Hall Ticket Number :										

Code: 5GC34 **R-15**

II B.Tech. I Semester Regular Examinations November 2016

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 = 70 Marks)

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UNIT–I

1. a) What are different disciplines involved with environment. Explain? 7M
   b) Describe the importance of environmental studies. 7M

OR

2. a) Describe the consequences of over-exploitation of natural resources. 7M
   b) What is pollution? Illustrate the different types of pollution briefly. 7M

UNIT–II

3. a) Summarize the effects of dams on forest and tribal people. 7M
   b) Distinguish between traditional agriculture and modern agriculture. 7M

OR

4. a) How land degradation occurs. Mention few remedial measures to prevent land degradation. 7M
   b) Outline the role of an individual in the conservation of natural resources. 7M

UNIT–III

5. a) Describe the energy flow in an ecosystem with help of a flow chart. 7M
   b) Write notes on conservation of biodiversity. 7M

OR

6. a) What are the characteristic features of forest ecosystem? 7M
   b) What are hot spots? Write notes on the hot spots of India. 7M

UNIT–IV

7. a) Explain the effects caused by air pollution and how air pollution will be prevented. 7M
   b) Write short notes on (a) Noise pollution and (b) Thermal pollution 7M

OR

8. a) Describe the soil pollution and what are the consequences with respect to agriculture? 7M
   b) What are the causes for solid waste production and mention few control measures. 7M

UNIT–V

9. a) Explain any three best practices for rain water harvesting. 7M
   b) What are the preventive measures to be taken for HIV/AIDS? 7M

OR

10. a) What is global warming? Propose the best practices to prevent the global warming. 7M
    b) Write notes on family welfare program. 7M

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Hall Ticket Number :										

Code: 5GC32 **R-15**

II B.Tech. I Semester Regular Examinations November 2016

Mathematical Methods-III

(Common to EEE & ECE)

Max. Marks: 70 Time: 3 Hours

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

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UNIT–I

1. a) Let A be a $m \times n$ matrix, then prove that $\rho(A) = \rho(A^T)$. 6M

   b) Solve the system of equations: $x_1 - x_2 + x_3 + x_4 = 2$; $x_1 + x_2 - x_3 + x_4 = -4$; $x_1 + x_2 + x_3 - x_4 = 4$; $x_1 + x_2 + x_3 + x_4 = 0$. 8M

OR

2. a) Determine the rank of the matrix $\begin{bmatrix} 0 & 1 & -3 & 1 \\ 1 & 0 & 1 & 1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & -2 & 0 \end{bmatrix}$ 8M

   b) State and prove the Cayley Hamilton theorem. 6M

UNIT–II

3. a) Show that the Regula-Falsi method has super linear convergence. 6M

   b) Employ Taylor's method to obtain appropriate value of y at $x = 0.2$ for the differential equation $\frac{dy}{dx} = 2x + 3e^x$, $y(0) = 0$. Compare the numerical solution obtained with the exact solution. 8M

OR

4. a) Using the bisection method, find a real root of the equation $\cos x = xe^x$ correct to three decimal places. 7M

   b) Apply fourth order Runge-Kutta method to $\frac{dy}{dx} = 3x + \frac{1}{2}y$, $y(0) = 1$ to determine $y(0.1)$ correct to four decimal places. 7M

UNIT–III

5. a) From the following table, estimate the number of students who obtained marks between 40 and 45 using Newton's interpolation formula.

Marks	30-40	40-50	50-60	60-70	70-80
No. of students	31	42	51	35	31

   7M

   b) Find $f'(7.5)$ from the following table:

x	7.47	7.48	7.49	7.50	7.51	7.52	7.53
$f(x)$	0.193	0.195	0.198	0.201	0.203	0.206	0.208

   7M

OR

6. a) One entry in the following table is incorrect and y is a cubic polynomial in x. Use the difference table to locate and correct the error.

x	0	1	2	3	4	5	6	7
y	25	21	18	18	27	45	76	123

   7M

   b) Velocity V of a particle at distances from a point m its linear path is given by the following table. Estimate the time taken by the particle to travels the distance of 20 meters.

S(m)	0	2.5	5.0	7.5	10.0	12.5	15	17.5	20
V(m/sec)	16	19	21	22	20	17	3	11	9

   7M

UNIT–IV

7. a) The pressure and volume of a gas are related by the equation $PV^{¥} = k$, ¥ and k being constants. Fit this equation to the following set of observations

P(kg/cm²)	0.5	1.0	1.5	2.0	2.5	3.0
V (liters)	1.62	1.00	0.75	0.62	0.52	0.46

7M

b) Solve $\left(x^2 - yz\right)p + \left(y^2 - zx\right)q = \left(z^2 - xy\right)$. 7M

OR

8. a) Using the method of separation of variables, solve $\frac{\partial^2 u}{\partial x^2} = \frac{\partial u}{\partial y} + 2u$ subject to the condition $u = 0$ and $\frac{\partial u}{\partial y} = 1 + e^{-3y}$, when $x = 0$ for all values of y. 7M

b) Obtain the least square fit of the form $f(t) = ae^{-3t} + be^{-2t}$ for the following data

t	0.1	0.2	0.3	0.4
$f(t)$	0.26	0.58	0.44	0.35

7M

UNIT–V

9. a) Obtain a half range cosine series for $f(x) = \begin{cases} kx, & 0 \le x \le l/2 \\ k(l-x), & l/2 \le x \le l \end{cases}$. Deduce the sum of the series $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \cdots\cdots\infty$. 7M

b) Find the Fourier transform of $f(x) = \begin{cases} 1 - x^2, & |x| \le 1 \\ 0, & |x| \ge 1 \end{cases}$. Hence evaluate $\int_0^\infty \frac{x\cos x - \sin x}{x^3} \cos x/2 \; dx$ 7M

OR

10. If $f(x) = \begin{cases} 0, & -® \le x \le 0 \\ \sin x, & 0 \le x \le ® \end{cases}$, Prove that $f(x) = \frac{1}{®} + \frac{\sin x}{2} - \frac{2}{®}\sum_{n=1}^{\infty} \frac{\cos 2nx}{4n^2 - 1}$. Hence show that $\frac{1}{1\cdot 3} - \frac{1}{3\cdot 5} + \frac{1}{5\cdot 7} - \cdots\cdots\infty = \frac{1}{4}(® - 2)$ 14M

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Hall Ticket Number :										

R-15

Code: 5G235

II B.Tech. I Semester Regular Examinations November 2016

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 = 70 Marks)

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UNIT–I

1. a) State and Explain Ohm's law and list out the limitations. 7M

   b) Five bulbs are connected in parallel across 110V.each bulb is rated at 60W. How much current flows through each bulb, and what is the total current. 7M

OR

2. a) Explain about source transformation techniques. 7M

   b) Three resistances of equal value are available. Find
      i. The total equivalent conductance and total equivalent resistance ratio.
      ii. The ratios of power drawn by each configuration in each element. Considering that the supply voltage is same when the configuration is in series and in parallel. 7M

UNIT–II

3. a) Obtain the fundamental sinusoidal response of a series RL circuit. 7M

   b) An r.m.s voltage in a three phase star connected circuit is given by 231V(Ph-N). Write the instantaneous voltage expression. If the current in each phase lag the corresponding phase voltage by 30^0, what are the expressions of instantaneous currents? 7M

OR

4. a) Explain the importance of sinusoidal waveforms and list out the advantages of AC supply. 7M

   b) Define the following terms with respect to fundamental sinusoidal A.C quantity.
      i) Average value
      ii) RMS value
      iii) Form factor
      iv) Peak factor 7M

UNIT–III

5. a) Derive the resonant frequency of parallel combination of series RC and RL circuits. 7M

   b) The Q factor of a RLC circuit is 5 at its resonance frequency of 1kHz. Assuming the power dissipation of 250W when the current drawn is 1A, find the circuit parameters and Band Width of the circuit. 7M

OR

6. a) A steel ring of 25cm mean diameter and of circular section of 3cm in diameter has an air gap of 1.5 mm length. It is wound uniformly with 700 turns of wire carrying a current of 2A. Calculate.
      i. Magnetomotiveforce .
      ii. Fluxdensity
      iii. magneticflux and Relative permeability of steel ring. 7M

   b) Explain about series connection of Magnetic coupled coils 7M

UNIT–IV

7. A balanced delta connected load is supplied from a symmetrical, 3-phase, 400V, 50Hz supply system. The current in each phase is 20A and lags behind its phase voltage by an angle 40^0 Calculate. The line current, Total power, draw the phasor diagram showing the voltages and currents in the lines and the phases. and also calculate the wattmeter readings if two watt meters are used. 14M

OR

8. a) Derive the relation between line and phase quantities in a three phase balanced star connection. 7M

   b) Three identical impedances of (3+j4)Ω are connected in delta. Find an equivalent star network such that the line current is the same when connected to the same supply 7M

UNIT–V

9. a) State and prove maximum power transfer theorem and list out its applications. 7M

   b) Using Norton's theorem find voltage V2 in the circuit shown below Fig.9.b such that current through (4+j3)Ω impedance is zero.

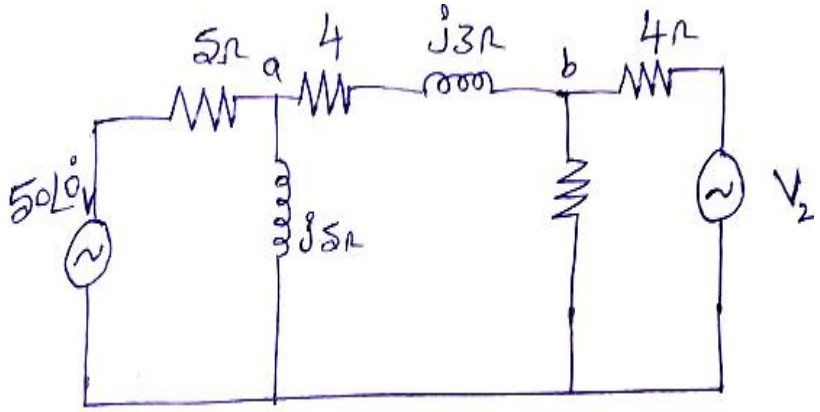

Fig.9.b 7M

OR

10 a) State and Explain compensation theorem with a suitable Example 7M

   b) For the circuit shown in Fig.10b, If the resistance of 6Ω branch is reduced to 5Ω, Determine the compensation source and verify the results.

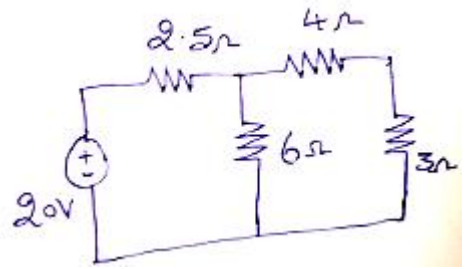

Fig.10.b 7M

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Hall Ticket Number :										

R-15

Code: 5G331

II B.Tech. I Semester Regular Examinations November 2016

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) In Common drain amplifier the values of R_G=1 MΩ, RS= 2.25 KΩ, g_m=2.28mA/V, r_d=40KΩ. Find the values of Z_i, Z_o, and A_v. 6M

   b) Analyze the common drain amplifier with neat diagram 8M

OR

2. a) Explain the different coupling schemes in Multistage amplifier 8M

   b) In Multistage RC Coupled amplifier the circuit parameters are R_s=1KΩ, R_{C1}=15KΩ, Re_2=100Ω, Rc_2=4KΩ, Re_2=330Ω with baising resistances of 1st stage R_1=200KΩ, R_2=20KΩ and biasing resistances of 2nd stage are R_3=47KΩ, R_4=4.7KΩ.Find A_I, A_V, R_i and A_{vs} with h-parameters of h_{ie}=1.1KΩ, h_{fe}=50, h_{re}=2.5X10^{-14} and h_{oe}=25μA/V. 6M

UNIT–II

3. a) Derive the expression for the CE current gain (A_I) with resistive load at high frequencies. 10M

   b) Discuss the gain bandwidth product 4M

OR

4. a) Draw the small-signal equivalent circuit for an emitter follower stage at high frequencies and obtain the voltage gain 10M

   b) Give the significance of two capacitors in hybrid π-Model. 4M

UNIT–III

5. a) Draw the practical circuit of the Current Series Feedback Amplifier and describe the concept involved in such an amplifier? 8M

   b) An RC Coupled amplifier has a Voltage gain (A_V) of 1000, f_L=50Hz, f_H=200KHz. Find the amplifier gain, f_{LF}, f_{HF} when a negative feedback is introduced with feedback ratio of 0.01 6M

OR

6. a) Explain the General Characteristics of negative feedback amplifier. 8M

   b) Explain various topologies of feedback amplifiers. 6M

UNIT–IV

7. a) Derive the frequency of oscillation for Colpitts oscillator using BJT? 10M

   b) What are the factors which causes the frequency stability of an oscillator? 4M

OR

8. a) State and explain the Barkhausan Conditions. 4M

   b) Draw the circuit diagram of a RC Phase Shift Oscillator using BJT. Derive the expression for frequency of oscillations. 10M

UNIT–V

9. a) Draw the circuit diagram of Class B Complementary Symmetry Push-Pull amplifier, explain its working and derive its efficiency. 10M

   b) Explain about Cross-Over distortion in Class B Complementary-Symmetry amplifier. 4M

OR

10. a) Draw the circuit diagram of single tuned inductive coupled amplifier and explain its operation. 10M

    b) What is the importance of Q-factor in tuned amplifier? 4M

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Hall Ticket Number :										

R-15

Code: 5G332

II B.Tech. I Semester Regular Examinations November 2016

Digital Design

(Electronics and Communication and Engineering)

Max. Marks: 70 Time: 3 Hours

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

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UNIT–I

1. a) Perform the following using BCD arithmetic.
   i. 126310 + 968710 — 3M
   ii. 767210 + 337810 — 3M
   b) Convert the following:
   i. $99710 = (\ )_{16}$ — 2M
   ii. $25710 = (\ )_{8}$ — 2M
   iii. $65410 = (\ )_{2}$ — 2M
   iv. $10116 = (\ )_{10}$ — 2M

OR

2. a) Explain different methods used to represent negative numbers in binary system. — 6M
   b) Perform the subtraction with the following unsigned binary numbers by taking the 2's complement of the subtrahend.
   i. 11010 – 10110 — 2M
   ii. 11011 - 1001 — 2M
   iii. 100 - 110100 — 2M
   iv. 1010101 - 1010101 — 2M

UNIT–II

3. a) Convert the following expressions in to sum of products and product of sums.
   i. (AB + C) (B + C'D) — 3M
   ii. x' + x(x + y')(y + z'). — 3M
   b) Obtain the Dual of the following Boolean expressions.
   i. (AB' + AC')(BC + BC')(ABC) — 2M
   ii. AB'C + A'BC + ABC — 2M
   iii. (ABC)'(A + B + C)' — 2M
   iv. A + B'C (A + B + C') — 2M

OR

4. a) Using K-map method determine the prime implicant and obtain the possible minimal expression for the following function
   F(A,B,C,D) = _m(8,12,13) + d(1,2,4,6,7,11) — 7M
   b) Obtain minimal SOP expression for the complement of the given expression:
   F(A,B,C) = π(1, 2, 5, 7) And draw the circuit using NOR - gates. — 7M

UNIT–III

5. a) Design a full – subtractor circuit with three inputs x,y,z and outputs D, B. The circuit subtracts X – Y – Z where Z is the input borrow, B is the output borrow and D is the difference draw the circuit using NAND gates. 8M

   b) With an example and necessary circuit diagram explain about a magnitude comparator. 6M

OR

6. a) Derive the PLA programming table and the PLA structure for the combinational circuit that converts 3- bit binary to Gray code.. Minimize the number of product terms. 8M

   b) With relevant diagrams, discuss about encoder and decoder. 6M

UNIT–IV

7. a) Draw the sequential circuit for serial adder using shift registers, full adder and D-FF. Explain its operation with state equations and state table. 7M

   b) With relevant diagram and tables, discuss about Sequence Detector. 7M

OR

8. a) Design a 4-bit ring counter using T- flip flops and draw the circuit diagram and timing diagrams. 7M

   b) Explain synchronous and ripple counters. Compare their merits and demerits 7M

UNIT–V

9. a) Explain the difference between Mealey and Moore machines with relevant state tables and state diagrams. 8M

   b) Describe the basic building blocks of an ASM chart with an example. 6M

OR

10. a) With an example, discuss about minimization of completely specified and incompletely specified sequential machine 8M

    b) With an example, explain the concept of minimal cover table. 6M

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Hall Ticket Number :										

R-15

Code: 5G333

II B.Tech. I Semester Regular Examinations November 2016

Signals and systems

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

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

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UNIT–I

1. a) Classify different types of signals. 4M

   b) Find the Fourier series coefficients for the continuous time periodic signal

   x(t) = 1.5 for $0 \le t < 1$

   = -1.5 for $1 \le t < 2$ with the fundamental frequency $\omega_0 = \pi$. 10M

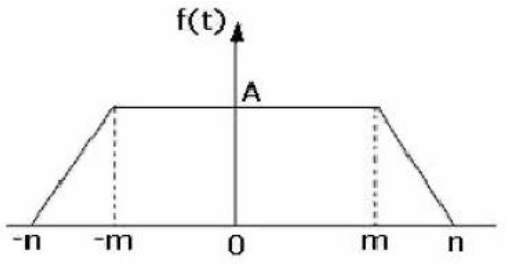
OR

2. a) Write conditions for the existence of Fourier series. 6M

   b) Distinguish trigonometric Fourier series and complex Fourier series. 8M

UNIT–II

3. a) Determine the Fourier Transform of the following signal.



8M

   b) State and verify time shifting and time scaling property of Fourier Transforms 6M

OR

4. a) Find the Fourier transform of a Rectangular pulse and Signum function. 10M

   b) Find Hilbert transform of a function $f(t) = \sin\omega_0 t + \cos\omega_0 t$ 4M

UNIT–III

5. a) A system has an impulse response $h(t) = 2e^{-2t}u(t)$. Find the output signal y(t) if the input is x(t) = u(t) – u(t-1). 8M

   b) Draw ideal characteristics of filters. 6M

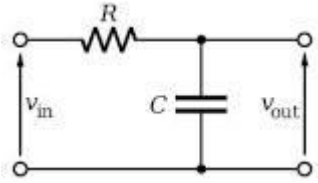
OR

6. a) Determine the linearity and time invariance of the following systems

   i) $y(t) = t^2u(t)$

   ii) $y(n) = nx(n)$ 8M

   b) Obtain transfer function of the following network with R = 1Ω and C = 1F**.**



6M

UNIT–IV

7. a) State sampling theorem and find the nyquist rate for the following signals.
   i. 8sin50πt
   ii. 4sin30 πt+3cos70 πt 8M
   b) Determine autocorrelation of $A\sin\omega_0 t$ 6M

OR

8. a) State and prove the Parseval's relation for continuous time signals. 8M
   b) Verify convolution property in time domain using Fourier transform 6M

UNIT–V

9. a) A signal has Laplace transform $X(s) = \frac{S+2}{S^2+4s+5}$. Find Laplace transform Y(s) of the following signals
   i. $y_1(t) = tx(t)$
   ii. $y_2(t) = e^{-t}x(t)$ 10M
   b) Determine Laplace Transform of a standard signals unit impulse and unit step. 4M

OR

10. a) Using Z transform, compute response of the following system $y(n) = 0.7y(n-1) - 0.12y(n-2) + x(n-1) + x(n-2)$ to the input $x(n) = nu(n)$. Is the system stable? 9M
    b) Find the z transform of 2^n u(n) and $-(1/2)^n$u(n-1) 5M

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