

Code: 4G354

III B.Tech. I Semester Supplementary Examinations May 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) Derive the relation between Directivity and Effective Aperture Area. 5M
- b) A radio communication link has 15W transmitter connected to an antenna of 2.5m^2 effective aperture at 5GHz. The receiving antenna has an effective aperture of 0.5m^2 and is located at 15KM line of sight distance from the transmitting antenna. Find the power delivered to the receiver. 3M
- c) Define and explain the following 6M
 - i) Directivity
 - ii) Beam width
 - iii) Radiation resistance

OR

2. a) Write short notes on normalized field pattern. 7M
- b) Compare far fields of small loop and short dipole? 7M

UNIT-II

3. a) Estimate the array factor for arrays of n-isotropic point sources of equal amplitude and spacing. Illustrate the principle of pattern multiplication. 7M
- b) A linear broadside array consists of 16 identical isotropic radiators with spacing $\lambda/2$. Derive an expression and plot the radiation pattern. Also find directivity and beam width. 7M

OR

4. a) Discuss the application of linear array. Explain the advantages and disadvantage of linear array. 7M
- b) Compare broad side array and end fire array. 7M

UNIT-III

5. Explain the design parameter of helical antenna with practical design considerations; also write the expression for the HPBW, BWFN and axial ratio. 14M

OR

6. a) Explain about flat sheet and corner reflector antennas. 9M
- b) The aperture diameter of a 1.43 GHz dish antenna is 64 meters. Find its FNBW and also its power gain with respect to half wave dipole. 5M

UNIT-IV

7. What is wave tilt? List all factors that affect the angle of tilt and describe them. Explain how the wave tilt affects the range of a transmitter. 14M

OR

8. a) Discuss briefly the salient features of ground wave propagation. 7M
- b) Derive expression for field strength when space wave propagates between transmitting and receiving antennas of heights h_t and h_r respectively. 7M

UNIT-V

9. Describe the structure of the ionosphere and how its layers are aiding long distance communication at radio frequencies. 14M

OR

10. a) Explain the different types of irregular Ionospheric variations. 7M
- b) Write short notes on duct propagation and super refraction. 7M

Code: 4G351

III B.Tech. I Semester Supplementary Examinations May 2017

Control Systems

(Electronics and Communication Engineering)

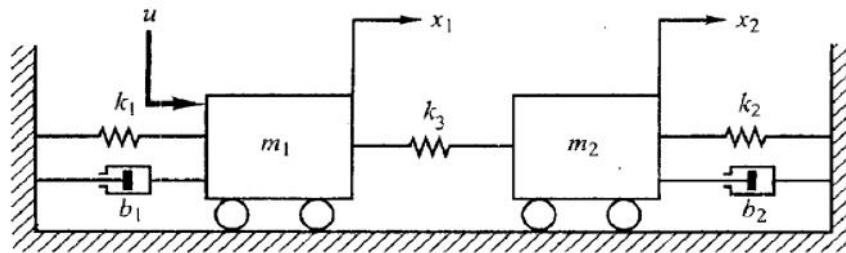
Max. Marks: 70

Time: 3 Hours

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

UNIT-I

1. a) Explain briefly about the components of control system and discuss their functionalities? 7M
- b) Obtain transfer functions $x_1(s)/u(s)$ and $x_2(s)/u(s)$ of the mechanical system shown below

**OR**

2. a) A linear time invariant system has an impulse response e^{2t} for $t > 0$. If the initial conditions are zero and the input is e^{3t} . Obtain transfer function for $t > 0$ with new input and its initial impulse response? 7M
- b) Obtain transfer functions $C(s)/R(s)$ and $C(s)/D(s)$ for the system shown in figure below?

UNIT-II

3. a) List the steps involved to construct root locus with necessary equations? 7M
- b) Consider the following characteristic equation :
 $s^4 + 2s^3 + (4+k)s^2 + 9s + 25 = 0$ using routh stability criterion, determine the ranges of k for stability? 7M

OR

4. a) Consider the system shown in figure, where $\zeta = 0.6$ and $\tilde{\omega}_n = 5 \text{ rad/sec}$. Obtain rise time t_r , peak time t_p , maximum peak over shoot and settling time when the system is subjected to a unit step input? 7M
- b) Define static position error constant K_p , velocity constant K_v and acceleration constant K_a . Obtain steady state errors for type-0, type-1 and type-2 systems with step, ramp and parabolic response? 7M

UNIT-III

5. a) Draw the bode diagram for the transfer function

$$G(j\check{S}) = \frac{10(j\check{S} + 3)}{j\check{S}(j\check{S} + 2) + ((j\check{S})^2 + j\check{S} + 2)} ?$$

7M

- b) What is meant by frequency response? Explain frequency domain specifications? 7M

OR

6. a) Define phase margin and gain margin with significant expressions and discuss about their effects on stability? 7M

- b) Sketch polar plot for the transfer function $G(j\check{S}) = \frac{e^{-j\check{S}L}}{1 + j\check{S}T}$? 7M

UNIT-IV

7. a) What are the effects of phase lead compensation? 7M

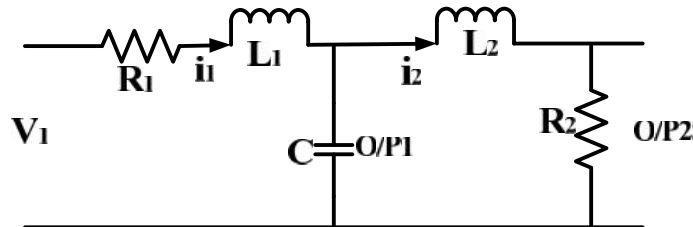
- b) Explain clearly about time domain interpretation of phase lag and phase lead control? 7M

OR

8. Explain Clearly about steps involved to realize phase margin of system using PI controller in frequency domain, summarize the advantages and disadvantages of properly designed PI controller using those steps? 14M

UNIT-V

9. a) Obtain state space equations for the electrical network shown below?



7M

- b) List out the advantages of state space analysis over transfer function analysis? 7M

OR

10. a) Check controllability and observability for the given state space equations.

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -1 & -2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u. \text{ And output equation: } C = \begin{bmatrix} 1 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}.$$

7M

- b) What is the use of state transition matrix and state its properties? 7M

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R-14

Code: 4G455

III B.Tech. I Semester Supplementary Examinations May 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) Convert the following octal numbers into binary and hexadecimal:
(i) $5436.15_8 = ?_2 = ?_{16}$ (ii) $13705.207_8 = ?_2 = ?_{16}$ 10M
- b) List different types of computers and write significance of each type 4M

OR

- 2. a) List various error detection codes with an example 10M
- b) Differentiate between multi processors and multi computers 4M

UNIT-II

- 3. a) Write about register transfers and Register Transfer language with an example 8M
- b) Explain Arithmetic Micro Operations, logic micro operations, 6M

OR

- 4. a) Write about register transfers and Register Transfer language with an example. 10M
- b) Draw a state Diagram for Instruction cycle. 4M

UNIT-III

- 5. a) Compute square root for 172_{10} using binary square root algorithm. 8M
- b) Develop a flow chart for the Booth's multiplication algorithm. 6M

OR

- 6. a) " Suppose a machine encodes instructions in 32 bits according to the following format. Also, suppose the encoding must accommodate 164 opcodes and 50 registers".
 OPCODE, Source Registers, Destination Registers, Immediate field
 What is the greatest number of bits that are required to represent the Immediate field? If the Immediate field encodes a 2's complement integer, what range of values can be represented with these bits? 7M
- b) Explain about address sequencing in Micro Programmed control Unit with an example 7M

UNIT-IV

- 7. a) Explain various cache memory management techniques 8M
- b) Write about associate Memory 6M

OR

- 8. a) Discuss in detail about Direct Memory Access (DMA) 8M
- b) write about peripheral Component interconnect (PCI) bus 6M

UNIT-V

- 9. a) Explain Arithmetic Pipelining processing with an example 8M
- b) Distinguish between parallel processing and pipelining processing 6M

OR

- 10. a) An unpipelined processor has a cycle time of 25ns. What is the cycle time of a pipelined version of the processor with 50 evenly divided pipeline stages, if each pipeline latch has a latency of 1ns? 6M
- b) What are the interconnection structures and explain any one of them in detail. 8M

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R-14

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III B.Tech. I Semester Supplementary Examinations May 2017

Digital IC Applications

(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 in detail about CMOS logic families 7M
- b) Discuss Schottky transistor 7M

OR

- 2. a) Discuss CMOS / TTL interfacing 7M
- b) Compare different logic families 7M

UNIT-II

- 3. a) Draw and explain VLSI design flow with neat diagram 7M
- b) Discuss in brief about VLSI basic language elements 7M

OR

- 4. Explain in detail about all data types of VHDL and operators with one example of each 14M

UNIT-III

- 5. Explain with an example about data flow design elements 14M

OR

- 6. a) Discuss selected and conditional signal assignment statements 7M
- b) Explain delay models of VHDL 7M

UNIT-IV

- 7. Draw with neat sketch and explain Barrel shifter 14M

OR

- 8. Draw pin diagram of IC 74X138 and write its VHDL code 14M

UNIT-V

- 9. Discuss synchronous design methodology and impediments to synchronous design 14M

OR

- 10. Write VHDL code for 4 bit UP/DOWN counter with neat diagram 14M

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R-14

Code: 4G352

III B.Tech. I Semester Supplementary Examinations May 2017

Linear IC Applications

(Electronics & 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 the basic current mirror and explain its operation. 6M
- b) What is constant current bias? How it is obtained in a differential amplifier? Explain with circuit diagram. 8M

OR

2. a) Draw the equivalent circuit diagram of op amp and derive the expression of gain for inverting amplifier. 7M
- b) Explain the input bias current and input offset current of op amp. 7M

UNIT-II

3. a) Design a summing amplifier to add four DC input voltages. The output of this circuit must be equal to three times the negative sum of the inputs. 8M
- b) Explain the need and operation of lossy integrator. 6M

OR

4. a) Draw and explain the operation of saw tooth wave generator. 7M
- b) List and explain any three applications of comparator. 7M

UNIT-III

5. a) Sketch the functional diagram of 555 timer and explain how it can be used as a Schmitt trigger. 8M
- b) List and explain the applications of Astable Multivibrator using 555 timers. 6M

OR

6. a) Explain in detail about applications of PLL. 7M
- b) Explain Functional Block Diagram of IC565 in detail? 7M

UNIT-IV

7. a) Draw and explain the operation of counter type ADC 8M
- b) Calculate the values of the LSB, MSB and full scale output for an 8 bit DAC for the 0 to 20v range. 6M

OR

8. a) Draw the schematic circuit diagram of servo A/D converter and explain the operation of this system. 7M
- b) Explain in detail about inverted R-2R ladder DAC. 7M

UNIT-V

9. a) What is switching regulator? List four major components of the switching regulator. 8M
- b) What are the advantages of 723 regulators over 78XX/79XX regulators? 6M

OR

10. a) Derive the expression for the transfer function of second order low pass Butterworth filter. 8M
- b) Design a HPF at a cut off frequency of 5kHz and a pass band gain of 2 6M

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R-14

Code: 4GA51

III B.Tech. I Semester Supplementary Examinations May 2017

Managerial Economics and Financial Analysis

(Common to CE, ME and 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 is Managerial Economics? Discuss its relation with other areas of Management?

OR

2. Explain various Demand forecasting techniques with suitable examples?

UNIT-II

3. Define Production function? Explain about Cobb-Douglas production function?

OR

4. Explain Law of variable proportions with a suitable diagram?

UNIT-III

5. How do you classify markets? Discuss price output determination in monopoly market?

OR

6. What is the need of Public Sector business organizations? Explain various public sector organizations in detail?

UNIT-IV

7. Define Capital? Explain its types and significance?

OR

8. What is Capital budgeting? Discuss various methods of capital budgeting?

UNIT-V

9. What is Trail balance? Explain its role and importance in financial accounting?

OR

10. What is Ratio Analysis? Discuss various financial ratios in financial analysis?
