

Hall Ticket Number :

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R-15

Code: 5G353

III B.Tech. I Semester Supplementary Examinations May 2018

Analog & Digital Integrated Circuits

(Electronics and Communication Engineering)

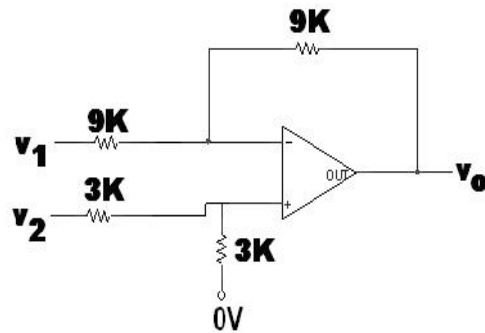
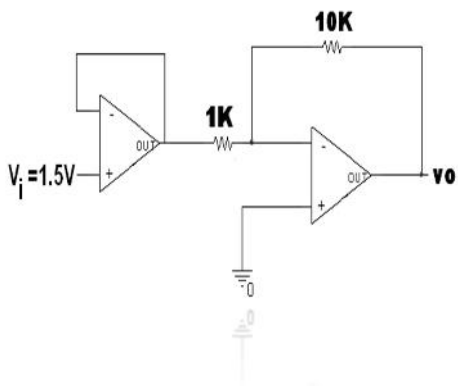
Max. Marks: 70

Time: 3 Hours

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

UNIT-I

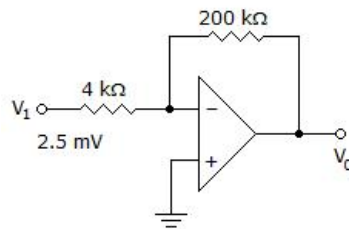
- What is the significance of virtual ground in OP-AMP? 3M
 - Mention four applications of OP-AMP. 3M
 - Determine the output voltage of the following circuits shown below (assuming the op-amp as ideal)



8M

OR

- What are the advantages of inverting configuration over non-inverting configuration? 4M
 - Draw the output for this circuit with a sinusoidal input of 2.5 mV.



6M

- Draw the output of an Op-Amp when a sinusoidal signal $5\sin\pi t$ is applied at the input. The differential gain is 1000 and the DC biasing are +15V and -15V. 4M

UNIT-II

- Design a RC active filters using OP-AMP. 8M
 - Explain Monolithic PLL. 6M

OR

- With suitable diagram explain the monostable and astable operation of IC 555 timer. 14M

UNIT-III

5. Write short notes on
- i. TTL logic
 - ii. Bipolar logic
 - iii. ECL
- 14M

OR

6. a) Explain dynamic electrical behavior of CMOS. 10M
- b) Mention two merits of CMOS circuit in context to switching application. 2M
- c) Which logic family has the highest power dissipation per gate? 2M

UNIT-IV

7. A magnitude comparator is combinational circuit that compares two numbers. A & B and determine their relative magnitudes. The outcome of the comparison is specified by three binary variables that indicates whether $A > B$, $A = B$, or $A < B$. Determine the algorithm to implement this comparator and draw a 4-bit magnitude comparator using combinational circuit. 14M

OR

8. a) With an example discuss in detail about functions and libraries in VHDL. 10M
- b) Design a 4:1 multiplexer using logic gates. 4M

UNIT-V

9. a) Design a four bit binary ripple counter using T Flip-Flops. 7M
- b) What is Race around condition in JK Flip Flop? How it is avoided? 4M
- c) Why both "S" and "R" inputs of an S-R Latch should never be "1" simultaneously? Justify your answer 3M

OR

10. Draw the state diagram of a MOD - 3 counter. Write its excitation table and draw the circuit diagram of a MOD 3 synchronous counter using JK Flip Flops. 14M

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III B.Tech. I Semester Supplementary Examinations May 2018

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) Derive the relation for the electric and magnetic field radiated by an infinitesimal dipole. 7M
b) Define the term "directivity" for an antenna. Derive the equation for the directivity. 7M

OR

2. a) Derive an expression for the power radiated by a current element. 7M
b) What do you mean by the radiation resistance of an antenna? What is the nature of the current distribution in a base fed half wave vertical antenna erected just above a perfect earth. 7M

UNIT-II

3. a) Derive an expression for the width of principal lobe of uniform end fire array. 7M
b) Explain the binomial array in detail. What are the disadvantages of it? 7M

OR

4. a) Design a three elements binomial array of isotropic elements positioned along the Z-axis a distance 'd' apart. Find the:
(i) Normalized excitation coefficient
(ii) Array factor
(iii) Null of the array factor, when the distance between the elements is one wavelength, 7M
b) Define the principle of pattern multiplication. Using this principle show that the binomial array has no side lobe. 7M

UNIT-III

5. a) Explain the horn antenna. How is this antenna fed and what are its applications? 7M
b) A 12 turn axial helical antenna of circumference has a turn spacing of $\lambda/4$. Determine HPBW, directivity and axial ratio. 7M

OR

6. a) Explain the properties of E-plane and H-plane sectorial horns. 7M
b) A parabolic antenna having a circular mouth is to have a power gain of 1000 at wavelength 10 cm. Estimate the diameter of the mouth and the half power beam width of the antenna. 7M

UNIT-IV

7. a) Discuss the importance of ground wave propagation for communication purpose. Why ground waves are not received beyond certain range? 7M
b) Explain surface wave propagation. 7M

OR

8. a) Explain how earth's magnetic field affects the propagation of radio waves in the ionosphere. 7M
b) Deduce the expression for phase-difference between direct and reflected waves for the ground propagation. 7M

UNIT-V

9. a) Explain how earth's magnetic field affects the propagation of radio waves in the ionosphere. 7M
b) Write short notes on:
(i) Maximum Usable frequency
(ii) Skip distance. 7M

OR

10. a) Describe tropospheric propagation. List its applications. 7M
b) What is Super Refraction? Explain its use in long-range propagation. 7M

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III B.Tech. I Semester Supplementary Examinations May 2018

Control Systems

(Electronics and Communication Engineering)

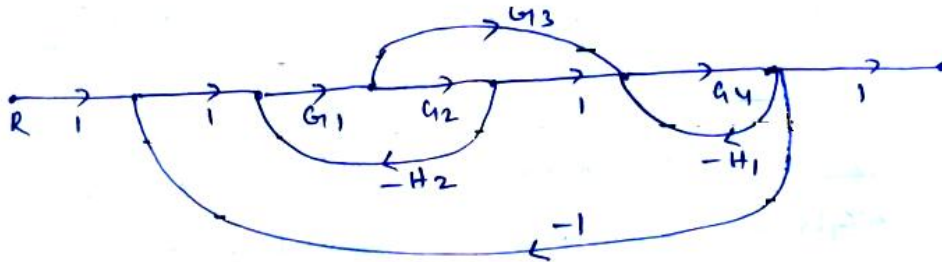
Max. Marks: 70

Time: 3 Hours

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

UNIT-I

1. a) The signal flow graph for the system of figure is shown in below figure



7M

- b) Compare the open loop and closed loop system with suitable examples

7M

OR

2. a) Explain the Mason's gain formula
b) Obtain the transfer function of armature controlled DC motor

7M

7M

UNIT-II

3. a) What are the time domain specifications
b) Obtain the unit step response of a unity feedback system whose open loop

7M

transfer function is $G(s) = \frac{4}{s(s+5)}$

7M

OR

4. Sketch the root locus plot of the control system with loop transfer function

$$G(s)H(s) = \frac{k}{s(s+4)(s^2+4s+8)}$$

14M

UNIT-III

5. Sketch the bode plot for the transfer function $\frac{300(s^2+2s+4)}{s(s+10)(s+20)}$

14M

OR

6. a) Explain Nyquist criterion
b) Explain how stability can be assessed from bode plots

7M

7M

UNIT-IV

7. a) Explain the necessity of a compensator 7M
 b) Write the difference between lead and lag compensator 7M

OR

8. The open loop transfer function of the UFB system is $G(s) = \frac{k}{s(s+1)}$. It is desired to have the velocity constant $K_v = 12 \text{ sec}^{-1}$ and phase margin as 40 degrees. Design a lead compensator to meet the above specifications 14M

UNIT-V

9. a) Compute the STM for the system given the system matrix $A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ 7M
 b) Write the solution of linear state equations 7M

OR

10. a) Write short notes on controllability and observability 7M
 b) Check whether the system represented by

$$\dot{x} = \begin{bmatrix} -3 & 1 & 1 \\ -1 & 0 & 1 \\ 0 & 0 & 1 \end{bmatrix} x + \begin{bmatrix} 0 & 1 \\ 0 & 0 \\ 2 & 1 \end{bmatrix} u$$

$$y = \begin{bmatrix} 0 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix} x \text{ observable (or) not}$$

7M

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Code: 5G453

III B.Tech. I Semester Supplementary Examinations May 2018

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) Explain the terms computer architecture, computer organization and computer design in a detailed fashion. 8M
- b) Discuss about fixed point and floating point representations. 6M

OR

2. a) Explain in brief about the performance of a computer system. 7M
- b) Discuss in detail about error detection codes. 7M

UNIT-II

3. a) Draw and explain the 4 bit binary adder-subtractor. 7M
- b) Explain in detail different computer instruction formats with examples. 7M

OR

4. a) Describe in brief various Logic Micro-operations. 7M
- b) Explain instruction cycle. How will you represent instruction cycle with interrupts? Explain. 7M

UNIT-III

5. a) Explain about microinstruction sequencing techniques, specifically variable format address microinstruction 10M
- b) Explain the basis for booths multiplication algorithm along with its constituents Steps. 4M

OR

6. a) Hard wired control unit is faster than micro programmed control unit. Justify this statement 6M
- b) Explain with example the process of binary division in digital hardware. 8M

UNIT-IV

7. a) Explain the features of the cache memory and its accessing. 9M
- b) Explain in detail Isolated Vs Memory mapped I/O. 5M

OR

8. a) Explain in detail the virtual memory address translation. 9M
- b) Explain in detail I/O Bus Vs Memory Bus. 5M

UNIT-V

9. a) What is pipelining? Explain the arithmetic pipeline. 7M
- b) Explain in detail the system bus structure for multiprocessors. 7M

OR

10. a) Explain four segments pipelining with space time diagram. 7M
- b) Discuss in detail the characteristics of multiprocessors. 7M

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R-15

Code: 5G351

III B.Tech. I Semester Supplementary Examinations May 2018

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 the working principle of Pulse Code Modulation (PCM) with necessary block diagram. 8M
b) Prove that the output Signal to Noise Ratio (SNR) in PCM is $6N$ dB. 6M

OR

2. a) Describe the basic elements of a digital communications system. 8M
b) What are the advantages of digital communications 6M

UNIT-II

3. a) What is an optimum receiver? Derive the equation for transfer function of this filter. 8M
b) Calculate the probability of error for an optimum filter? 6M

OR

4. a) What matched filter? Describe the impulse response of this 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 Phase Shift Keying (PSK) signal. 8M
b) Derive an equation for probability of error for PSK system. 6M

OR

6. a) Describe the generation and detection Differential Phase Shift Keying (DPSK) signal. 8M
b) Determine the error probability of Binary Frequency Shift Keying (BFSK) signal with 1 kHz and carrier amplitude of 1 mV at the receiver. The Power Spectral Density (PSD) of Additive White Gaussian Noise (AWGN) is 10^{-10} W/Hz 6M

UNIT-IV

7. a) What is entropy? State and prove the properties of entropy. 8M
b) A continuous signal is band limited to 5 kHz. The signal is quantized to 8-level PCM system with probabilities: $0.25, 0.2, 0.2, 0.1, 0.1, 0.05$ and 0.05 . Calculate the rate of information. 6M

OR

8. A Discrete Memory less Source (DMS), X have equally likely symbols.
(i) Construct a Shannon-Fano code for X and calculate the efficiency of the code;
(ii) Construct another Shannon-Fano code and compare the results;
(iii) Repeat for the Huffman code and compare the results. 14M

UNIT-V

9. a) Find out the generator matrix corresponding to $g(p) = p^3 + p + 1$ and find out the code vectors for a $(7, 4)$ cyclic code. 8M
b) What are the advantages and disadvantages of cyclic code? 6M

OR

10. A generator polynomial of a $(15, 11)$ Hamming code is given by $g(x) = 1+x+x^4$. Develop encoder And syndrome calculator for this code using systematic form 14M

Hall Ticket Number :

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Code: 5GA51

III B.Tech. I Semester Supplementary Examinations May 2018

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. Define Price elasticity, Income elasticity and Cross price elasticity of demand. What are the different methods of measuring Price Elasticity of demand? Derive relationship between Price Elasticity of Demand and Marginal Revenue?

OR

2. Define Managerial Economics. Discuss the nature and scope of Managerial Economics. What is the relationship of Managerial Economics with Microeconomics?

UNIT-II

3. What is the shape of long-run average cost curve and explain why? Differentiate between Economies of Scale and Economies of Scope with suitable examples.

OR

4. Define and show graphically the Break even point of a firm. Find out the break even output (Q^*) of a firm if total cost (TC) = Rs. 6310; total revenue (TR) = Rs. 4130; fixed cost (FC) = Rs. 4980; variable cost (VC) = Rs. 1330 and present output (Q) = 5.

UNIT-III

5. Compare and Contrast the Short-run and Long-run equilibrium conditions under Perfect competition and Monopoly market.

OR

6. Define Oligopoly market structure. Describe how price and output is determined under Stackelberg Duopoly model.

UNIT-IV

7. Why is capital important for a firm? What are the various sources of raising capital? Elaborate.

OR

8. What is capital budgeting? Define Net Present Value and Discount Rate. Write a brief note on Pay Back Method.

UNIT-V

9. What do you understand by the term 'Ledger' and 'Trial Balance'? Name two methods of preparing a Trial Balance. Prepare a purchase book from the following information:
 - a) Purchase of goods costing Rs. 5000/- from M/s Ramesh & Co. vide invoice no. 120 dated 15/09/2017.
 - b) Purchase of Fixed Assets costing Rs. 8000/- from M/s Renu & Co. vide invoice no. 016 dated 20/09/2017.
 - c) Paid wages of Rs. 600/- in cash vide receipt no.16 dated 25/09/2017.

OR

10. What is the meaning of Accounting Ratios? What are the objectives of ratio analysis? List out the advantages and limitations of ratio analysis.
