Hall Ticket Number :										

R-15

Code: 5GC34

II B.Tech. I Semester Supplementary Examinations May 2019

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) Define Environment? What are the components of the environment?
   b) Discuss the role of people in protecting the environment with respect to loss of biodiversity.

OR

2. a) What is the necessity for the people to know about environment?
   b) What are the causes and effects of over exploitation of natural resources?

UNIT–II

3. a) What are the effects of deforestation? Suggest some conservation measures.
   b) What are the environmental hazards associated with mineral extraction?

OR

4. a) Define and write a note on soil erosion and preventive measures.
   b) Write a note on renewable and nonrenewable energy resources.

UNIT–III

5. a) Write a short note on food chain and food web with examples.
   b) Write a note on energy flow in the ecosystem.

OR

6. a) Describe the various methods of ex-situ conservation of biodiversity.
   b) What are the major threats to biodiversity?

UNIT–IV

7. a) Explain the various factors responsible for soil pollution.
   b) What are the various methods of control to reduce water pollution?

OR

8. Write a note on causes, effects and control measures of urban solid wastes?

UNIT–V

9. Write a short note on
   i) Global warming
   ii) Ozone layer depletion
   iii) Acid rain

OR

10. a) Write a note on population explosion and consequences.
    b) Explain the family welfare programmes.

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Hall Ticket Number :										

R-15

Code: 5GC32

II B.Tech. I Semester Supplementary Examinations May 2019

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) Solve the equations 3x + y + 2z = 3, 2x -3y - z = - 3 , x + 2y + z = 4 using Guass elimination method

   b) Prove that the eigen values of a triangular matrix are just the diagonal elements of the matrix.

OR

2. a) Define Rank of a Matrix. Reduce the matrix $\begin{bmatrix} 2 & 1 & -3 & -6 \\ 3 & -3 & 1 & 2 \\ 1 & 1 & 1 & 2 \end{bmatrix}$ to the normal form and hence find its rank.

   b) Discuss for values of ª and « the simultaneous equations $x + y + z = 6$; $x + 2y + 3z = 10$; $x + 2y +$ ª $z =$ « have (i) unique solution, (ii) no solution and (iii) infinite number of solutions

UNIT–II

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

   b) Using Modified Euler's method find an approximate value of y when $x = 0.3$. Given that $\frac{dx}{dy} = x + y$ and $y = 1$ when $x = 0$

OR

4. a) Find a real root of the equation $3x = \cos x + 1$ by Newton-Raphson method correct to four decimal places.

   b) Apply Runge-Kutta method to find an approximate value of y when $x = 0.2$ if $\frac{dx}{dy} = x + y$ given that $y = 1$, where $x = 0$.

UNIT–III

5. a) Find f(2.5) using Newton's forward formula from the following data.

x	0	1	2	3	4	5	6
f(x)	0	1	16	81	256	625	1296

   b) Use Simpson's rule to find $\int_0^{0.6} e^{-x^2} dx$ by taking seven ordinates.

OR

6. Use Trapezoidal rule and Simpson's $\frac{1}{3}$ rule to estimate $\int_0^1 \frac{1}{1+x^2} dx$

UNIT–IV

7. a) Fit a straight line by the method of least squares method to the following data

x	1	2	3	4	5
y	14	27	40	55	68

b) Form the partial differential equations (by eliminating the arbitrary constants and arbitrary functions) from

$(i)\ z = a\,x + b\,y + a^2 + b^2$ and $(ii)\ z = f(x + a\,y) + g(x - a\,y)$

OR

8. Solve by the method of separation of variables $\frac{\partial u}{\partial x} = 2\frac{\partial u}{\partial t} + u$ and $u(x,0) = 6e^{-3x}$.

UNIT–V

9. a) Find the half range cosine series for $f(x) = x^2$ in the range $0 \le x \le ®$

b) Find the sine and cosine transform of $f(x) = \begin{cases} \sin x, 0 < x < a \\ 0, x \ge a \end{cases}$

OR

10. If $f(x) = \begin{cases} 0, -® \le x \le 0 \\ \sin x, 0 \le x \le ® \end{cases}$, prove that $f(x) = \frac{1}{®} + \frac{\sin x}{2} + \frac{2}{®}\sum_{n=1}^{\infty}\frac{\cos 2nx}{4n^2 - 1}$ and hence show that i) $\frac{1}{1.3} + \frac{1}{3.5} + \frac{1}{5.7} + - - - + \infty = \frac{1}{2}$

ii) $\frac{1}{1.3} - \frac{1}{3.5} + \frac{1}{5.7} - - - - + \infty = \frac{1}{4}(® - 2)$

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Hall Ticket Number :										

R-15

Code: 5G333

II B.Tech. I Semester Supplementary Examinations May 2019

Signal 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) Obtain the condition under which two signals $f_1(t)$ and $f_2(t)$ are said to be orthogonal to each other. Hence prove that Sin nw_ot and Cos mw_ot are orthogonal to each other for all integer values of m,n 7M

   b) Derive the necessary expression to represent the function f(t) using Trigonometric Fourier Series 7M

OR

2. a) Compute the Fourier Transform of i) f(t) = (1/2) - n u(-n-1) ii) f(t) = sin (n π/2)+cos (n) 8M

   b) State and prove sampling theorem for band limited signals using graphical approach. And What is aliasing? Explain its effect on sampling. 6M

UNIT–II

3. a) Find the Fourier transform of a gate pulse of unit height, unit width and centered at t=0. 7M

   b) Determine the Fourier Transform for double exponential pulse whose function is given by y (t) = $e^{-2|t|}$ Also draw its magnitude and phase spectra 7M

OR

4. a) Find the Fourier Transform of (i) Triangular pulse with period T = 8Sec and amplitude A = 10V. (ii) One cycle of sine wave 8M

   b) What is aliasing? Explain its effect on sampling. 6M

UNIT–III

5. a) What are the requirements of a system to allow the distortion less transmission of a signal? 7M

   b) What is the impulse response of two LTI systems connected in parallel? State the convolution Integral for CT LTI systems? 7M

OR

6. a) A stable LTI system is characterized by the differential equation $d^2y(t)/dt^2+6\ dy(t)/dt+8\ y(t)=2\ x(t)$ Find the frequency response & Impulse response using Fourier transform. What is the response of this system if $x(t) = t\ e^{-2t}\ u(t)$ 8M

   b) Find the impulse response of series RL circuit. What is an LTI system? Explain its properties 6M

UNIT–IV

7. a) Find the convolution of the following signals using graphical analysis: $x(t) = e^{-2t}\ u(t)$ and $h(t) = u(t + 2)$. 7M

   b) Show that the auto-correlation function at the origin is equal to the energy of the function. 7M

OR

8. a) Show that the cross correlation of f(t) with $\delta(t - t_0)$ is equal to $f(t - t_0)$. Where $\delta(t-t_0)$ is delayed unit impulse function. 7M

   b) Prove that auto correlation function and energy/power spectral density function forms Fourier Transform pair. 7M

UNIT–V

9. a) Find the Inverse Z transform of

$$X(z) = \frac{z+2}{4z^2 - 2z + 3} \; |Z| < \sqrt{3/4}$$

7M

   b) Find inverse Z-transform of

$$X(Z) = (1 - 1/3z^{-1})(1 - 1/6z^{-1}) \; ROC: |Z| > 1/3$$

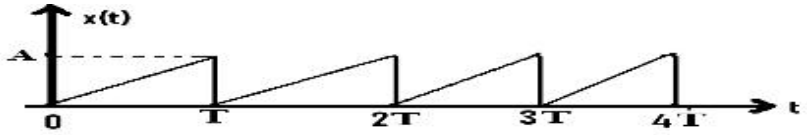
7M

OR

10 a) Determine the inverse Laplace of the following functions

$i)\ 1/s(s+1)(s+3)$ $\quad ii)\ 3s^2 + 8s + 6/(s+8)(s^2 + 6s + 1)$ 8M

   b) Find out the Laplace transform of the signal shown in below figure.



6M

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Hall Ticket Number :										

R-15

Code: 5G332

II B.Tech. I Semester Supplementary Examinations May 2019

Digital Design

(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) Convert the following numbers:
   (i) $(7562.45)_{10}$ to octal
   (ii) $(175.175)_{10}$ to binary
   (iii) $(11010111)_2$ to decimal and octal 6M

   b) Define a self-complementing code, give the examples of self complementing codes and explain about Excees-3 code. 8M

OR

2. a) (i) Using 10's complement, subtract 72532-3250
   (ii) Using 2's complement, subtract 1010100-1000011
   (iii) Convert the binary code 10010011 into Gray code 6M

   b) Give the examples of non-weighted codes and explain about Hamming code 8M

UNIT–II

3. a) Reduce the following Boolean expressions to the indicated number of literals
   (i) A'C' + ABC + AC' to three literals
   (ii) (x'y' + z)' + z + xy + wz to three literals
   (iii) A'B(D' + C'D) + B(A + A'CD) to one literal 9M

   b) Using K-map method, simplify the following 4-variable function
   $F(A,B,C,D) = \sum (0, 2, 4, 5, 6, 7, 8, 10, 13, 15)$ 5M

OR

4. a) Simplify the following Boolean function using k-map method and implement with NAND gates
   F(w,x,y,z) = xz + w'xy' + wxy + w'yz + wy'z 6M

   b) Simplify the following Boolean function using tabulation method
   $F(A,B,C,D) = \sum (0, 1, 2, 5, 7, 8, 9, 10, 13, 15)$ 8M

UNIT–III

5. a) Implement a full adder with two half adders and one OR gate and explain the operation of full adder with the help of truth table 7M

   b) Explain 3 x 8 decoder with the help of truth table 7M

OR

6. a) Write short notes on
   (i) ROM
   (ii) PROM 6M

   b) Implement the following Boolean functions with PAL
   $w(A, B, C, D) = \sum(2, 12, 13)$
   $x(A, B, C, D) = \sum(7, 8, 9, 10, 11, 12, 13, 14, 15)$
   $y(A, B, C, D) = \sum(0, 2, 3, 4, 5, 6, 7, 8, 10, 11, 15)$
   $z(A, B, C, D) = \sum(1, 2, 8, 12, 13)$ 8M

UNIT–IV

7. a) Draw the logic circuit of SR Flip-Flop and explain its operation with the help of its truth table 6M

   b) Draw the diagram for 4-bit up-down counter and explain its operation 8M

OR

8. a) Draw the excitation table and write the characteristic equation of SR Flip-Flop and JK Flip-Flop 6M

   b) Explain the operation of Johnson counter with the help of neat diagram 8M

UNIT-V

9. a) Minimize the following machine using partition technique and draw its reduced state table

Present State	Next State, output(z)	
	x = 0	x = 1
A	E, 0	C, 0
B	C, 0	A, 0
C	B, 0	G, 0
D	G, 0	A, 0
E	F, 1	B, 0
F	E, 0	D, 0
G	D, 0	G, 0

8M

   b) Explain the basic building blocks of ASM chart 6M

OR

10. a) Design a sequence detector to detect the binary sequence 1111 using T Flip-flop 8M

    b) Explain the salient features of ASM chart 6M

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Hall Ticket Number :										

R-15

Code: 5G331

II B.Tech. I Semester Supplementary Examinations May 2019

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 = 70 Marks)

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UNIT–I

1. a) Draw the small signal hybrid equivalent model of a transistor. Derive the expressions for A_I, Z_i, Av and Y_o. 8M

   b) A CE amplifier is drawn by a voltage source of internal resistance R_s = 800 Ω and the load impedance is a resistance R_L = 1000 Ω. The h-parameters are h_{fe} = 50, h_{ie} = 1 kΩ, h_{oe} = 25 μA/V and hre = 2 x 10^{-4}. Calculate A_i, A_v, Z_i and Z_o using exact analysis. 6M

OR

2. Draw the circuit diagram of two stage RC coupled transistors amplifiers. Explain the operation and calculate the mid frequency range and low frequency range. 14M

UNIT–II

3. Determine high frequency parameters of Hybrid – π model in terms of low frequency parameters. 14M

OR

4. a) Define Gain Bandwidth product and derive the relation between f_T and f_β. 7M

   b) Derive the expression for CE Short circuit current gain with the help of necessary circuit diagrams and approximations. 7M

UNIT–III

5. a) Derive the expression for feedback gain, input resistance and output resistance for voltage series feedback amplifier. 8M

   b) A voltage series negative feedback amplifier has a voltage gain without feedback of A=50, input resistance R_i= 2KΩ, output resistance R_o= 15KΩ and feedback ratio of 0.01. Calculate the voltage gain, input resistance and output resistance of the amplifier with feedback? 6M

OR

6. a) Prove that negative feedback increases the bandwidth and decreases the distortion. 7M

   b) An amplifier has a gain of 400, f_1=50Hz,f_2=200KHz and a distortion of 10% without feedback. Determine the amplifier voltage gain f_{1f}, f_{2f} and D_f when a negative feedback is applied with feedback ratio of 0.01. 7M

UNIT–IV

7. a) With a neat circuit diagram, explain the generalized analysis of LC oscillator. 8M

   b) Colpitt's oscillator is designed with C_2=100 pF, C_1= 7500pF and a variable inductance. Determine the range of inductance values, if the frequency of oscillation is varied between 950 KHz and 2050 KHz. 6M

OR

8. a) Classify various types of oscillators. Explain in brief. 6M

   b) Show that the gain of Wein-bridge oscillator using BJT amplifier is at least 3 for oscillations to occur. 8M

UNIT–V

9. a) Show the conversion efficiency of transformer coupled class A amplifier is 50%. 8M

   b) Explain the operation of Class B push pull amplifier. 6M

OR

10. Describe the operation of a single tuned capacitive coupled amplifier and derive the expression for bandwidth. 14M

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Hall Ticket Number :										

R-15

Code: 5G235

II B.Tech. I Semester Supplementary Examinations May 2019

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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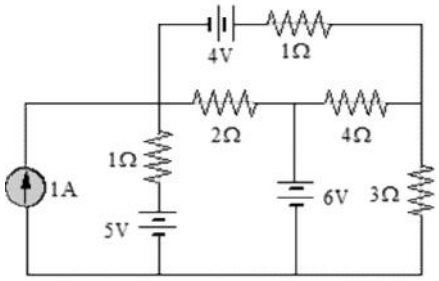
UNIT–I

1. Determine the current through 3 ohms resistor using node voltage analysis



OR

2. Explain about Star &Delta transformations with equations.

UNIT–II

3. a) Explain the advantages of AC supply

   b) A series circuit consisting of a resistor of 10 ohms and an inductance of 100mH is connected across a 200V, 50Hz, single phase ac supply. Determine the current drawn, real power and reactive power

OR

4. a) Define Cycle, Time Period, Frequency, Peak to Peak value & Amplitude with wave forms.

   b) A voltage wave is represented by v=200sin314t. Find i)Maximum value ii)RMS value iii) Average Value iv) Frequency v) Time period vi)instantaneous value after 0.05 sec.

UNIT–III

5. A steel ring of 180cm mean diameter has a cross-sectional area of 250mm^2. Flux developed in the ring is 250μWb when a 4000 turns coil carries certain current. Calculate i) MMF required ii) Reluctance iii) current in the coil. Assume relative permeability of steel is 1100.

OR

6. a) Derive the expression for resonant frequency of a parallel resonant circuit.

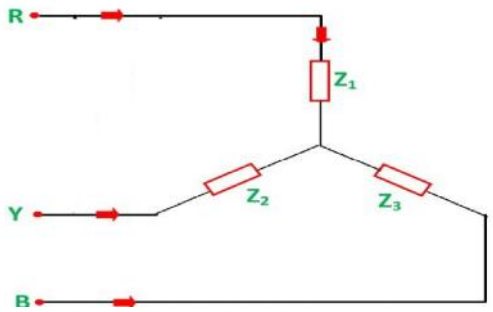
   b) A series RLC circuit has R=1000Ω, L=100mH and C=10μF. If a voltage of 100V is applied across the series combination. Calculate i) Resonant frequency ii) Q-factor and iii) Half power frequencies.

UNIT–IV

7. Obtain the relationship between line and phase voltages and currents in Delta connection with phasor diagram.

OR

8. A three phase balanced system supplies 100V, 50Hz to star connected load whose phase impedances are (6+j8)ohm. Determine the line currents and voltages and also draw the phasor diagram.



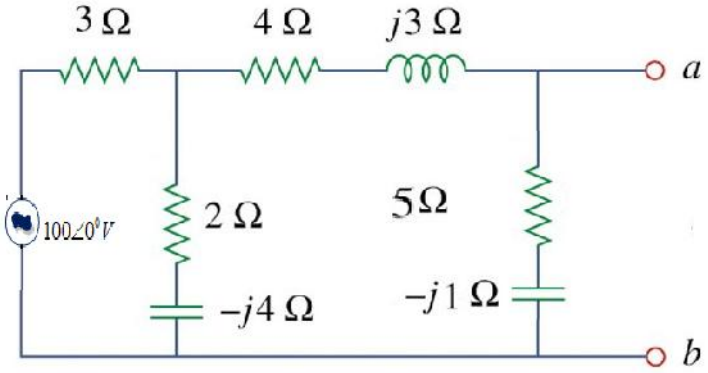
UNIT–V

9. a) State and explain Superposition theorem with an example

   b) State and explain Millman's theorem.

OR

10. Find the load impedance Z_L across ab for maximum power transfer to the load. Also find the max. power delivered to the load impedance for the network shown below



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