Hall Ticket Number :										

R-15

Code: 5G332

II B.Tech. I Semester Supplementary Examinations November 2018

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)

****

UNIT–I

1. a) Convert the following numbers:
   (i) $(1431)_8$ to base 10
   (ii) $(11001101.0101)_2$ to base 8 and base 4
   (iii) $(53.1575)_{10}$ to base 2 6M

   b) i. Construct even parity 7 bit Hamming code for the message 0101
   ii. The 7-bit Hamming coded message 0011011 has been transmitted through a noisy channel. Decode the message assuming that at most a single error has occurred in the code word. 8M

OR

2. a) Perform the following:
   (i) Subtraction by using 10's complement for the given 5250-1321
   (ii) Subtraction by using 2's complement for the given 11010-1101 6M

   b) Why the NAND and NOR gates are called Universal gates and construct the AND, OR, NOT and EXOR gates with universal gates. 8M

UNIT–II

3. a) Simplify the following algebraic expressions:
   (i) x'y + xy' + xy + x'y'
   (ii) x' + xy + xz' + xy'z'
   (iii) (BC' + A'D)(AB' + CD') 9M

   b) Using K-map method, simplify the following 4-variable function
   F(w,x,y,z) = ∑ (0, 1, 2, 4, 5, 6, 8, 9, 12, 13, 14) 5M

OR

4. a) Convert the following expressions into SOP and POS forms
   (i) (AB + C)(B + C'D)
   (ii) x' + x(x + y')(y + z') 6M

   b) Simplify the following Boolean function using tabulation method
   F(A,B,C,D) = ∑ (0, 1, 2, 5, 6, 7, 8, 9, 10, 14) 8M

UNIT–III

5. a) Explain about 4-bit magnitude comparator 8M

   b) Implement full adder circuit with one 3 x 8 decoder and two OR gates 6M

OR

6. a) Implement the following Boolean function with 8 x 1 multiplexer
   $F(A,B,C,D) = \sum (0, 3, 5, 6, 8, 9, 14, 15)$ 7M

   b) A combinational circuit is defined by the function
   $F_1(A,B,C) = \sum(3, 5, 6, 7)$
   $F_2(A,B,C) = \sum(0, 2, 4, 7)$
   Implement the circuit with a PLA having three inputs, four product terms and two outputs. 7M

UNIT–IV

7. a) Distinguish between synchronous and asynchronous sequential circuits 6M

   b) What is the drawback of JK Flip-Flop and explain how it overcomes with master slave JK Flip-Flop. 8M

OR

8. a) Explain the triggering methods of Flip-flops 6M

   b) Design modulo-8 binary counter using Flip-Flops 8M

UNIT–V

9. a) Explain the capabilities and limitations of finite-state machine 6M

   b) Design a sequence detector to detect the binary sequence 0101 using D Flip-Flops 8M

OR

10. a) Distinguish between Mealy and Moore machines 6M

    b) Explain the designing procedure of serial binary adder with the help of any example 8M

***

Hall Ticket Number :										

R-15

Code: 5G331

II B.Tech. I Semester Supplementary Examinations November 2018

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)

****

UNIT–I

1. a) Draw and explain the circuit of cascaded amplifier and mention the advantages. 7M

   b) Compare various coupling schemes used in amplifiers. 7M

OR

2. a) With a neat diagram, explain in detail about the operation of direct and transformer coupled amplifiers. 8M

   b) State and prove miller's theorem. 6M

UNIT–II

3. a) What are half power frequencies? 6M

   b) Derive the expression for Current gain with R_L and explain the variation of frequency Response with R_L 8M

OR

4. a) Draw the Hybrid – π model and discuss the significance of components present. 7M

   b) Derive the expression for Diffusion capacitance. 7M

UNIT–III

5. Derive the expression for input impedance and output impedance for the current series and current shunt feedback amplifiers. 14M

OR

6. a) Explain the concept of feedback with block diagram. 7M

   b) What are the characteristics of negative feedback amplifier? Explain. 7M

UNIT–IV

7. a) State and explain Barkhausen's criteria. 4M

   b) Derive the expression for frequency of oscillations of RC phase shift oscillator. 10M

OR

8. a) Explain the working principle of crystal oscillator and derive expressions for frequency of oscillation. 7M

   b) Explain the working of Hartley oscillator. Also derive the expression for its frequency of oscillations. 7M

UNIT–V

9. a) What is Q Factor? Write about unloaded and loaded Q in tuned circuit. 7M

   b) A single tuned RF amplifier uses a transistor with an output resistance of 50 KΩ, output capacitance of 15 pF and internal resistance of next stage is 20 kΩ. The tuned circuit consists of 47 pF capacitance in parallel with series combination of 1μH inductance and 2Ω resistance. Calculate resonant frequency, effective quality factor and bandwidth of the circuit. 7M

OR

10. a) Draw and explain class B push pull amplifier. Show that in class B push pull amplifier the maximum conversion efficiency is 78.5%. 7M

    b) Draw and explain Class B complementary symmetry power amplifier. 7M

***

Hall Ticket Number :										

R-15

Code: 5G235

II B.Tech. I Semester Supplementary Examinations November 2018

Electrical Circuit Theory

(Electronics and Communication Engineering)

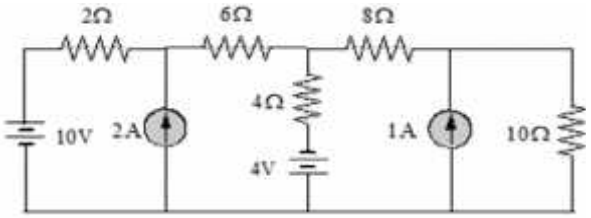
Max. Marks: 70 Time: 3 Hours

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

****

UNIT–I

1. Simplify the circuit into one voltage source in series with a resistor and find the current in 10 ohms resistor using source transformation technique.



14M

OR

2. a) Explain in detail about Voltage-Current relationship of resistance, inductance and Capacitance. 10M

   b) The voltage and current in a circuit element is V=400sin(314t-20) and i=40sin(314t-20).Identify the elements and their values. 4M

UNIT–II

3. a) Define Reactance, Impedance, Susceptance, Admittance. 7M

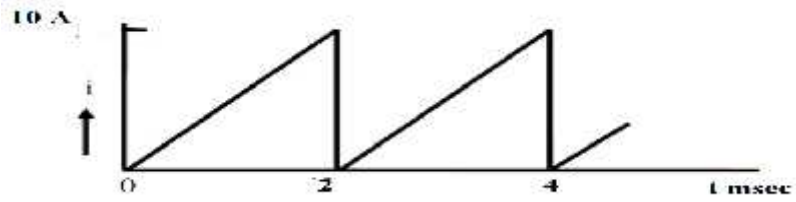
   b) A series circuit having R=10Ω, L=1H and C=20μF connected across a 100V, 50Hz supply. Calculate (i) Impedance (ii) Current

   iii) Voltage across R, L and C iv) Real power v) Reactive power

   vi) Apparent power vii) Power factor. 7M

OR

4. A current as shown in figure is applied across a 5 ohm resistor. Find V(t) and P(t) and draw their profiles.



14M

UNIT–III

5. a) A resistance of 15 ohms is connected in series with an inductance of 200mH and a capacitance of 100μF. Determine the resonant frequency and bandwidth 7M

   b) Define bandwidth and Q factor of a resonant circuit. Derive the expressions for bandwidth and Q factor for a series resonant circuit 7M

OR

6. a) Explain the concept of Dot convention with suitable example. 7M

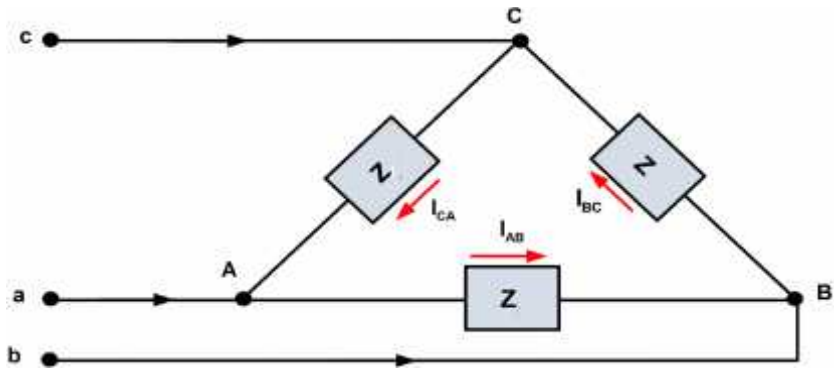
   b) Two identical coils connected in series having equivalent inductances of 0.5H and 0.1H depending upon their relative current directions. Determine L1, L2 ,M and K. 7M

UNIT–IV

7. Obtain the relationship between line and phase voltages and currents in Star connection with phasor diagram. 14M

OR

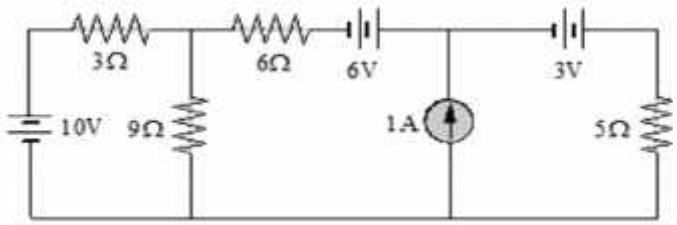
8. A three phase balanced system supplies 110V to a delta connected load whose phase impedances are (3.554+j3.54)ohm. Determine the line currents and voltages and also draw the phasor diagram.



14M

UNIT–V

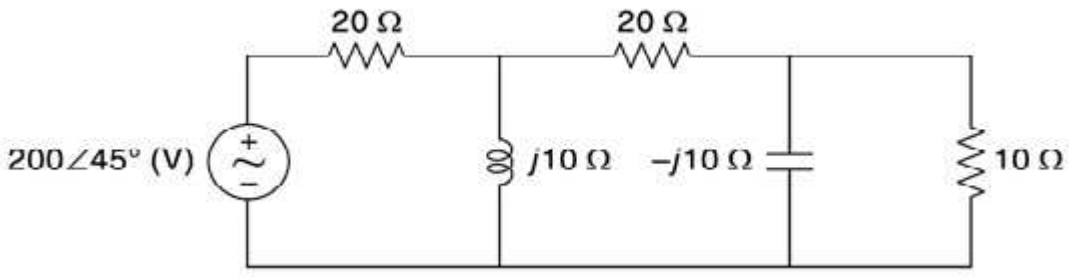
9. In the circuit find the power consumed by 5 ohms resistor using Thevenin's theorem.



14M

OR

10. a) Verify Reciprocity Theorem



8M

b) State and explain Maximum Power Transfer Theorem for AC Excitations 6M

***

Hall Ticket Number :										

R-15

Code: 5GC34

II B.Tech. I Semester Regular Examinations November 2018

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)

****

UNIT–I

1. a) What is an environment and what are the factors affecting it. 7M
   b) Write a brief note on various institutions and its contributions towards environmental safety.

OR 7M

2. a) Write the importance of environmental studies. 7M
   b) Describe the various methods to create environmental awareness in the public. 7M

UNIT–II

3. a) Write a note on world food problems and its consequences. 7M
   b) What is chipko movement and write a note on preservation of resources. 7M

OR

4. a) Explain with examples the types of energy with relevant case studies. 7M
   b) Write a note on Energy conservation 7M

UNIT–III

5. a) What is an ecosystem and explain the degradation of the same. 7M
   b) Explain with relevant examples the structure and functions of an eco-system. 7M

OR

6. a) Explain the energy flow of an eco-system 7M
   b) What is an energy cycle and explain the features of the same 7M

UNIT–IV

7. a) How groundwater gets polluted and suggest few measure for it. 7M
   b) Explain briefly the causes for soil pollution. 7M

OR

8. a) Explain marine pollution and causes of it. 7M
   b) Write down the effects of noise pollution 7M

UNIT–V

9. a) How urban areas are affected due to energy issues. 7M
   b) Write a note on rain water harvesting 7M

OR

10. a) Write a note on climate change and global warming 7M
    b) Discuss the methods and advantages of rain water harvesting 7M

***

Hall Ticket Number :										

R-15

Code: 5GC32

II B.Tech. I Semester Supplementary Examinations November 2018

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)

****

UNIT–I

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

   b) Find whether the following system of equations are consistent. If so, solve them

   X + 2y + 2z = 2 ; 3x - 2y - z = 5 ; 2x - 5y + 3z = - 4 ; x + 4y +6z = 0

OR

2. a) Find the Eigen values and the corresponding Eigen vectors of the matrix $\begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & 6 \\ -1 & -2 & 0 \end{bmatrix}$

   b) Test for consistency and solve $2x - 3y + 7z = 5$; $3x + y - 3z = 13$; $2x + 19y - 47z = 32$

UNIT–II

3. a) Find a real root of $x^3 - x^2 - 1 = 0$ by Bisection method

   b) Using Euler's method find an approximate value of y corresponding to $x = 1$, given $\frac{dx}{dy} = x + y$ and $y = 1$ when $x = 0$

OR

4. Using R-K method of order 4, find y for $x = 0.1, 0.2, 0.3$ given that $\frac{dx}{dy} = xy + y^2$, $y(0) = 1$. Continue the solution at $x = 0.4$ using Milne's method.

UNIT–III

5. a) Find the cubic polynomial which takes the following values

x	0	1	2	3
f(x)	1	2	1	10

And hence find f(4).

   b) Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x = 1.1$ from the following table:

x	1.0	1.1	1.2	1.3	1.4	1.5	1.6
y	7.989	8.403	8.781	9.129	9.451	9.750	10.031

OR

6. a) Estimate the value of $f(22)$ and $f(42)$ from the following table by Newton's forward and backward interpolation formula:

x	20	25	30	35	40	45
$f(x)$	354	332	291	260	231	204

b) Compute $f'(x)$ and $f''(x)$ at $x=15$

x	15	17	19	21	23	25
$f(x)$	3.873	4.123	4.359	4.583	4.796	5.800

UNIT–IV

7. a) Fit a straight line to the following data

x	1	2	3	4	5	6	7	8	9
y	9	8	10	12	11	13	14	16	5

b) Form the partial differential equation by eliminating a and b from $2z=(x-a)^{1/2}+(y-a)^{1/2}+b$.

OR

8. a) The pressure and volume of a gas are related by the equation $PV^{¥} = k$, where ¥ 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

b) Solve $z^2 = p\,q\,x\,y$ by Charpit's method

UNIT–V

9. Find the Fourier series of $f(x)=\begin{cases}-®, -® < x < 0\\ x, 0 < x < ®\end{cases}$ and hence show that $\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+---+\infty=\frac{®^2}{8}$

OR

10. a) Obtain a half range cosine series for $f(x)=(x-1)^2$ in interval $0<x<1$. Deduce the sum of series $\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+---+\infty=\frac{®^2}{8}$

b) Find the Fourier sine transform of the function $f(x)=\frac{e^{ax}}{x}, a>0$.

***

Hall Ticket Number :										

R-15

Code: 5G333

II B.Tech. I Semester Supplementary Examinations November 2018

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)

****

UNIT–I

1. a) Sketch the waveforms of the following Signals:

   i. $x(t) = u(t+1) - 2u(t) + u(t-1)$

   ii. $y(t) = r(t+1) - r(t) + r(t-2)$

   iii. $x(t) = -u(t+3) + 2u(t+1) - 2u(t-1) + u(t-3)$ 6M

   b) State and prove any FOUR properties of Fourier Series. 8M

OR

2. a) Find the trigonometric Fourier Series for the periodic square wave f(t) illustrated in Fig.1 and sketch its Amplitude and Phase spectra.

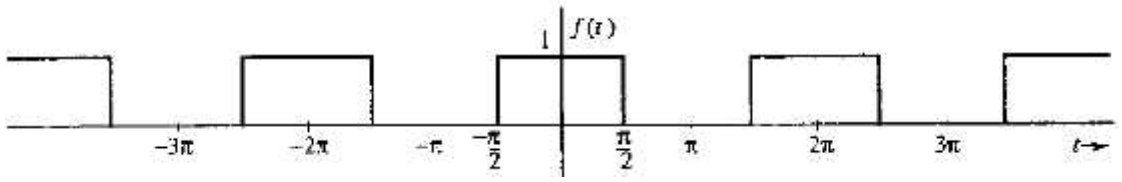


Fig. 1 8M

   b) Define mathematically and graphically the following continuous time elementary signals:

      i. Unit Impulse Signal
      ii. Unit Step Signal

   Also, give the relation between the two. 6M

UNIT-II

3. a) State and prove time differentiation and integration properties of Fourier Transform. 6M

   b) Find the Fourier Transform of the waveform shown in Fig. 2 in the following methods:

      i. Using definition
      ii. Converting first into impulses and using standard Fourier transforms

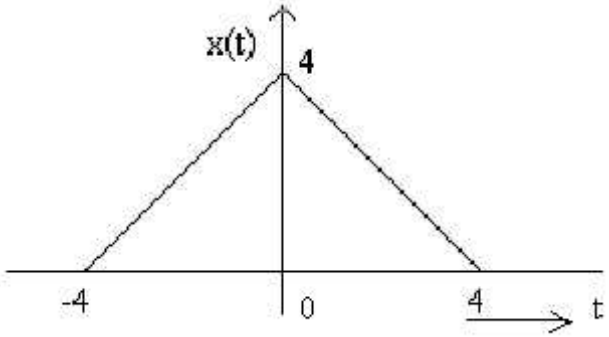


Fig. 2 8M

OR

4. a) State and prove time shifting and frequency shifting properties of Fourier Transform. 6M

   b) Find the Fourier transform of the waveform shown in Fig. 3 in the following methods:
      i. Using definition
      ii. Converting first into impulses and using standard Fourier transforms

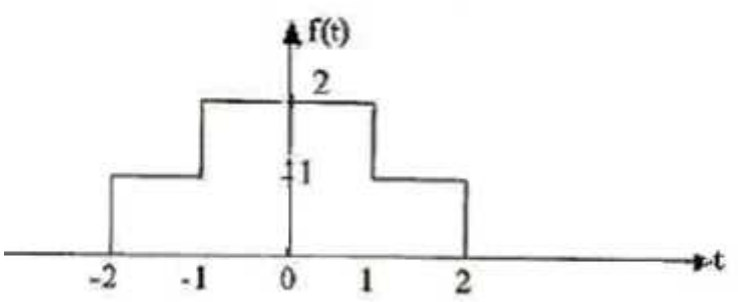


Fig. 3 8M

UNIT–III

5. a) What do you understand by the term signal bandwidth and system bandwidth? Illustrate. 6M

   b) How to test whether the system is physically realizable or not? Give both the time domain and frequency domain conditions used to test physical realizability? Give one example of system which is realizable and one system which is not realizable. 8M

OR

6. a) What is an LTI system? Discuss all its properties with examples for each. 9M

   b) "Linear system has characteristics of filter" Support the statement. 5M

UNIT–IV

7. a) What is Aliasing? How to avoid it? Illustrate with diagrams. 6M

   b) Perform graphical convolution of $f_1(t)$ and $f_2(t)$.

$$f_1(t) = 3[u(t-1) - u(t-4)]$$

$$f_2(t) = u(t-2) - u(t-7)$$

8M

OR

8. a) State and prove sampling theorem. 7M

   b) Derive the relation between Auto-correlation function and Power spectral density function. 7M

UNIT–V

9. a) Give the relation between DTFT and Z-Transform. 4M

   b) State and Prove the following properties of Laplace Transform.
      i). Initial-value theorem
      ii). Final-Value theorem
      iii). Time Scaling Property
      iv). Time Scaling Property
      v). Time-differentiation Property 10M

OR

10. a) What is the importance of ROC? List and explain properties of ROC of Laplace transform with examples. 7M

    b) Determine the Inverse Z Transform of the function

$$x(z) = \frac{z-2}{(1-0.2z^{-1})(1-2z^{-1})(1-z^{-1})} \text{ with ROC of } 0.2 < |Z| < 1$$

7M

***