

Printed Pages – 4

Roll No. :

C028511(028)

B. Tech. (Fifth Semester) Examination, Nov.-Dec. 2021

AICTE

(New Scheme)

(Electronics & Telecommunication Engineering Branch)

DIGITAL COMMUNICATION

(BT-3028)

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Attempt all questions. Part (a) of each question is compulsory. Attempt any two parts from (b), (c) & (d).

Part (a) is of 04 marks, Parts b, c, d each of 08 marks

Unit-I

1. (a) A signal

$$m(t) = 2 \cos 6000 \pi t + 4 \cos 8000 \pi t + 6 \cos 10000 \pi t$$

C028511(028)

PTO

[2]

is to be truthfully represented by its samples. What is the minimum sampling rate from (1) low pass sampling theorem consideration and (2) band pass consideration?

- (b) State and prove sampling theorem.
- (c) Differentiate among PAM, PWM and PPM.
- (d) Explain with the help of block diagram TDM PAM system.

Unit-II

2. (a) Define the following terms :
 - (i) SNR
 - (ii) Companding
- (b) Explain with the help of block diagram PCM transmission and reception.
- (c) Derive the formula for signal to quantization noise ratio for delta modulation.
- (d) Explain Adaptive Delta modulation with the help of block diagram Also discuss its advantages and disadvantages.

C028511(028)

[3]

Unit-III

3. (a) Write a note on eye Diagram.
- (b) Derive the expression for power spectral density for unipolar signaling.
- (c) Explain scrambling with the help of an example.
- (d) Derive the expression for probability of error for bipolar signaling.

Unit-IV

4. (a) Differentiate among ASK, FSK & PSK on the basis of following points :
 - (i) Definition
 - (ii) Representation of data 101101
- (b) Explain DPSK transmitter and receiver with the help of block diagram and waveform.
- (c) Explain QPSK transmitter and receiver with the help of block diagram and waveform.
- (d) Write a short note on M-ary PSK.

C028511(028)

PTO

[4]

Unit-V

5. (a) Define Spread Spectrum. Name its and different types. Also list some of its applications.
- (b) Explain DSSS. Derive the formula for ranging using DSSS.
- (c) Explain the generation and characteristics of PN sequence with th help of block diagram.
- (d) Briefly explain Tracking and Acquisition of an FH signal using block diagram and waveforms.

C028512(028)

B. Tech. (Fifth Semester) Examination,

Nov.-Dec. 2021

AICTE

(New Scheme)

(Electronics & Telecommunication Engg. Branch)

DESIGN of ELECTRONICS CIRCUIT

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Attempt all questions. Part (a) of each question is compulsory and carries 4 marks each. Attempt any two parts from (b), (c) and (d) of each questions & carrying 8 marks each.

1. (a) List the ideal characteristics of an Op-amp.
- (b) What is the use of level shifter stage? Draw and explain its circuit diagram.

[2]

- (c) Draw the circuit symbol of Op-amp. Explain what is mean by inverting input and non-inverting input?
- (d) Define the following terms on the reference of practical Op-amp.
- CMRR, Slew Rate
 - Input Offset voltage, Output Offset Voltage

2. (a) For the inverting amplifier in below figure (a) if the input voltages are 2V, 3V and 1V and corresponding resistances are 2K, 1K and 4K respectively and feedback resistor is 4K. Calculate the output voltage.

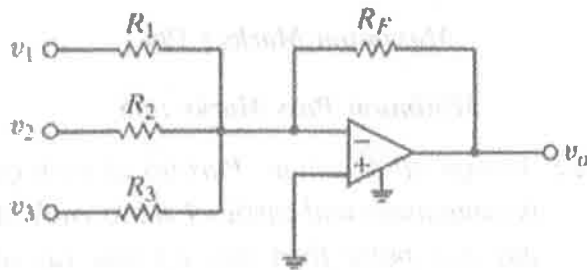


Figure (a)

- (b) What is instrumentation amplifier? What are the basic requirements of an instrumentation amplifier?
- (c) Explain sample and hold circuit using op-amp and also write the performance parameters of the circuit.

C028512(028)

[3]

- (d) Calculate the output voltage V_o of the circuit given in figure (b).

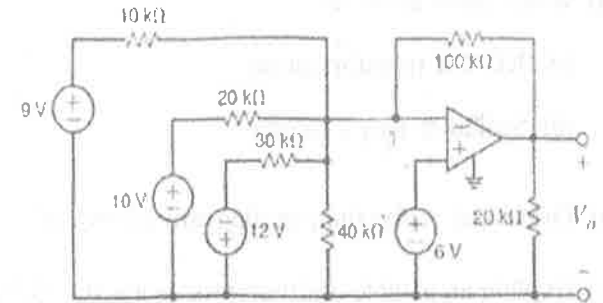


Figure (b)

3. (a) Write the advantages of active filters over the passive filters.
- (b) Write the transfer function of a 2nd order Low Pass Filter (LPF) shown in figure (c).

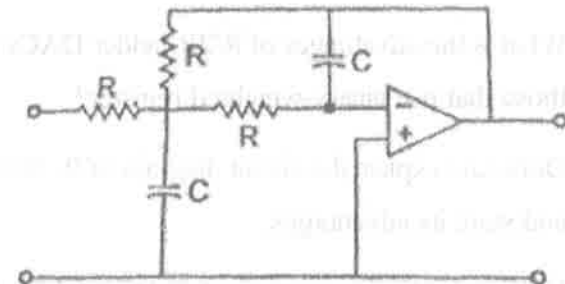


Figure (c)

- (c) Explain the design of Low Pass Butterworth filter in

C028512(028)

PTO

[4]

details.

(d) Write short notes on :

(i) RC-CR transformation

(ii) Sallen & Key Circuits

4. (a) Draw and name the pin diagram of 555 IC.

(b) Explain an astable multivibrator using IC-555 with neat diagram.

(c) Explain monolithic PLL IC 565 in details with their applications.

(d) What is SMPS? What are its advantages? Draw the circuit for SMPS and explain its operation.

5. (a) What are the advantages of R/2R ladder DACs over those that use binary-weighted register?

(b) Draw and explain the circuit diagram of R-2R DAC and state its advantages.

(c) Define the term accuracy of DACs. A 5-bit D/A converter produces $V_{out} = 0.2$ V for a digital input

[5]

of 0001. Find the value of V_{out} for an input of 11111.

(d) Explain the operation of successive approximation ADC. Discuss its merits and demerits.

C028513(028)

B. Tech. (Fifth Semester) Examination, Nov.-Dec. 2021

AICTE (New Scheme)

(Elect., Tele comm. Engg. Branch)

MICROCONTROLLER and EMBEDDED SYSTEM

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Attempt all questions. Part (a) is compulsory and carries 4 marks. Attempt any two parts from (b), (c) and (d) of each carries 8 marks.

Unit-I

1. (a) Define the term microcontroller. 4
- (b) Explain Addressing mode of 8051. 8
- (c) Explain internal RAM of 8051 microcontroller. 8

[2]

- (d) Describe the block diagram of microcontroller. 8

Unit-II

2. (a) Describe TMOD Register in 8051. 4
- (b) Describe mode 2 programming steps in 8051 for programming timer. 8
- (c) Assuming that XTAL = 11.0592 MHz, write a program to generate a square wave of 2kHz frequency on pin P 1.5. 8
- (d) Explain interrupt structure in 8051. 8

Unit-III

3. (a) Describe serial and parallel data transfer. 4
- (b) Explain the purpose of MAX232 driver. 8
- (c) Describe 8 bit SCON register in detail. 8
- (d) Write a program for the 8051 to transfer "YES" serially at 9600 baud, 8-bit data, 1 stop bit, do this continuously. 8

Unit-IV

C028513(028)

[3]

4. (a) What is $\overline{\text{PSEN}}$, $\overline{\text{RD}}$ and $\overline{\text{WR}}$ signal. 4
- (b) Interface 8K*8 data ROM with 8051. 8
- (c) Describe stepper moter interfacing with 8051. 8
- (d) Describe interfacing of ADC 0804 with 8051. 8

Unit-V

5. (a) What is Embedded system? 4
- (b) Explain characteristics of embedded system. 8
- (c) Explain the design challenges in embedded system. 8
- (d) Discuss embedded system with real life example. 8

100]

C028513(028)

Printed Pages – 7

Roll No. :

C028514(028)

B. Tech. (Fifth Semester) Examination Nov.-Dec. 2021

(ET & T Engg. Branch)

CONTROL SYSTEM

Time Allowed : Three hours

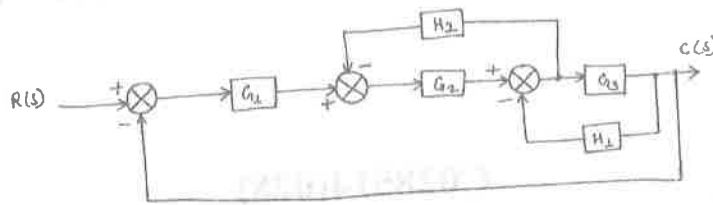
Maximum Marks : 100

Minimum Pass Marks : 35

Note : Attempt all questions. Part (a) from each question is compulsory and answers any two of the remaining (b), (c) and (d).

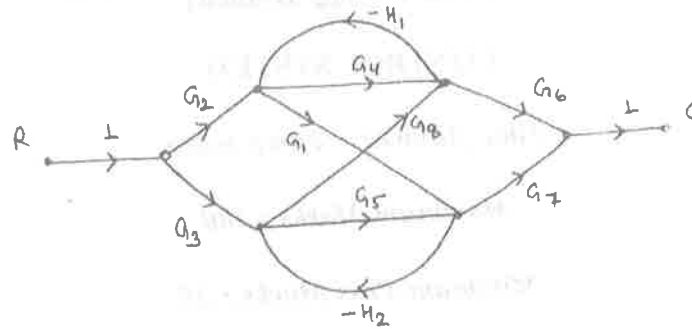
1. (a) Define closed loop system. 4
- (b) Find the ratio $C(s)/R(s)$ of the system shown in figure. 8

[2]



(c) Obtain the transfer function C/R from signal flow graph shown in figure.

8



(d) Write the comparison between open loop system and close loop system.

8

2. (a) Write the expression for transfer function of a second order control system.

4

(b) Calculate the time response of second control system subjected to unit step input function.

8

(c) For a unity feedback control system the forward path transfer function is given by :

[3]

$$G(s) = \frac{20}{s(s+2)(s^2+2s+20)}$$

Determine the steady state error of the system when the inputs are :

(i) 5

(ii) $5t$

(iii) $\frac{3t^2}{2}$

8

(d) The overall transfer function of a control system is given by :

8

$$\frac{C(s)}{R(s)} = \frac{16}{s^2 + 1.6s + 16}$$

It is desired that the damping ratio be 0.8. Determine the derivative rate feedback constant K_f and compare rise time, peak time, maximum overshoot and steady state error for unit ramp input without and with derivative feedback control.

3. (a) Define relative stability.

4

[4]

- (b) A closed loop system, has characteristics equation gives by : 8

$$s^5 + 2s^4 + 2s^3 + 4s^2 + 11s + 10 = 0$$

Find the stability using Routh Hurwitz criterion.

- (c) The characteristics equation of feedback control system is : 8

$$s^4 + 20s^3 + 15s^2 + 2s + k = 0$$

- (i) Determine the range of k for the system to be stable.
- (ii) Can the system be marginally stable? If so, find the required value of k and the frequency of sustained oscillation.
- (d) For a unity feedback system the open loop transfer function is given by

$$G(s) = \frac{k}{s(s+2)(s^2+6s+25)}$$

- (i) Sketch the root locus for $0 \leq k \leq \infty$
- (ii) At what value of ' k ' the system becomes unstable. 8

[5]

4. (a) What are the advantages of frequency domain analysis? 4

- (b) Sketch the polar plot for : 8

$$G(s) = \frac{20}{s(s+1)(s+2)}$$

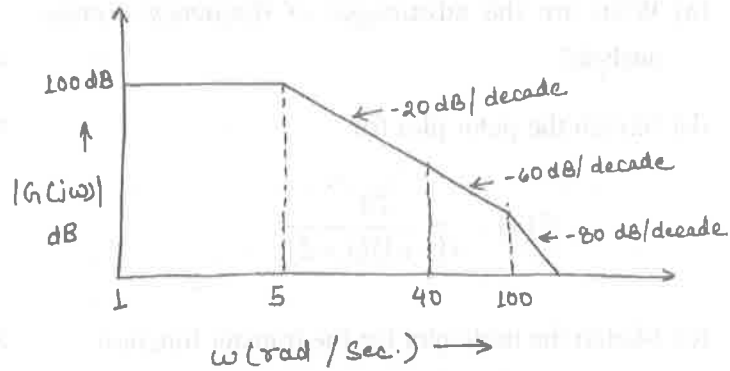
- (c) Sketch the bode plot for the transfer function 8

$$G(s) = \frac{1000}{(1+0.1s)(1+0.001s)}$$

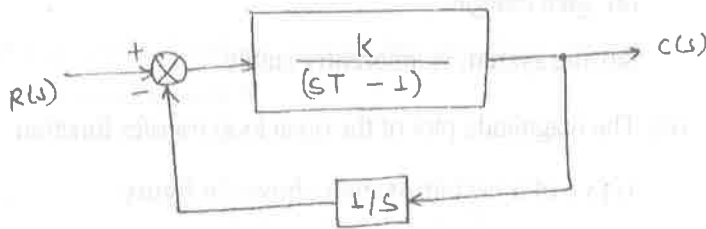
Determine the :

- (i) phase margin
- (ii) gain margin
- (iii) the system is inherently stable
- (d) The magnitude plot of the open loop transfer function $G(s)$ of a certain system shown in figure. 8
- (i) Determine $G(s)$ if it is known that system is of minimum phase type.
- (ii) Estimate the phase at each of the corner frequencies.

[6]



5. (a) Define state variable and state vector. 4
- (b) A closed loop control system is described by the block diagram given below, determine the stability using Nyquist criterion. 8



- (c) The transfer function of a control system is given by : 8

$$\frac{Y(s)}{U(s)} = \frac{s+2}{s^3 + 9s^2 + 26s + 24}$$

Check for controllability and observability.

[7]

- (d) Use diagonalization of matrix A to determine the time response of the system : 8

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -6 & -5 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u \text{ and}$$

$$Y = \begin{bmatrix} 6 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}; \text{ given that, } x(0) = \begin{bmatrix} L \\ 0 \end{bmatrix}$$

Printed Pages – 3

Roll No. :

C028531(028)

B. Tech. (Fifth Semester) Examination,

Nov.-Dec. 2021

AICTE (New Scheme)

(Electronics & Telecommunication Engg. Branch)

COMPUTER NETWORKS

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Attempt all questions. Part (a) is compulsory and attempt any two parts from (b), (c) & (d) in each unit.

Unit-I

1. (a) What is Network Topology? Explain its types with diagram. 4

[2]

- (b) Define transmission mode and explain types of transmission mode. 8
- (c) Explain DTE-DCE interface and significance of using EIA-232. 8
- (d) Explain different layers of OSI Model with their functions. 8

Unit-II

- 2. (a) Define the three main function of Data Link Layer. 4
- (b) Describe stop and wait flow control. 8
- (c) Describe sliding window flow control. 8
- (d) Discuss the mechanism of stop and wait ARQ error control. 8

Unit-III

- 3. (a) Define Ethernet. 4
- (b) Explain CSMA/CD and its use in detail. 8
- (c) Explain token ring and its access mechanism. 8

[3]

- (d) Explain the frame structure of FDDI. 8

Unit-IV

- 4. (a) Explain the principle of inter-networking. 4
- (b) Explain connecting devices : Repeaters, Hubs, Bridges, Routers. 8
- (c) Explain in detail TCP under TCP services and header format. 8
- (d) Explain difference between IPv4 and IPv6. 8

Unit-V

- 5. (a) Explain Services of Application Layers. 4
- (b) Explain Circuit and Packet switching. 8
- (c) Explain File transfer protocol in detail. 8
- (d) Explain working of SMTP (Simple Mail Transfer Protocol). 8

Printed Pages – 3

Roll No. :

C028532(028)

**B. Tech. (Fifth Semester) Examination,
Nov.-Dec. 2021**

AICTE (New Scheme)

(Electronics & Telecommunication Engg. Branch)

NANO ELECTRONICS

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Part (a) of each question is compulsory. Attempt any two parts from part (b), (c) and (d) from each question. All question carry equal marks. Marking pattern is 4, 8, 8 i.e. part (a) is of 4 marks and the rest two of 8 marks each.

Unit-I

1. (a) What is the size of nanotechnology?
(b) Give the detailed classification of different areas of

[2]

Nanotechnology.

- (c) Explain how chemical vapour deposition carbon nanotubes are produced?
- (d) Explain the Fourier Transform Infra-red Spectroscopy.

Unit-II

- 2. (a) What do you mean by Semiconductor nanostructures?
- (b) Give the details of Two-dimensional semiconductor nanostructures.
- (c) Explain Quantum wells, wires and dots and compare each.
- (d) Describe the spintronics.

Unit-III

- 3. (a) Which quantum structure is used in single-electron transistor?
- (b) Write a short notes on Heterojunctions and Superlattices?

[3]

- (c) Explain advanced MOSFET concepts.
- (d) Explain the working of SET (Single Electron Transistor).

Unit-IV

- 4. (a) Mention the types of nanotubes.
- (b) Explain the covalent functionalization of CNTs.
- (c) Describe the applications of nanotube for memory.
- (d) Explain the formation of nanotubes.

Unit-V

- 5. (a) Write the full forms of MEMS, NEMS, RAM.
- (b) Explain the concept of Quantum dot lasers.
- (c) Write short notes on Surround Gate FET and MODFETs.
- (d) Explain the working OLEDs.

Printed Pages – 3

Roll No.

C028534(022)

B. Tech. (Fifth Semester) Examination, Nov.-Dec. 2021

ACTE (New Scheme)

(Elec. & Tele. Comm. Engg. Branch)

**COMPUTER ORGANIZATION AND
ARCHITECTURE**

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Attempt all questions. Part (a) of each question is compulsory. Attempt any two from (b), (c) and (d) parts of each question. Assume if any data is missing.

Unit-I

1. (a) What is Bus? Explain different types of buses. 4
- (b) Describe various types of Addressing modes with example. 8

[2]

- (c) Explain various field of instruction format. Also write types of instructions used in computer system. 8
- (d) What is register transfer language? Explain briefly. 8

Unit-II

2. (a) What is control memory? 4
- (b) Differentiate between Hardwire control and Micro-program control organization. 8
- (c) Explain Microinstruction format. 8
- (d) What is instruction interpretation? 8

Unit-III

3. (a) Differentiate between fixed point and floating point number. 4
- (b) Explain multiplication algorithm with hardware implementation. 8
- (c) Design hardware implementation for fixed point addition subtraction and explain it. 8
- (d) How to design control unit for performing various arithmetic operations. 8

[3]

Unit-IV

4. (a) Define 10 instructions. 4
- (b) Write short notes on DMA with diagram. 8
- (c) Discuss about Loosely Coupled & Tights Coupled System. 8
- (d) Write difference between RISC and CISC. 8

Unit-V

5. (a) Define cache memory in brief. 4
- (b) Write short notes on : Semiconductor memory and Associative memory. 8
- (c) Explain memory hierarchy. 8
- (d) What is memory interleaving? 8