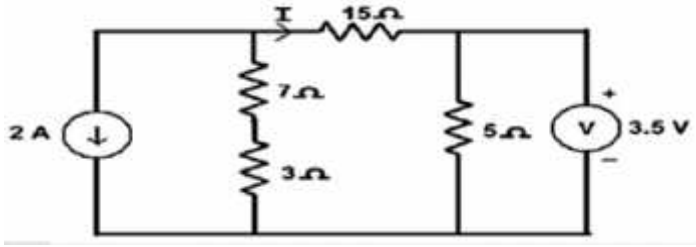
b) Define: (**i**) Flux. (**ii**) mmf (**iii**) Reluctance. (**iv**) Magnetic field intensity 8M

7. a) Determine the Thevenin's equivalent for the figure



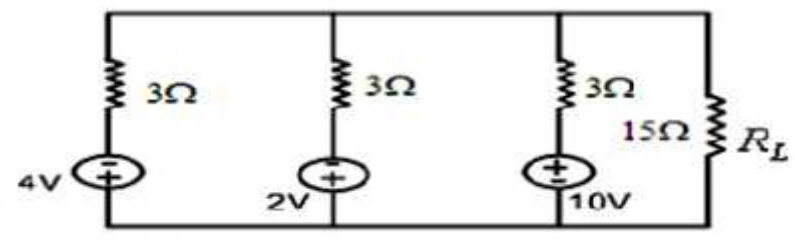
7M

b) For the circuit shown, use superposition theorem to compute current I.



7M

8. a) Find the current through load resistance R_L and also find the voltage drop across load using Millman's theorem for the network as shown in fig



7M

b) State and explain Tellegan's theorem? 7M

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Hall Ticket Number :										

R-11/R-13

Code : 1G331

II B.Tech. I Semester Supplementary Examinations May/June 2016

Electronic Circuits

(Electronics & Communication Engineering)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

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1	a)	Define millers theorem and it's dual	4M
	b)	For the emitter follower the circuit parameters are Rs=400Ω, R_1=R_2=60KΩ, R_L=2.2KΩ, h_{fe}=100 and h_{ie}=1.1KΩ.determine the input resistance, output resistance, current gain and voltage gain.	10M
2	a)	How two amplifiers are cascaded using coupling.	4M
	b)	Give the complete analysis of RC coupled CE amplifier.	10M
3	a)	Write short notes on the effect of coupling capacitor on low frequency response.	6M
	b)	A BJT has g_m =38m mhos, $R_{b'e}$=5.9KΩ, h_{ie}=6KΩ, $r_{bb'}$=100Ω, $C_{b'c}$=12pF, $C_{b'e}$=63pF and h_{fe}=200 at 1KHz calculate α and β cutoff frequencies and f_T.	8M
4	a)	What are the effects of negative feedback in amplifiers	6M
	b)	An amplifier has a midband gain of 120 and a bandwidth of 250KHz **i)** If 4% negative feedback is introduced, find the new bandwidth and gain. **ii)** If the bandwidth is to be restricted to 1MHz, find the feedback ratio.	8M
5	a)	What is the function of R and C elements in RC coupled oscillator	4M
	b)	A crystal has the following parameters L=0.5H, Cs=0.06pF, Cp=1pF and R=5KΩ. Find the series and parallel resonant frequencies and Q factor of the crystal.	10M
6	a)	How crossover distortion occurs in power amplifier.	7M
	b)	Derive the power efficiency in class B power amplifier.	7M
7	a)	What is stagger tuning? How it improves selectivity.	6M
	b)	A tank circuit has a capacitor of 110 pF and a inductor of 90μH.the resistance of the inductor is 5Ω determine **i)** The resonant frequency, **ii)** Impedance at resonance and **iii**) Q-factor and bandwidth.	8M
8	a)	List different 78xx and 79xx series voltage regulators.	4M
	b)	Explain 723-voltage regulator in detail.	10M

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Hall Ticket Number :										

R-11 / R-13

Code: 1G332

II B. Tech. I-Semester Supplementary Examinations May/June 2016

Pulse & Digital Circuits

(Electronics & Communication Engineering)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

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1. a) Explain the response of RC low pass circuit for exponential input signal. 7M
   b) A limited ramp is applied to an RC differentiator. What is the peak of the output wave form for i) T = RC ii) T= 0.2 RC iii) T=5RC 7M

2. a) What are the clamping circuits? State and prove the clamping circuit theorem. 7M
   b) Explain the two level transistor clipper circuits. Derive the equation for input voltage swing. 7M

3. a) Define the following:
      i) Storage time ii) Delay time iii) Rise time iv) Fall time 8M
   b) Write short notes on:
      i) Diode Switching times ii) Switching characteristics of transistor. 6M

4. a) Draw the circuit diagram of Schmitt trigger and explain its operation. Derive the expression for UTP and LTP. 7M
   b) Draw and explain the operation of collector-coupled monostable multivibrator. 7M

5. a) Explain the basic principle of Miller and bootstrap time base generators. 7M
   b) Design a relaxation oscillator to have 2 kHz output frequency using 2N3980 and 20V supply. Calculate the output amplitude.
      Note: Specification are η = 0.68 to 0.82, I_P =2μA, I_V = 1mA, and $V_{BE(sat)}$ =3V. 7M

6. a) With the help of neat diagram, explain the working of two diode sampling gate. 7M
   b) What is pedestal? How it affects the output of a sampling gate. 7M

7. a) Explain the synchronization of sweep circuit with symmetrical signals. 7M
   b) Discuss in brief about the sine wave frequency division with a sweep circuit. 7M

8. a) Explain the positive logic AND gate and negative logic AND gate using diode logic. 7M
   b) Draw and explain two-input TTL NAND gate with neat sketch. 7M

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Hall Ticket Number :										

R-11/R-13

Code : 1G333

II B.Tech. I Semester Supplementary Examinations May/June 2016

Random Variables and Random Processes

(Electronics & Communication Engineering)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

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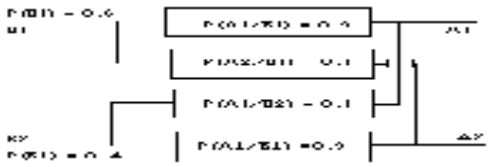
1. a) Define Bay's Theorem and Conditional probability 6M

   b) An elementary binary communication system consists of a transmitter that sends one of two possible symbols (a 1 or a 0) over a channel to a receiver. The channel occasionally causes errors to occur so that a 1 shows up at the receiver as a 0, and vice versa. The probabilities that the symbols 1 and 0 are selected for transmission are assumed to be $P(B_1)=0.6$ and $P(B_2)=0.4$.. Assume A_1 and A_2 are two receivers and B_1 and B_2 are two transmitters. Assume, the channel is binary symmetric channel. Calculate the $P(B_1/A_1)$, $P(B_2/A_2)$, $P(B_1/A_2)$ and $P(B_2/A_1)$.



8M

2. a) Define Moments. 4M

   b) Find Characteristic function and Moment generating function of the given exponential density function.

$$f_x(x) = \begin{cases} \frac{1}{b}e^{-(x-a)/b} & x > a \\ 0 & x < a \end{cases}$$

10M

3. a) Show that "*the density function of the sum of two statistically independent random variables is the convolution of their individual density functions*" 7M

   b) Prove that *" The mean value of a weighted sum of random variables equals the weighted sum of mean values"*. 7M

4. Derive relations of Mean, Mean squared value of system response and Auto-correlation function of response in Random signal response of linear systems 14M

5. Define noise band width and Explain Modeling of noise Sources? 14M

6 Define Time averages and ergodicity. Derive the expression for mean-Ergodic and correlation-Ergodic processes. 14M

7. a) Define Auto-correlation function and list its properties. 6M

   b) Find the mean and variances of the random processes X(t). It's Auto-correlation function is shown below. Assume X(t) is stationary Ergodic processes with no periodic component.

$$R_{XX}(\tau) = 25 + \frac{4}{1+6\tau^2}$$

8M

8. Derive the expression for *Wiener-Khintchine* relations 14M

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