Hall Ticket Number :

Code: 4GC34

R-14

II B. Tech. I-Semester Regular Examinations Nov/Dec 2015

Environmental Science

(Common to ECE & IT)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70Marks)

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UNIT-I

1.	a)	Write a note on need for public awareness of environment and its importance	7M
	b)	Explain the main causes for environmental pollution and mention few preventive measures	7M

OR

2.	a)	Explain the problems associated with natural resources due to over exploitation	7M
	b)	Discuss the role of people in protecting the environment with respect to loss of biodiversity	7M

UNIT-II

3.	a)	What are the effects of deforestation and write a note on remedial measures to be taken.	7M
	b)	Discuss the pros and cons of traditional agriculture and modern agriculture	7M

OR

4.	a)	Write a note on renewable and non renewable energy resources	7M
	b)	What is the role of an individual in conserving natural resources	7M

UNIT-III

5.	a)	Differentiate producers, consumers and decomposers	7M
	b)	What are ecological pyramids? Explain?	7M

OR

6.	a)	Write a detailed note on biodiversity in India	7M
	b)	Give a brief account on values of biodiversity	7M

UNIT-IV

7.	a)	Define pollution. Write a note on different types of pollutions	7M
	b)	What is the main cause of global warming and what are the measures to be taken	7M

OR

8.	a)	What are the causes for the solid waste production and how it effects the environment?	7M
	b)	How sold waste is managed in urban area.	7M

UNIT-V

9.	a)	Write a note on different methods of rain water harvesting	7M
	b)	write short notes on acid rains and ozone layer depletion	7M

OR

10.	a)	Explain in detail about the water act (prevention and pollution)	7M
	b)	What is population explosion, write few reasons for it.	7M

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Hall Ticket Number :										

R-14

Code: 4GC32

II B. Tech. I-Semester Regular Examinations Nov/Dec 2015

Engineering Mathematics

(Common to EEE & ECE)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70Marks)

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UNIT-I

1. (a) Find the Fourier series expansion for $f(x) = \pi - x$ in $0 < x < \pi$.

   (b) Find the half-range sine series for $f(t) = t - t^2$ in $0 < t < 1$.

OR

2. (a) If $F(s)$ is the complex Fourier transform of $f(x)$ then prove that $F\{f(ax)\}=\frac{1}{a}F\left(\frac{s}{a}\right)$ $a \neq 0$.

   (b) Find the Fourier cosine transform of $(x) = e^{-ax}$ $(x > 0, a > 0)$.

UNIT-II

3. (a) Reduce A into Echelon form and determine its rank

$$A = \begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{bmatrix}$$

   (b) Solve the system of equations

$$x + 3y - z = 0; \quad 2x - y + 4z = 0; \quad x - 11y + 14z = 0.$$

OR

4. (a) List the properties of Eigen values and Eigen vectors.

   (b) Find the Eigen values and Eigen vectors of $A = \begin{bmatrix} 3 & 2 \\ 1 & 2 \end{bmatrix}$

UNIT-III

5. (a) Using the Newton-Raphson method, evaluate to two decimal places the root of the transcendental equation $f(x) = e^x - 3x = 0$. Using between 0 and 1.

   (b) Find the real root of the equation $x^3 + x-1=0$ using the method of iteration.

OR

6. Use Runge Kutta method to evaluate $y(0.1)$ and $y(0.2)$ given that $y' = x + y, y(0) = 1$.

UNIT-IV

7. (a) Using Newton's forward interpolation formula and the given table values

x	1.1	1.3	1.5	1.7	1.9
y	0.21	0.69	1.25	1.89	2.61

Obtain $f(x)$ when $x = 1.4$

(b) Using Lagrange is interpolation formula find the value of $y(10)$ from the following table:

x	5	6	9	11
y	12	13	14	16

OR

8. Evaluate $\int_0^6 \frac{1}{1+x} dx$ by using

(i) $\text{Simpson's} \frac{1}{3}$ rule (ii) $\text{Simpson's} \frac{3}{8}$ rule.

UNIT-V

9. (a) Fit a straight line $y = a + bx$ from the following data

x	0	1	2	3	4
y	1	1.8	3.3	4.5	6.3

(b) Fit a second degree polynomial to the following data by the method of least squares

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

OR

10. (a) Eliminate the arbitrary function from $z = x - y + f(x, y)$.

(b) Solve $\frac{\partial^2 u}{\partial x^2} - 2\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = 0$

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Hall Ticket Number :										

Code: 4G235 **R-14**

II B. Tech. I-Semester Regular Examinations Nov/Dec 2015

Electrical Circuit Theory

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70Marks)

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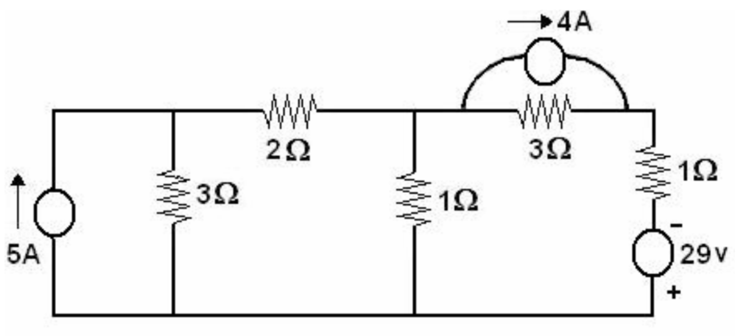
UNIT-I

1. a) Derive expressions for star to delta transformation. 7M

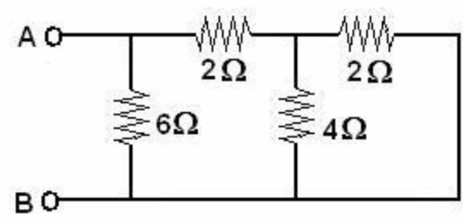
   b) Determine the current in the 2 ohms resistor for the circuit shown using nodal analysis.



7M

OR

2. a) Determine the equivalent resistance between A and B of the network shown



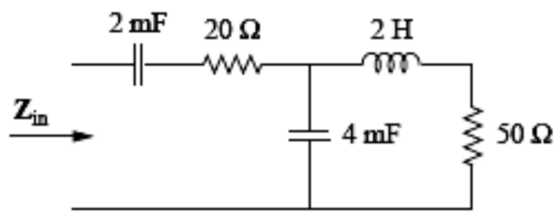
7M

   b) Explain current and voltage division rules in a given network. 7M

UNIT-II

3. a) A circuit contains two impedances Z1 = (3 + J4) ohms and Z2 = (4 + J3) ohms in parallel and connected to 50V, 50 Hz supply. Determine the currents through impedances, total current, power and power factor. 7M

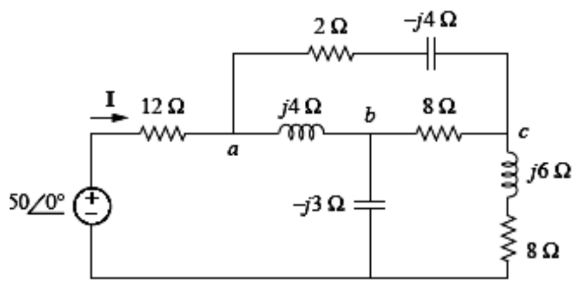
   b) Determine the input impedance of the circuit shown in below Figure.4 at ω = 10 rad/s.



7M

OR

4. Find current **I** in the circuit shown in below Figure



14M

UNIT-III

5. a) Derive bandwidth for a series RLC circuit as a function of resonant frequency 7M

b) A series RLC circuit has R=20 ohm, L=0.005H and C = 0.2 x 10-6 F. It is fed from a 100V variable frequency source. Find **i)** resonant frequency **ii)** impedance at this frequency **iii)** band width and **iv)** Q-factor 7M

OR

6. a) A steel ring of 25cm mean diameter and of circular section of 3 cm in diameter has an air gap of 1.5 mm length. It is wound uniformly with 700 turns of wire carrying a current of 2 A. Calculate

i) magneto motive force

ii) flux density

iii) magnetic flux 7M

b) Two coils connected in series have an equivalent inductance of 0.8H when connected in aiding, and an equivalent inductance of 0.5H when the connection is opposing. Calculate the mutual inductance of the coils. 7M

UNIT-IV

7. a) Two wattmeters are used to measure power in a 3 phase, 3 wire load. Determine the total power, power factor and reactive power if the two wattmeter's read **(i)** 1000 watt each, both positive **(ii)** 1000 watt each, but of opposite sign. 7M

b) A symmetrical 400 V, 3-phase, supplies a star connected load with $Z_R = 5\ \Omega$, $Z_Y = j5\ \Omega$ and $Z_B = -j5\ \Omega$. Determine the line currents when the phase sequence is RYB. 7M

OR

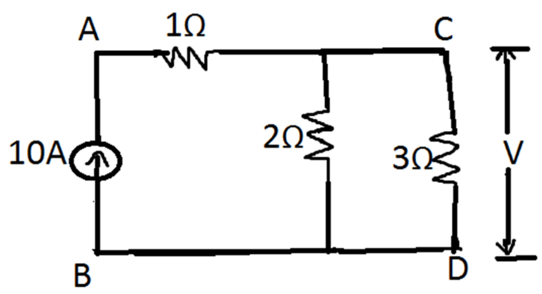
8. a) Derive the relations between line and phase quantities of a balanced three phase star connected system. 7M

b) Describe Millman's method of solving unbalanced 3-wire star connected load. 7M

UNIT-V

9. a) With suitable example explain Tellegen's theorem for AC circuits. 7M

b) Verify the reciprocity theorem for the circuit shown in figure

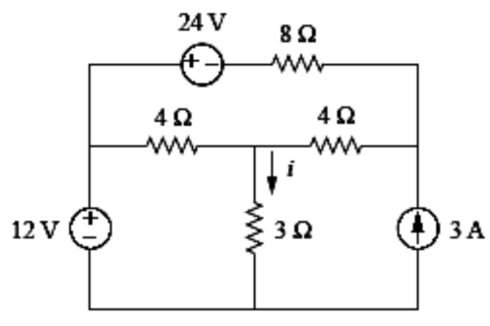


7M

OR

10. a) State and explain superposition theorem. 7M

b) Use the superposition theorem to find *the current* **i** for the circuit shown in figure.



7M

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Hall Ticket Number :										

Code: 4G331

R-14

II B. Tech. I-Semester Regular Examinations Nov/Dec 2015

Electronic Circuits

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70Marks)

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UNIT-I

1. a) Sketch the h parameter model for CB configuration 4M
   b) Derive the expressions for current gain, input impedance, voltage gain, output impedance of a transistor. 10M

OR

2. a) List the characteristics and applications of common base amplifier. 4M
   b) Explain common source amplifier with neat sketch. 10M

UNIT-II

3. a) What are half power frequencies? 4M
   b) What is the effect of emitter bypass capacitor on low frequency response? 10M

OR

4. a) What is gain bandwidth product? 4M
   b) A certain BJT transistor has $r_\pi = 2k\Omega$ and $\beta = 100$ at 1MHz and $\beta = 5$ at 20MHz. determine the values of $f_t, f_b\ and\ c_\pi$. 10M

UNIT-III

5. a) List the advantages of negative feedback. 6M
   b) An amplifier has midband gain of 125 and a bandwidth of 250KHz calculate 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

OR

6. a) Explain voltage shunt feedback 8M
   b) List the differences between different types of negative feedbacks 6M

UNIT-IV

7. a) Classify the oscillators according to the frequency generated. 4M
   b) Derive the expression for the frequency for RC phase shift oscillator. 10M

OR

8. a) Explain the working of crystal oscillator. 6M
   b) A collipits oscillator is designed with C_1=100pF and C_2= 7500pF.The inductance is variable. Determine the range of inductance values, if the frequency of oscillations is to vary between 950 KHz to 2050 KHz. 8M

UNIT-V

9. a) Explain transformer coupled class A power amplifier with neat sketch. 8M
   b) Calculate the transformer turn ratio to match a 8Ω speaker load to an amplifier so that the effective load resistance is 7.2KΩ. 6M

OR

10. a) What are the basic characteristics of a tuned amplifier? 4M
    b) Explain single tuned transformer coupled amplifier. 10M

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Hall Ticket Number :										

R-14

Code: 4G332

II B. Tech. I-Semester Regular Examinations Nov/Dec 2015

Pulse and Digital Circuits

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70Marks)

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UNIT-I

1. a) What is high-pass filter? Derive an expression for the output of a high-pass circuit excited by a ramp input. 8M
   b) In an RC low-pass circuit R=2KΩ and C= 1μF. A square wave with half period of 5μs is applied as input to this circuit. Determine the output waveform. 6M

OR

2. a) What is an attenuator? Write application of attenuators in CRO? 6M
   b) Explain the RC integrator with neat input and output waveforms. 8M

UNIT-II

3. a) Explain how transistor acts as a switch? Draw the characteristics and explain 7M
   b) What is meant by piece wise linear approximation? Draw the V-I characteristics of junction diode on the basis of above approximation. 7M

OR

4. a) Discuss series and shunt clipper using diode along with relevant waveforms 8M
   b) Explain the clamping circuit theorem 6M

UNIT-III

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. 8M
   b) Discuss the differences between Miller sweep circuit and Bootstrap sweep circuit. 6M

OR

6. a) 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
   b) Explain about methods of linearity improvement? 6M

UNIT-IV

7. a) Draw a neat diagram of bi-stable multivibrator using transistor and explain its working with help of timing diagrams 8M
   b) Design an astable multivibrator to produce an unsymmetrical wave t_1= 0.5ms and t_2 = 0.4ms. The amplitude of the square wave is 15v. Assume h_{fe} (min) = 20, I_c(sat) = 5mA and Vce (sat) = 0V 6M

OR

8. a) What is monostable multivibrator? Explain with the help of neat circuit diagram and derive an equation for pulse width. 7M
   b) Explain Schmitt trigger circuit in detail. 7M

UNIT-V

9. a) Draw the circuit of an emitter coupled bi-directional sampling gate and explain in detail 7M
   b) Explain the six diode sampling gate with the help of circuit diagram 7M

OR

10. a) Explain the working of TTL-NAND with suitable circuit diagram 8M
    b) Draw the OR gate with diodes and resistors. Verify the truth table 6M

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Hall Ticket Number :										

R-14

Code: 4G333

II B. Tech. I-Semester Regular Examinations Nov/Dec 2015

Signals and Systems

(Electronics & Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70Marks)

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UNIT-I

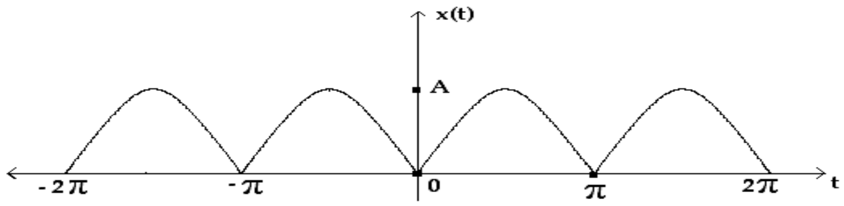
1. a) Sketch the signals. $(i)\ 2\,u(t+1) - 2\,u(t-3)$ $(ii)\ r(t)\cdot u(-t+3)$ 7M

   b) A rectangular function is defined as $x(t) = \begin{matrix} A & for & 0 \le t \le \pi/2 \\ -A & for & \pi/2 \le t \le \pi \end{matrix}$

   Approximate the above function by ***A cost*** between the interval ***(0, π),*** such that the Mean Square Error is Minimum. 7M

OR

2. a) Find the Trigonometric Fourier Series for the following signal.



7M

   b) With regard to Fourier series representation, justify the following statements

   (i) Odd functions have only sine terms

   (ii) Even functions have no sine terms 7M

UNIT-II

3. a) Derive Fourier Transform from Exponential Fourier series? 7M

   b) Find the Fourier Transform of the signals.

   (i) $u(t)$

   (ii) $e^{-3t}\,cost\ u(t)$ 7M

OR

4. a) State and Prove the Time Scaling and Time Differentiation properties of Fourier Transform 7M

   b) Using properties of Fourier Transform, Find the Fourier Transform of the signals

   (i) $e^{-3t}\,u(t-2)$

   (ii) $t\,e^{-3t}\,u(t)$ 7M

UNIT-III

5. a) Check whether the system described by the differential equation

$$\frac{d^2y(t)}{dt^2} + 2\,y(t)\frac{dy(t)}{dt} + 3t\,y(t) = x(t) \quad \text{is}$$

(i) Static or dynamic

(ii) Linear (or) Non linear

(iii) Causal or Non causal

(iv) Time variant or time invariant 8M

b) The output y(n) for a LTI system, with input x(n) is given by
$y(n) = x(n) - 2x(n-1) + x(n-2)$

Determine the Magnitude & Phase response of the system. 6M

OR

6. a) Explain Causality and Physical reliability of a system and hence give Paley-Wiener Criterion. 7M

b) Derive the relation between Bandwidth and Rise Time of a system 7M

UNIT-IV

7. a) Find the Convolution of the following signals

(i) $x(t) = e^{-2t}\,u(t)$ & $h(t) = e^{-4t}\,u(t)$

(ii) $x(t) = e^{-3t}\,u(t)$ & $h(t) = u(t+3)$ 7M

b) State and Explain the Sampling theorem for Band pass signals. 7M

OR

8. a) Show that the Auto Correlation function and Energy Spectral Density forms a Fourier Transform pair. 7M

b) Determine the Auto Correlation Function and Energy Spectral Density of
$x(t) = e^{-at}\,u(t)$ 7M

UNIT-V

9. a) Find the Laplace Transform of the signal $x(t) = e^{-2t}\,u(-t) + e^{-3t}\,u(-t)$ 7M

b) Find the Inverse Laplace Transform of the following

$X(s) = \dfrac{(s+1)}{s^3 + 4s^2 + 6s + 4}$ 7M

OR

10. a) Find the Z-Transform of the following

(i) $x(n) = a^n \cos\left(\frac{\pi}{2}n\right) u(n)$

(ii) $x(n) = a^{-n}\,u(-n-1)$ 7M

b) Derive the relation between Z-Transform and DTFT. 7M

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