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R-15

Code: 5G354

III B.Tech. I Semester Regular Examinations Nov/Dec 2017

Antennas and Wave Propagation

(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) Distinguish between 'directivity' and 'gain' of an antenna. Derive expressions for both. 7M
b) Find the directivity of a Half wave dipole antenna. 7M

OR

2. a) Explain the term radiation resistance of a antenna. Calculate the radiation resistance of an antenna in free space having wavelength 10 mm and length 1 cm. 7M
b) Derive the reciprocity theorem for antennas. Show that the transmitting and receiving radiation patterns of an antenna are equal. 7M

UNIT-II

3. a) What is broadside array? Find the width of principle lobe for n-element uniform broadside array. 7M
b) Explain the importance of binomial array. How can this produce pattern without secondary lobes? 7M

OR

4. Four isotropic sources are placed symmetrically along the z-axis a distance 'd' apart design a binomial array, find the : 14M
(i) Normalized excitation coefficients
(ii) Array factor
(iii) Angles in degree where the array factor nulls occur when $d = 3\lambda/4$.

UNIT-III

5. a) Describe and discuss the principle of operation of parabolic reflector antenna 7M
b) A square horn is to have a gain of 13dB at 10GHz frequency. Determine the horn mouth dimension assuming an aperture efficiency of 0.6. State the approximations made. 7M

OR

6. a) With the help of a neat diagram, describe the cassegrain method of feeding a paraboloid reflector. 7M
b) Compare axial and normal mode helical antennas. 7M

UNIT-IV

7. a) Discuss the ground wave propagation. What is the angle of tilt and how does it effect the field strength received at a distance from the transmitter? 7M
b) Obtain the expression of radius of curvature of ray path in terms of rate of change of permittivity with height. 7M

OR

8. a) Mention the different modes of radio wave propagation. What do you mean by space wave? Where are these waves used? 7M
b) Discuss the propagation characteristics of radio waves from HF to microwave stating the various factors which influence propagation. 7M

UNIT-IV

9. a) What is super refraction? Explain its use in long range propagation. 7M
b) Describe the tropospheric propagation in detail. 7M

OR

10. a) Find the expression for the critical frequency of a layer. 7M
b) Discuss the characteristics of ionosphere and its effect on wave-propagation. 7M

Code: 5G352

III B.Tech. I Semester Regular Examinations Nov/Dec 2017

Control Systems

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

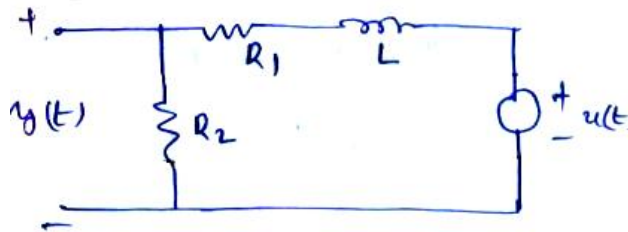
Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)

UNIT-I

1. a) Obtain the transfer function of a field controlled DC motor? 7M
 b) Write down Mason's gain formula and explain each term 7M

OR

2. a) Consider the network of fig 1, We shall obtain the transfer function $\frac{Y(s)}{U(s)}$ of the electrical network



- b) For the system represented by the following equations, Find the transfer function $\frac{X(s)}{U(s)}$ by signal flow graph technique

$$x = x_1 + a_3 x$$

$$X_1 = -1x_1 + x_2 + a_2 u$$

$$X_2 = -2x_2 + a_2 u$$

UNIT-II

3. a) The closed loop transfer function of a system is given by

$$\frac{C(s)}{R(s)} = \frac{6(S+3)}{(S+8)(S^2+4S+8)}$$

- b) Given the open loop transfer of a servo system with unity feedback is $G(s) = \frac{10}{S(0.1S+1)}$. Evaluate the dynamic error using the dynamic error

coefficients when the system is subjected to the input $r(t) = A_0 + A_1 t + \frac{A_2}{2} t^2$

OR

4. Sketch the root loci for the closed loop control system with

$$G(s) = \frac{K}{S(S+1)(S^2+4S+5)}, H(S) = 1$$

14M

UNIT-III

5. Sketch the bode plot for the transfer function $G(S) = \frac{200(S+2)}{S(S^2+10S+100)}$ and determine these from the gain margin and phase margin 14M

OR

6. a) Explain Nyquist Criterion 7M
 b) Explain how stability can be assessed from Bode plot 7M

UNIT-IV

7. a) Write the differences between lead and lag compensator 7M
 b) Explain the procedure for design of PID controller 7M

OR

8. A unity feedback system has OLTF $G_f(s) = \frac{K}{S^2(1+0.2S)}$, Design a lead compensator to meet the following specifications. Acceleration error constants $K_a = 10$, phase margin 35 degrees 14M

UNIT-V

9. a) Diagonalize the matrix $A = \begin{bmatrix} 0 & 1 & 0 \\ 3 & 0 & 2 \\ -12 & -7 & -6 \end{bmatrix}$ 7M
 b) State the transition matrix and its properties 7M

OR

10. a) State the solution of linear state equations 7M
 b) Check the system represented by

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -0.5 & 0 \\ 0 & -2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u \text{ is controllable or not} \quad \text{7M}$$

Code: 5G453

III B.Tech. I Semester Regular Examinations Nov/Dec 2017

Computer System Architecture

(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) Perform the arithmetic operations $(+42) + (-13)$ and $(-42) - (-13)$ in binary using signed 2's complement representation for negative numbers. 7M
- b) Explain in brief about the performance of a computer system. 7M
- OR**
2. a) Explain the basic operational concepts of a computer system. 7M
- b) Convert the following decimal numbers to the bases indicated.
- i. 7562 to octal
- ii. 1938 to hexadecimal
- iii. 17 to binary 7M

UNIT-II

3. a) Describe in brief various Shift Micro-operations. 7M
- b) Explain in brief different basic computer instruction formats. 7M
- OR**
4. a) Describe in brief various Logic Micro-operations. 7M
- b) Explain in detail different memory reference instructions. 7M

UNIT-III

5. a) Hardwired control unit is faster than micro programmed control unit. Justify this statement. 7M
- b) Draw and explain sequential circuit binary multiplier. 7M
- OR**
6. a) Explain the variety of techniques available for sequencing of microinstructions based on the format of the address information in the microinstruction. 7M
- b) Draw and explain the circuit arrangement for binary division. 7M

UNIT-IV

7. What are the different types of Mapping Techniques used in the usage of Cache Memory? Explain. 14M

OR

8. What are the different kinds of I/O communication techniques? Compare and contrast 14M

UNIT-V

9. a) What is meant by instruction pipeline? Explain four segment Instruction Pipeline. 7M
- b) Explain in detail the inter processor arbitration. 7M
- OR**
10. a) Give the timing diagram of instruction pipeline. 7M
- b) Explain system bus structure for multiprocessors with a neat sketch. 7M

Code: 5G351

III B.Tech. I Semester Regular Examinations Nov/Dec 2017

Digital Communication

(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) Describe basic working principle of Differential Pulse Code Modulation (DPCM) with necessary block diagram. 8M
 b) What are the advantages of digital communications 6M

OR

2. a) What are the drawbacks of Delta Modulation (DM)? Describe how these draw backs are eliminated in Adaptive Delta Modulation (ADM) 8M
 b) Determine maximum SNR for a DM system that samples at 400 Hz sinusoid with a sampling rate of (i) 8 kHz and (ii) 16 kHz when no post reconstruction filter is used. (iii) Repeat above if a 1 kHz low pass post reconstruction filter is used assuming quantization noise is uniform over frequency band 0 to sampling frequency. 6M

UNIT-II

3. a) What are the requirements of baseband signal receiver? Derive an equation for output Signal to Noise Ratio (SNR) of an integrate and dump receiver. 8M
 b) Derive an equation for probability of error for an integrate and dump receiver. 6M

OR

4. a) What is correlator? Prove that the output of the correlator is same as the output of a matched filter receiver. 8M
 b) Calculate the probability of error for a matched filter receiver? 6M

UNIT-III

5. a) Describe the generation and coherent detection of Amplitude Shift Keying (ASK) signal. 8M
 b) Derive an equation for probability of error in ASK system. 6M

OR

6. a) Describe the generation and detection of Quadrature Phase Shift Keying (QPSK) signal. 8M
 b) Derive an equation for probability of error in QPSK system. 6M

UNIT-IV

7. a) What is entropy? State and prove the properties of entropy. 8M
 b) A black and white TV picture consists of 525 lines of picture information. Assuming each line consists of 525 picture elements (pixels), each element having 256 brightness levels and pictures are repeated at a rate of 30 per second. Calculate the average information conveyed by a TV set to a viewer? 6M

OR

8. The 5 symbols $\{s_0, s_1, s_2, s_3, s_4\}$ of an alphabet of DMS and their probabilities of occurrences are $\{0.4, 0.2, 0.2, 0.1, 0.1\}$. Construct the Huffman code as (i) moving the probability of combined symbol as high as possible, and (ii) moving the probability of combined symbol as low as possible. Calculate code efficiency and variance of the constructed codes. Comment on results obtained. 14M

UNIT-V

9. a) A generator polynomial of a (7,4) cyclic code is $g(p) = p^3 + p + 1$ and find out the code vectors of the code in systematic form. 8M
 b) Describe the principle of decoder for a cyclic code. 6M

OR

10. A rate 1/3 convolutional encoder has generating vectors as $g_1 = (100)$, $g_2 = (111)$ and $g_3 = (101)$. Sketch the encoder configuration. (i) Draw the code tree, state diagram and Trellis diagram; (ii) If input message sequence is 10110, determine the output sequence of the encoder. 14M

Code: 5GA51

III B.Tech. I Semester Regular Examinations Nov/Dec 2017

Managerial Economics and Financial Analysis

(Common to CE, ME & 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. What are the different methods of measuring Price Elasticity of demand? Given the following information, calculate the price elasticity using percentage and arc methods and comment on the nature of the good:

$P = 12; Q = 10$ and $P_1 = 15; Q_1 = 8$.

OR

2. Briefly discuss the various methods of Demand forecasting.

UNIT-II

3. Define Isoquant and Isocost line. Graphically show the optimal or cost minimizing choice of inputs. Also graphically show the long-run and short-run expansion path of a firm.

OR

4. Define Production Function and write the Cobb-Douglas production function. Suppose in the Cobb-Douglas production function, $\alpha + \beta > 1$, what does it imply about the returns to scale? If $\alpha + \beta = 1$ and $\alpha + \beta < 1$, what do they imply?

UNIT-III

5. Discuss in brief the short-run and long-run equilibrium conditions under Monopolistic market. Why do firms under Monopolistic market operate with Excess Capacity?

OR

6. Briefly discuss the various forms of business organizations. Write a short comment on PPP model.

UNIT-IV

7. Define Capital. What are the different types of capital? Elaborate.

OR

8. What are the different methods of capital budgeting? Find out the Net Present Value of a project with an initial investment of Rs. 10,000/-; even cash inflow of Rs. 500/- for a period of 2 years with 5% interest rate and zero scrap value.

UNIT-V

9. What is Balance Sheet? What are the different sections of a balance sheet? Chart out assets and liabilities of a firm with suitable examples.

OR

10. What are turnover and solvency ratios? Calculate current ratio from the following information:

Particulars	Rs.
Inventories	50,000
Trade receivables	50,000
Advance tax	4,000
Cash and cash equivalents	30,000
Trade payables	1,00,000
Short-term borrowings	4,000

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III B.Tech. I Semester Regular Examinations Nov/Dec 2017

Analog & Digital Integrated 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

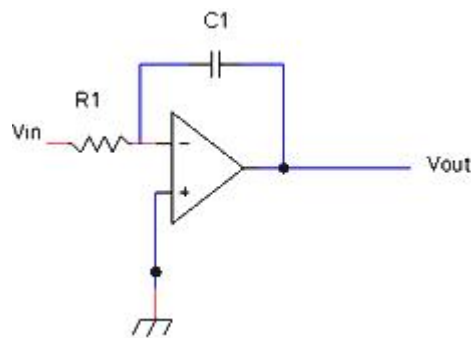
1. a) Define slew rate and CMRR of an OP-AMP. 4M
- b) Draw the circuit diagram of an integrator using OP-AMP. 4M
- c) Implement the following equation using Op-Amp

$$V_0 = 3v_1 - 2v_2 + v_3 - 5v_4$$

6M

OR

2. a) List the characteristics of an ideal OP-AMP. 4M
- b) If CMRR of an OP-AMP is 60dB and the common mode gain is 0.5, calculate the differential mode gain. 4M
- b) Draw the output of the following circuit if a unit step signal is applied at input.



6M

UNIT-II

3. a) What is a comparator? What are the applications of comparators? 4M
- b) Why normally control terminal of 555 timer is connected to ground through a 0.01μF bypass capacitor? 2M
- c) Design a monostable multi-vibrator using 555 timer. 8M

OR

4. a) Explain the Basic Principle and Operation of individual Blocks of PLL. 8M
- b) Design a triangular wave generator using OP-AMP. 6M

UNIT-III

5. a) Define fan-in and fan-out. 4M
- b) Explain steady State Electrical behavior of CMOS. 10M

OR

6. a) Are TTL outputs are more capable of sinking current or sourcing current? Justify. 4M
- b) Write short notes on
 - i. TTL Logic
 - ii. Bipolar logic 10M

UNIT-IV

7. What is the full form of VHDL? Write the VHDL code of two input AND gate. Also write the VHDL code of Half Adder using dataflow modeling. Using the above two code write VHDL code of Full adder. 14M

OR

8. a) Design a full adder using half adder. 5M
b) Write short notes on the followings
i. Three state devices
ii. Multiplexers
iii. ALU 9M

UNIT-V

9. a) What are the differences between Latch and Flip Flop? 4M
b) Design a 13 bit counter. 10M

OR

10. a) Design a shift left SISO register using Flip Flops. 4M
b) Draw the circuit diagram of a Master -slave J - K flip - flop using NAND gates. What is race around condition? How is it eliminated in a Master-slave J-K flip-flop? 10M
