Hall Ticket Number :										

R-17

Code: 7G234

II B.Tech. I Semester Regular Examinations November 2018

Electrical Circuit and Technology

(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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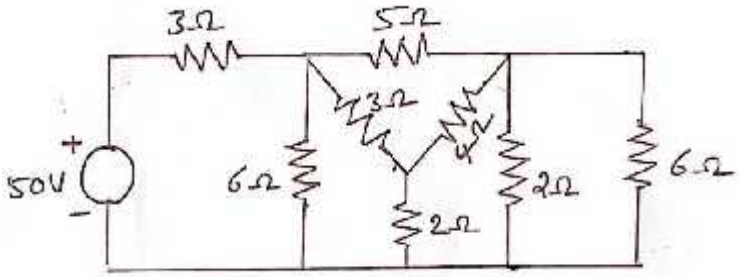
UNIT–I

1. a) Explain in detail super mesh analysis by taking one example. 7M

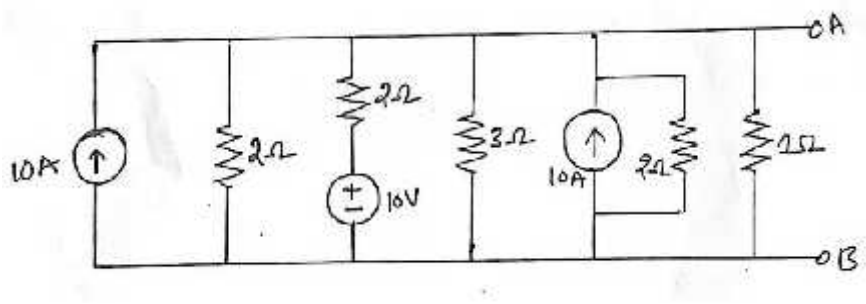
   b) Determine the current drawn by the circuit as shown in figure below.



7M

OR

2. a) By using source transformation convert following circuit into a single voltage source and single resistance



7M

   b) Derive the expression for current in terms of steady state and transient part for RC series circuit excited by a DC voltage. Also find the voltage across the resistor and power absorbed by resistor. 7M

UNIT–II

3. a) Explain with aid of phasor diagram the phenomenon of resonance in a circuit containing an inductor, a capacitor and a resistor in series 7M

   b) A resistor of 15 Ω, an inductance of 4H and a capacitance of 25μF are connected in series across 240V a.c supply. Calculate (i) the frequency at which the current shall be maximum. (ii) the current at this frequency (iii) the p.d across the inductance. 7M

OR

4. a) Explain the following terms applied to sinusoidal alternating current wave
   (i) Maximum value (ii) Average value (iii) RMS value (iv)Form factor and
   (vi) Peak factor 7M

   b) Find the average value, effective value, form factor and peak factor for the square waveform such that
   for $0 < t < 0.01$, $Y=10$
   for $0.01 < t < 0.03$, $Y =0$. The period is 0.03 Sec 7M

UNIT–III

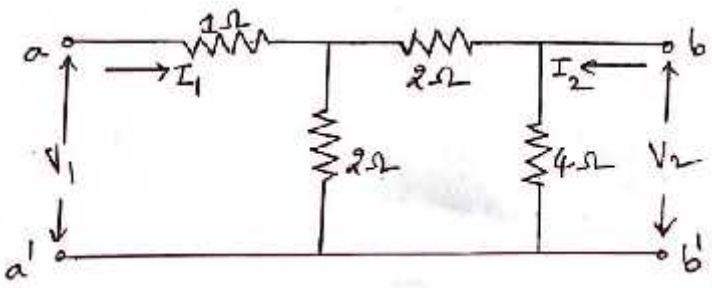
5. a) Derive the relations for expressing transmission parameters in terms of impedance parameters. 8M

   b) The impedance parameters of a two port network are Z11= 6 Ω, Z22=4Ω, Z12=Z21=3Ω. Compute the Y-parameters and ABCD parameters and write the describing equations. 6M

OR

6. a) Explain series and parallel interconnection of two port networks. 8M

   b) Find the Y-parameters of the network shown below.



6M

UNIT–IV

7. a) Derive emf equation of DC generator. 7M

   b) An 8 pole lap wound DC generator armature has 960 conductors, a flux of 40 mWb and a speed of 400 rpm. Calculate the emf generated on open circuit. If the same armature is wave wound, at what speed must it be driven to generate 400V. 7M

OR

8. a) What are the different methods of speed control of DC shunt motor? Give the advantages and disadvantages. 7M

   b) How the efficiency of DC machine be predetermined by using a swinburn's test and give its advantages and disadvantages. 7M

UNIT–V

9. a) Describe the method of calculating the regulation and efficiency of single phase transformer by open circuit and short circuit test. 8M

   b) A 50 KVA, single phase transformer 2300/230 has primary and secondary winding resistances of 2 Ω and 0.02 Ω respectively. The iron losses is equal to 412W. Calculate the efficiency at (i) Full – load (ii) Half – load When the power factor is 0.8 6M

OR

10. a) Draw and explain the speed torque characteristics of three phase induction motor. 7M

    b) How the performance characteristics of three phase induction motor can be determined by brake test. 7M

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Hall Ticket Number :										

R-17

Code: 7G331

II B.Tech. I Semester Regular 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 2 Ω 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

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Hall Ticket Number :										

R-17

Code: 7GC31

II B.Tech. I Semester Regular Examinations November 2018

Environmental Science

(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) 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

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Hall Ticket Number :										

R-17

Code: 7G333

II B.Tech. I Semester Regular 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)

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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.

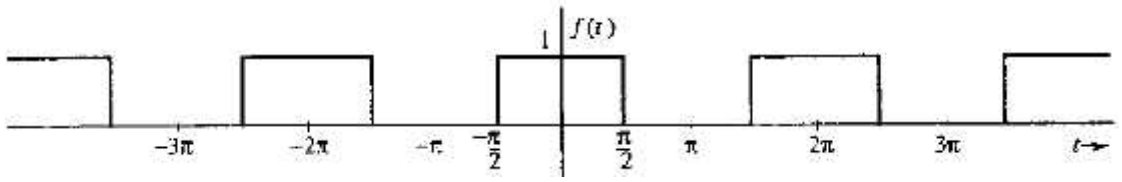

Fig. 1 8M

   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

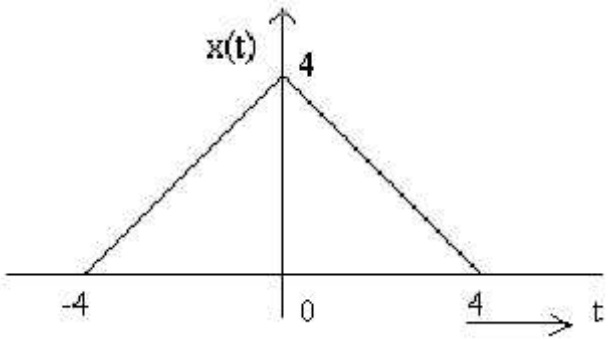

Fig. 2 8M

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

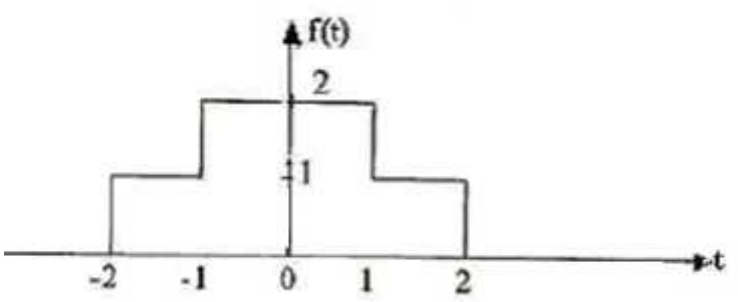

Fig. 3 8M

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

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Hall Ticket Number :										

R-17

Code: 7GC32

II B.Tech. I Semester Regular Examinations November 2018

Engineering Mathematics – III

(Common to All Branches)

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) Find a real root of the equation $x^3 - 3x - 5 = 0$ by the method of false position correct to three decimal places. 7M

   b) Find the real root of the equation $x = e^{-x}$ using Newton-Raphson method. 7M

OR

2. a) Employ Taylor's method to obtain the approximate values of y at $x = 0.1, 0.2$ for the differential equation $\frac{dy}{dx} = x - y^2,\ y(0) = 1.$ 7M

   b) Apply Runge-Kutta method of order 4, compute $y(0.2)$ *and* $y(0.4)$ from the equation $\frac{dy}{dx} = x + y,\ y(0) = 1.$ 7M

UNIT–II

3. a) The population of a town in the decennial census was given below

Year : x	1891	1901	1911	1921	1931
Population: y (in thousands)	46	66	81	93	101

   Estimate the population for the year 1895. 7M

   b) Use Lagrange's interpolation formula to find the value of y when $x = 3.5$ from the following table

x	0	1	3	4
y	-12	0	12	24

7M

OR

4. a) Find the first and second derivatives of the function tabulated below at the point $x = 1.5$

x	1.5	2.0	2.5	3.0	4.0
y	3.375	7.0	13.625	38.875	59

7M

   b) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ by using

   (i) Trapezoidal rule (ii) Simpson's $\frac{1}{3}$ rule, (iii) Simpson's $\frac{3}{8}$ rule with $h = 0.5$ *and* 0.25 7M

UNIT–III

5. a) Find the values of $a, b \text{ and } c$ so that $y = a + bx + cx^2$ is the best fit to the data

x	0	1	2	3	4
y	1	0	3	10	21

7M

b) Solve $x^2(y-z)p + y^2(z-x)q = z^2(x-y)$ 7M

OR

6. a) Determine the values of $a \text{ and } b$ by the method of least squares such that $y = ae^{bx}$ fits the following data

x	0	1	2	3
y	1.05	2.10	3.85	8.30

7M

b) Solve $x^2 \frac{\partial u}{\partial x} + y^2 \frac{\partial u}{\partial y} = 0$ by employing the method of separation of variables. 7M

UNIT–IV

7. Prove that $x^2 = \frac{®^2}{3} + 4\sum_{n=1}^{\infty} (-1)^n \frac{\cos nx}{n^2}, \ -® < x < ®$ by using Fourier series and hence show that $\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{®^2}{6}$ 14M

OR

8. Obtain a half range cosine series for $f(x) = \begin{cases} kx, & 0 \le x \le l/2 \\ k(l-x), & l/2 \le x \le l \end{cases}$

and deduce the sum of the series is $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \ldots = \frac{®^2}{8}$ 14M

UNIT–V

9. a) Find the Fourier transform of $f(x) = \begin{cases} a^2 - x^2, & for \ |x| \le a \\ 0, & for \ |x| > a \end{cases}$ 7M

b) Find the Fourier cosine transform of $e^{-ax}(a > 0)$. Hence Evaluate $\int_0^{\infty} \frac{\cos^{a} x}{x^2 + a^2} dx$ 7M

OR

10. Obtain the Fourier sine transfromation of

$$f(x) = \begin{cases} 4x, & for \ 0 < x < 1 \\ 4 - x, & for \ 1 < x < 4 \\ 0, & for \ x > 4 \end{cases}$$

14M

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Hall Ticket Number :										

R-17

Code: 7G332

II B.Tech. I Semester Regular 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

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