Hall Ticket Number :										

R-17

Code: 7G353

III B.Tech. I Semester Supplementary Examinations December 2020

Analog & Digital Integrated Circuit 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)

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UNIT–I

1. a) Define the following terms as applied to an operational amplifier and mention their typical values for IC 741:
   i) CMRR
   ii) PSRR
   iii) Slew rate
   iv) Output impedance 7M

   b) With a neat circuit diagram, explain basic operational amplifier circuit 7M

OR

2. Using block diagram of log and antilog amplifier explain the working of analog multiplier circuit. How you can convert it into a square? Explain. 14M

UNIT–II

3. a) Explain the functional diagram of IC 555 with a neat sketch 7M

   b) Design a monostable multivibrator using 555 timer to obtain a pulse of width 10 msec. 7M

OR

4. a) Explain the operation of a successive approximation ADC using a simplified block diagram. 7M

   b) Draw the block diagram representation of PLL and explain 7M

UNIT–III

5. Report in detail steady state electrical behavior of CMOS 14M

OR

6. a) With declaration syntax of procedure, explain its facts 7M

   b) Bring out the difference between functions and procedures 7M

UNIT–IV

7. Implement the Boolean function $F(a,b,c,d) = \sum m(0,1,2,4,5,7,8,9)$ using a 8:1 multiplexer. Draw the logic diagram and explain the operation. Additional gates can be used if required. 14M

OR

8. Design a circuit that accepts 2 unsigned 4 bit binary numbers and provides 3 outputs. The inputs are $A_3A_2A_1A_0$ and $B_3B_2B_1B_0$ .Outputs are A=B,A>B,A<B. Draw the logic diagram 14M

UNIT–V

9. Draw the logic diagram of a Master slave JK flop using gates. Write its function table and derive the characteristic equation. What is the type of triggering used in master slave flip flops? 14M

OR

10. Design a mod-5 synchronous binary counter using clocked J-K flip flops. 14M

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Hall Ticket Number :										

R-17

Code: 7G355

III B.Tech. I Semester Supplementary Examinations December 2020

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)

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UNIT–I

1. a) Define Reciprocity Theorem as applicable to antennas. State the antenna theorems and relate them to reciprocity theorem. 7M

   b) The maximum radiation intensity of a 90% efficiency antenna is 200 mW/st. Find the directivity and gain (dimensionless and in dB)

      i) The input power is 125.66 mW

      ii) Radiated power is 125.66 mW 7M

OR

2. a) Compare far fields of small loop and short dipole? 6M

   b) Show that the radiation resistance of Half Wave Dipole is 73Ω. 8M

UNIT–II

3. Find the array factor and phase pattern of the Uniform Linear Array considering the first element as phase reference. 14M

OR

4. a) A linear broadside array consists of 16 identical isotropic radiators with spacing λ/2. Derive an expression and plot the radiation pattern. Also find directivity and beam width. 7M

   b) What is principle of pattern multiplication? Explain its utility with examples. 7M

UNIT–III

5. a) Sketch and explain the constructional features of a helical antenna. 7M

   b) Explain about flat sheet and corner reflector antennas. 7M

OR

6. a) Give various causes of side lobes in the pattern of the dish 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. a) A VHF communication link is established with 35 watt transmitter at 90 MHz. Determine

      i. The distance up to which LOS communication may be possible if the height of the transmitting and receiving antenna are 40 m and 25 m respectively.

      ii. Evaluate field strength at the receiver end. 7M

   b) Describe the phenomenon of ground wave propagation. 7M

OR

8. What is the field strength due to ground wave according to Sommerfeld? What are the factors that are incorporated into this formula? 14M

UNIT–V

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

OR

10. Describe the phenomenon of ‘ghosting’ and ‘shadow zone’? What are the preventive measures that can be taken? 14M

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Hall Ticket Number :										

R-17

Code: 7G352

III B.Tech. I Semester Supplementary Examinations December 2020

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)

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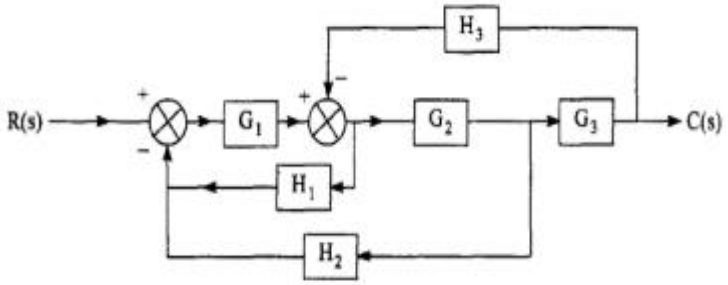
UNIT–I

1. a) Explain about the classification of control systems. 6M

   b) Derive the transfer function C(s)/R(s) for the following diagram by using block diagram reduction technique.

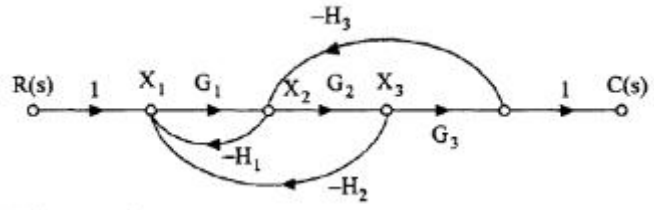


8M

OR

2. a) Compare in detail about Block diagram and signal flow graph methods. 7M

   b) Find transfer function C(s)/R(s).



7M

UNIT–II

3. a) Explain the time response of under damped 2nd order system along with its transient response specifications. 7M

   b) The open – loop transfer function of a unity feedback system is $G(s) = \frac{8}{s(s+6)}$

   Determine the nature of response of the closed – loop system for a unit – step input. Also determine the rise time, peak time, peak over shoot and settling time. 7M

OR

4. a) What are rules in construction of root loci? 7M

   b) For a unity feedback system with open loop transfer function $G(s)H(s) = \frac{K}{s(s+4)(s+6)}$. Find the range of K for which the system will be stable using RH – Criterion. 7M

UNIT–III

5. a) Find the Gain margin and phase margin of the system if the open loop transfer function is: $G(s)=\frac{10}{s(s+1)}$ 7M

   b) Draw the polar plot of $G(s)H(s)=\frac{K}{s(s+3)(s+5)}$ and there from determine range of K for stability using Nyquist Criterion. 7M

OR

6. The open loop transfer function of a unity feedback system is given by $\frac{10(s+3)}{s(s+2)(s^2+4s+100)}$ draw the bode plot, find the gain margin and phase margin and comment on stability by bode plot. 14M

UNIT–IV

7. a) Derive the expression for the transfer function of a lag-lead compensator. 7M

   b) Explain the design procedure of lag compensator 7M

OR

8. a) List various types of controller. Explain proportional plus derivative controller. 7M

   b) Explain PID Controllers with at least one example. 7M

UNIT–V

9. a) Discuss about the properties of state transition matrix. 6M

   b) The state equation of a linear-time invariant system is given:

$$\begin{bmatrix}\dot{X}_1\\ \dot{X}_2\end{bmatrix}=\begin{bmatrix}0 & 5\\ -1 & -2\end{bmatrix}\begin{bmatrix}X_1\\ X_2\end{bmatrix}+\begin{bmatrix}1\\ 1\end{bmatrix}u \text{ and } Y=\begin{bmatrix}1 & 1\end{bmatrix}X$$

   Determine state transition matrix. 8M

OR

10. a) Obtain the state model of the system described by the following transfer function: $\frac{Y(s)}{U(s)}=\frac{5}{s^2+6s+7}$ 7M

    b) Explain about diagonalization. 7M

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Hall Ticket Number :										

R-17

Code: 7G159

III B.Tech. I Semester Supplementary Examinations December 2020

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)

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UNIT–I

1. a) Explain in brief about the performance of a computer system. 7M

   b) Explain about the fixed point representation of integers. Discuss about the arithmetic addition and subtraction of signed-magnitude system. 7M

OR

2. a) Discuss about the error detection using parity bit code with examples. 8M

   b) Convert the following decimal numbers to the bases indicated.

      1) 7562 to octal ii) 1938 to hexadecimal iii) 175 to binary. 6M

UNIT–II

3. a) Explain the execution of micro instructions with a neat diagram. 7M

   b) What is shift register? Explain the general capabilities of shift registers. 7M

OR

4. a) Discuss about steps involved in instruction cycle with interrupt enabled. 8M

   b) Give the control sequence for the instruction ADD R4,R5,R6 6M

UNIT–III

5. a) Explain the floating point addition / subtraction algorithm with flow chart. 8M

   b) With examples explain the Data transfer, Logic and Program Control Instructions. 6M

OR

6. a) Give the major characteristics of RISC and CISC architectures 7M

   b) Perform the arithmetic operations 35 + 40 and - 35 + (- 40) with binary numbers in singed 2's complement representation and signed- magnitude representation 7M

UNIT–IV

7. a) What is Cache memory? Explain different types of mappings from main memory to cache memory. 8M

   b) Briefly explain various peripheral devices used in computer system. 6M

OR

8. a) Explain look-aside system organization for caches. 7M

   b) Discuss Direct Memory Access (DMA). 7M

UNIT–V

9. a) Discuss about Flynn's classification of parallel processor systems 7M

   b) Explain the characteristics of Multiprocessors 7M

OR

10. a) Discuss about exception in multiple execution unit pipelined processors with examples. 8M

    b) Explain how synchronization is achieved in multiprocessor systems. 6M

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Hall Ticket Number :										

R-17

Code: 7G354

III B.Tech. I Semester Supplementary Examinations December 2020

Electronic Measurements and Instrumentation

(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) Describe with the help of circuit diagram the construction and working of a shunt-type ohm meter. 8M

   b) Explain the fundamental principle on which DC meter is constructed. 6M

OR

2. a) How do we determine the performance of an instrument? 8M

   b) Explain with the help of circuit diagram the construction and working of a series type ohm meter. 6M

UNIT–II

3. a) Explain in detail about the principle and operation of Arbitrary Wave Generator with the help of neat block diagram. 7M

   b) Discuss briefly about operation of Logic Analyzer. 7M

OR

4. a) Explain the principle of operation and generation of pulse and square wave. 8M

   b) Discuss the basic principle of AF wave analyzer with neat diagram. 6M

UNIT–III

5. a) With a neat block diagram explain the working of sampling oscilloscope. List any three precautions to be taken when using a sampling oscilloscope? 8M

   b) A sampling oscilloscope is being used to observe a 400MHZ sine wave. A sampling pulse occurs every 3ms.Draw five cycles of the 400MHZ signal and places a dot at the sampled point on each of the five cycles. 6M

OR

6. a) Draw the block diagram of a dual trace oscilloscope and explain its working. 8M

   b) Discuss about CRT and its features with necessary diagram. 6M

UNIT–IV

7. a) Explain the operation of Kelvin Bridge. 8M

   b) Define the term null as it applies to bridge measurements. 6M

OR

8. a) Explain the principle of operation and construction of Q-meter. 8M

   b) In the case of Schering bridge, arm AC has R=4.7kΩ. Arm CD has unknown elements. They are BD has C=0.1MF, arm AB=4.7K Ω is shunt with 1MF.Determine values of components are the arm CD. 6M

UNIT–V

9. a) Discuss in detail about X-Y recorder with relevant diagram. 8M

   b) List three types of temperature transducers and describe the applications of each. 6M

OR

10. a) Explain working of strain gauge with neat sketch. 7M

    b) Explain the Data Acquisition system with neat sketch. 7M

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