

**5624077**

**B.Tech. DEGREE EXAMINATION, APRIL/MAY 2016.**

**Fourth Semester**

**Electronics and Communication Engineering**

**LINEAR AND DIGITAL CONTROL SYSTEMS**

**Time : Three hours**

**Maximum : 75 marks**

**SECTION A — (10 × 2 = 20 marks)**

**Answer ALL questions.**

**All questions carry equal marks.**

1. Write any two advantages of closed-loop control systems.
2. Name the two types of electrical analogies for the mechanical system.
3. Define the steady state error of a feedback control system.
4. What is the effect of PD controller on the system performance?
5. What is corner frequency?

6. What is minimum phase transfer function?
7. What is meant by relative stability?
8. State the Nyquist stability criterion.
9. What is linear discrete time system?
10. Define the terms state and state variable.

SECTION B — (5 × 11 = 55 marks)

Answer ALL questions, ONE from each Unit.

All questions carry equal marks.

### UNIT I

11. Determine the transfer function for the RC network shown in Fig. 1 and obtain the overall block diagram for the electrical system.

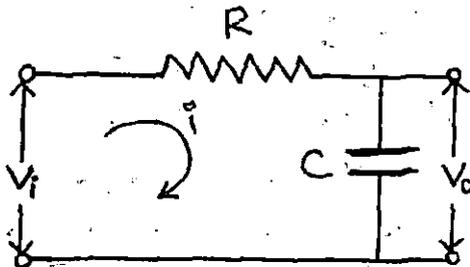


Fig. 1

Or

20. A feedback system has a closed-loop transfer function  $\frac{C(s)}{U(s)} = \frac{10(s+4)}{s(s+1)(s+3)}$ . Construct the canonical state model for the system and give the block diagram representation for the state model.

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12. Using Mason's gain formula, determine the closed-loop transfer function  $C(s)/R(s)$  for the signal flow graph shown in Fig. 2.

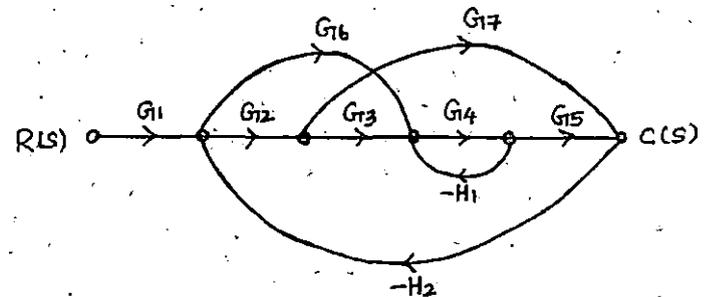


Fig. 2

UNIT II

13. Find the response of the under damped system

$$\frac{C(s)}{R(s)} = \frac{\omega_n^2}{s^2 + 2\zeta\omega_n s + \omega_n^2}$$

to a unit-step input  $r(t)$  and explain the effects of variations in parameter  $\zeta$  on transient behavior of the system.

Or

14. The open-loop transfer function of a servo system with unity feedback system is

$$G(s) = \frac{10}{s(0.1s+1)}$$

Evaluate the static error constant ( $K_p, K_v, K_a$ ) for the system. Obtain the steady-state error of the system to an input given by the polynomial

$$r(t) = a_0 + a_1 t + \frac{a_2}{2} t^2$$

### UNIT III

15. Explain in detail about the explicit correlation between time and frequency response of second order system.

Or

16. Using Bode plot, determine the gain crossover frequency, gain margin and phase margin for the transfer function  $G(s) = \frac{75(1+0.2s)}{s(s^2+16s+100)}$ .

### UNIT IV

17. Using Routh stability criterion, determine the range of  $K$  for stability of a unity feedback control system whose open-loop transfer function is

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

Or

18. Sketch the root locus plot of a unity feedback system with an open-loop transfer function

$$G(s) = \frac{K(s+9)}{s(s^2+4s+11)}$$

Determine the limiting value of  $K$  for stability of the system.

### UNIT V

19. (a) Find the inverse Z-transform of

$$F(z) = \frac{4z^2 - 2z}{z^3 - 5z^2 + 8z - 4} \quad (5)$$

- (b) Using Jury's stability test, check the stability of the digital control system represented by the characteristic equation

$$z^3 - 0.2z^2 - 0.25z + 0.05 = 0 \quad (6)$$

Or

**5623027**

**B.Tech. DEGREE EXAMINATION, APRIL/MAY 2016.**

**Third Semester**

**ECE**

**CIRCUIT THEORY**

**Time : Three hours**

**Maximum : 75 marks**

**PART A — (10 × 2 = 20 marks)**

**Answer ALL questions.**

**All questions carry equal marks.**

1. State Thevins Theorem.
2. State the superposition theorem.
3. Define the terms 'inductive reactance' and 'capacitive reactive'.
4. What is a Q-factor of a coil?
5. What is time constant?
6. What is meant by steady state and transient response?
7. What is coefficient of coupling?

8. Two coils connected in series have an equivalent inductance of  $0.4\text{H}$  when connected in aiding, and an equivalent inductance  $0.2\text{H}$  when the connection is opposing. Calculate the mutual inductance of the coils.
9. Distinguish between planar graph and non-planar graph.
10. Write the properties of a tree of the graph.

PART B — ( $5 \times 11 = 55$  marks)

Answer ONE question from each unit.

### UNIT I

11. Determine the current through the  $5\Omega$  resistor using Thevenin's theorem for the circuit shown in Fig. 1.

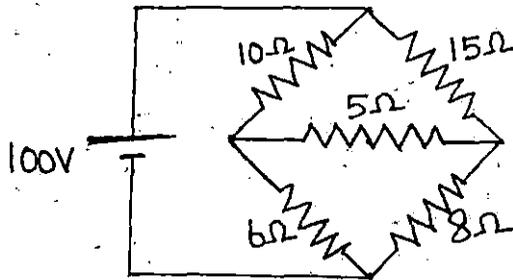


Fig. 1

Or

18. Write short note about the

- (a) single tuned circuit
- (b) double tuned circuit.

UNIT V

19. Draw the graph for the network shown in Fig. 7. Prepare a tie-set schedule and find the three loop currents.

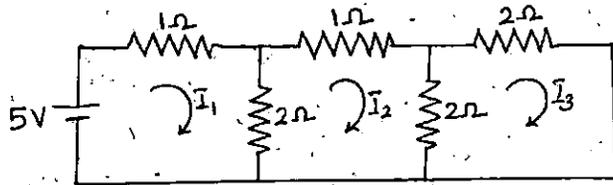


Fig. 7

Or

20. What is dual network? Explain the principle of duality with a suitable example.

12. What value of  $R_L$  in the circuit of Fig. 2 will receive the maximum power? Determine the maximum power delivered to the load  $R_L$ .

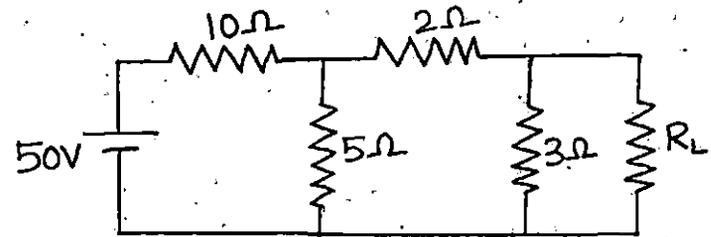


Fig. 2

UNIT II

13. Write the node equations for the circuit shown in Fig. 3. and obtain the nodal voltages  $V_a$  and  $V_b$ .

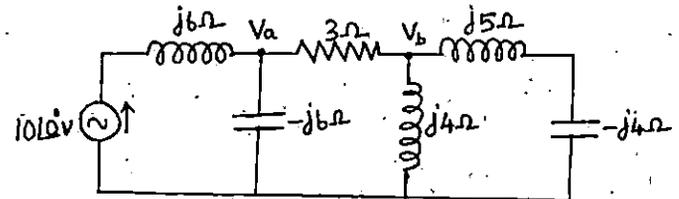


Fig. 3

Or

14. In a RLC series circuit, the source frequency is varied from zero to infinity. How do the values of voltage across L and C change? Derive expression for maximum values of these voltages and the frequencies at which the maximum values occur.

UNIT III.

15. The circuit shown in Fig. 4, consist of series RL elements with  $R = 100\Omega$  and  $L = 20H$  has a DC voltage of 200 volts applied through a switch at time  $t=0$ . Find

- (a) the equation for the current and voltage across the different elements.  
 (b) the current at  $t=0.5$  seconds.

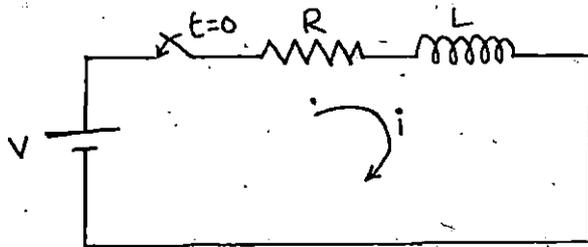


Fig. 4

Or

16. The circuit shown in Fig. 5, consist of series RC elements with  $R = 15\Omega$  and  $C = 100\mu F$ . A sinusoidal voltage  $v = 100 \sin(500t + \phi)$  volts is applied to the circuit at time corresponding to  $\phi = 45^\circ$ . Find the expression for current  $i(t)$ .

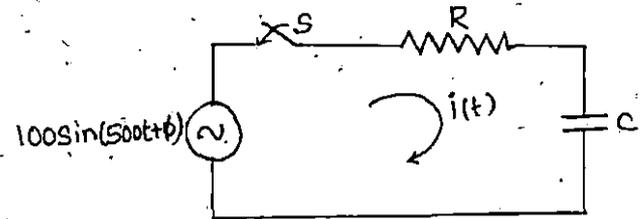


Fig. 5

UNIT IV.

17. Calculate the current in the  $5\Omega$  resistor for the coupled circuit shown in Fig. 6.

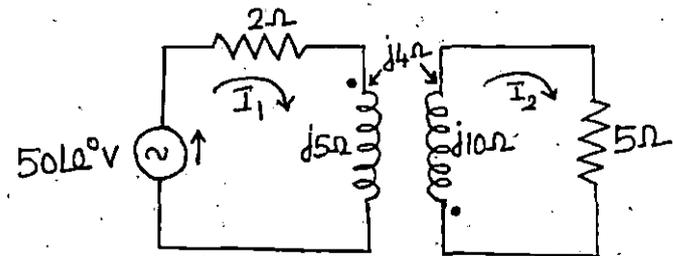


Fig. 6

Or

17. (a) Describe briefly the Periodogram method of Power Spectrum Estimation. (8)  
(b) Draw the AR model of parametric methods. (3)

Or

18. (a) Explain how alias free QMF realization is achieved. (7)  
(b) Brief about the principles of multirate DSP. (4)
19. Draw the internal architecture diagram of TMS320C50 and explain the various blocks.

Or

20. (a) Explain the pipelining operation and compare the performance with no pipe lining operation. (6)  
(b) Explain the various addressing modes of C6X processor. (5)

**5626175**

B.Tech. DEGREE EXAMINATION, APRIL/MAY 2016.

Sixth Semester

Electronics and Communication Engineering

**DIGITAL SIGNAL PROCESSING**

Time : Three hours

Maximum : 75 marks

**PART A — (10 × 2 = 20 marks)**

Answer ALL questions.

1. Relate analog and digital frequency in impulse invariant and bilinear transformation.
2. List out the advantages and disadvantages of IIR filters.
3. For what kind of applications, the symmetrical and asymmetrical impulse responses can be used?
4. Draw the direct form implementation of FIR system having difference equation.  
$$y(n) = x(n) - 2x(n-1) + 3x(n-2) - 10x(n-6).$$
5. What are the different types in fixed point number representation?

6. The filter coefficient  $H = -0.673$  is represented by sign magnitude fixed point arithmetic. If the word length is 6 bits, compute the quantization error due to truncation.
7. What are the disadvantages of non-parametric methods of power spectral estimation?
8. What is the significance of decimation and interpolation?
9. Differentiate Von-Neumann and Harvard architectures.
10. Mention the special addressing modes in P-DSPs.

PART B — (5 × 11 = 55 marks)

Answer ALL the questions, choosing ONE from each unit.

All questions carry equal marks.

11. Design a Butterworth digital filter using bilinear transformation by taking  $T = 1$  second, to satisfy the following specifications.

$$0.707 \leq |H(e^{j\omega})| \leq 1; \quad 0 \leq \omega \leq \pi/2$$

$$|H(e^{j\omega})| \leq 0.2; \quad 3\pi/4 \leq \omega \leq \pi.$$

Or

12. Obtain the direct-form I, direct-form II, cascade form and parallel form structures for the following system.

$$y(n) = -0.1y(n-1) + 0.72y(n-2)$$

$$+ 0.7x(n) - 0.252x(n-2).$$

13. Determine the coefficients of a linear phase FIR filter of length  $M = 15$  that has symmetric unit sample response and a frequency response that satisfies the conditions.

$$H(2\pi k/15) = \begin{cases} 1; & k = 0, 1, 2, 3 \\ 0; & k = 4, 5, 6, 7 \end{cases}$$

Realize the above filter using polyphase realization of order 3.

Or

14. Design a bandpass digital FIR filter with desired frequency response.

$$H(e^{j\omega}) = \begin{cases} 1 & \text{for } 0.25\pi \leq |\omega| \leq 0.75\pi \\ 0 & \text{for } |\omega| \leq 0.25\pi \text{ and } 0.75\pi \leq |\omega| \leq \pi \end{cases}$$

By using Hamming window function of length  $N = 11$ .

15. Explain the characteristics of a limit cycle oscillation with respect to the system described by the difference equation  $y(n) = 0.95y(n-1) + x(n)$ . Determine the dead band of the filter.

Or

16. (a) Draw the product Quantization noise model of second order IIR system. (6)
- (b) Briefly explain about input quantization error and coefficient quantization error. (5)

16. (a) Give the relationship between  $z$ -transform and Fourier transform. (5)
- (b) Determine the inverse  $z$  transform of the following function. (6)
- $$x(z) = 1/(1+z-1)(1-z-1) \text{ ROC: } |Z| > 1$$

#### UNIT IV

17. Find the output of the system whose input-output is related by the difference equation  $y(n) - 5/6 y(n-1) + 1/6 y(n-2) = x(n) - 1/2 x(n-1)$  for the step input. (11)

Or

18. Find the convolution sum of

$$x(n) = 1, n = -2, 0, 1$$

$$= 2n - 1$$

$$= 0 \text{ elsewhere}$$

and  $h(n) = \delta(n) - \delta(n-1) + \delta(n-2) - \delta(n-3)$  (16).

(11)

#### UNIT V

19. Compute the DFT for the sequence  $\{1, 2, 0, 0, 0, 2, 1, 1\}$ . Using radix-2 DIF FFT and radix-2 DIT-FFT algorithm. (11)

Or

20. If  $x(n) = \cos(n\pi/4)$ ,  $n = 0, 1, 2, 3$ . Find the DFT using DIF algorithm. (11)

**5624076**

B.Tech. DEGREE EXAMINATION, APRIL/MAY 2016.

Fourth Semester

Electronics and Communication Engineering

SIGNALS AND SYSTEMS

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

All questions carry equal marks.

- Sketch the discrete time signal  $x(n) = 4\delta(n+4) + \delta(n) + 2\delta(n-1) + \delta(n-2) - 5\delta(n-3)$
- What are the properties of a system?
- State Rayleigh's energy theorem.
- State the relationship between Fourier transform and Laplace transform.
- List the methods of obtaining inverse Z transform.
- Define Twiddle factor.

7. Mention the advantages of state variable technique.
8. Compare continuous and discrete time systems.
9. What are the advantages of FFT over DFT?
10. State the properties of IDFT.

PART B — (5 × 11 = 55 marks)

Answer ALL questions, ONE from each unit.

UNIT I

11. Determine whether the given signals are energy or power and calculate their energy and power. (11)

(a)  $x(n) = \left(\frac{1}{2}\right)^n u(n)$

(b)  $x(t) = \text{rect}\left(\frac{t}{T_0}\right)$

(c)  $x(t) = \cos^2(\omega_0 t)$

(d)  $x(n) = 2e^{j3m}$

Or

12. Determine whether the following systems are linear, causal, time invariant, stable and static. (11)

(a)  $y(t) = x(2t)$

(b)  $y(t) = \cos(x(t))$

(c)  $y(n) = x(n) \cos(x(n))$

(d)  $y(n) = x(-n + 2)$

UNIT II

13. A system is described by the differential equation,  $d^2y(t)/dt^2 + 3dy(t)/dt + 2y(t) = dx(t)/dt$  if  $y(0) = 2$ ,  $dy(0)/dt = 1$  and  $x(t) = e^{-t}u(t)$ .

Determine the response of the system to a unit step input applied at  $t = 0$ . (11)

Or

14. Find the Fourier transform of triangular pulse

$$X(t) = \Delta(t/m) = \begin{cases} 1 - 2|t|/m & |t| < m \\ 0 & \text{otherwise} \end{cases} \quad (11)$$

UNIT III

15. (a) Find the DTFT of  $x(n) = \{1, 1, 1, 1, 1, 0, 0\}$ . (6)
- (b) Find the convolution of  $x_1(n) = \{1, 2, 0, 1\}$ ,  $x_2(n) = \{2, 2, 1, 1\}$ . (5)

Or

**5425007**

**B.Tech. DEGREE EXAMINATION, APRIL/MAY 2016.**

**Fifth Semester**

**Electronics and Communication Engineering**

**Elective — CONSUMER ELECTRONICS**

**(2013-2014 onwards)**

**Time : Three hours**

**Maximum : 75 marks**

**PART A — (10 × 2 = 20 marks)**

**Answer ALL questions.**

1. Define GPRS System.
2. List out the different types of Loudspeakers.
3. State different types of washing machines. How automation is achieved in it?
4. Define the advantages of MP4 format.
5. What are the advantages of LCD over conventional picture tube?
6. State the principle of microwave oven.
7. State the advantages of blue tooth technology.
8. Define the characteristics of Microphone.

9. How the audio signals are recorded on magnetic tape?

10. What are the types of colour system?

**PART B — (5 × 11 = 55 marks)**

**Answer ALL questions.**

**UNIT I**

11. Explain in detail about the working of dynamic loudspeaker, woofers and tweeters.

**Or**

12. Discuss in detail about carbon microphone with neat diagram and highlight its characteristics.

**UNIT II**

13. Describe in detail about the working of monochrome picture tube and colour picture tube with neat diagram.

**Or**

14. Explain in detail about the plasma TV and LCD TV with suitable diagram.

**UNIT III**

15. Explain in detail about the Magnetic tape/cassette recorder and different types of CD's.

**Or**

16. Draw and Explain block diagram of a theater sound system and sound track recording on film.

**UNIT IV**

17. Explain in detail about GPRS and Public switched telephone networks.

**Or**

18. Explain in detail about GPS navigation system and elements of PA system.

**UNIT V**

19. Explain Proximity sensors and accelerometer sensors that are used in home appliances.

**Or**

20. Explain in detail about the basic principle of microwave oven and washing machine.

Find the probability that it will rain for 3 days from today assuming that it will rain after 3 days. Assume the initial probabilities of state 0 and state 1 as 0.4 and 0.6 respectively. (11)

Or

18. Derive Chapman-Kolmogorov equation for discrete time Markov chain. (11)

UNIT V

19. Customers arrive at the first class ticket counter of a theatre at a rate of 12 per hour.

There is one clerk servicing the customers at the rate 30 per hour.

- (a) What is the probability that there is no customer at the counter?  
 (b) What is the probability that there are more than 2 customers at the counter?  
 (c) What is the probability that there is no customer waiting to be served?  
 (d) What is the probability that a customer is being served and nobody is waiting? (11)

Or

20. Derive the mean number of customers in the system, the mean number of customers in the queue and waiting time for M/M/c/N ( $c < N$ ) queuing model. (11)

5625125

B.Tech. DEGREE EXAMINATION, APRIL/MAY 2016.

Fifth Semester

ECE

PROBABILITY AND RANDOM PROCESSES

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

All questions carry equal marks.

- X and Y are independent random variables with variance 2 and 3. Find the variance of  $3X + 4Y$ .
- A random variable X has the following probability distribution
 

X	0	1	2	3	4	5	6	7
P(X)	0	K	2K	2K	3K	K <sup>2</sup>	2K <sup>2</sup>	7K <sup>2</sup> +k

Find the value of K.
- Define a continuous random variable. Give one example.
- Establish the relationship between Weibull distribution and exponential distribution.
- What do you understand by stationary process?

6. Give two examples for renewal process.
7. Define stationary transition probabilities.
8. State Pollaczek-Khinchin transform equation.
9. Write the Little's formula for the infinite queuing capacity model.
10. What is the probability that a customer has to wait more than 15 minutes to get his service completed in a M/M/1 queuing system, if  $\lambda = 6$  per hour and  $\mu = 10$  per hour.

PART B — (5 × 11 = 55 marks)

Answer ONE question from each Unit.

All questions carry equal marks.

#### UNIT I

11. Obtain the moment generating function, mean and variance of Poisson distribution. (11)

Or

12. Derive Poisson distribution from binomial distribution. (11)

#### UNIT II

13. (a) Consider a university computer center with an average rate of job submission

$\lambda = 0.1$  jobs per second. Assuming that the number of arrivals per unit time is poisson, distributed, the interval time X is exponentially distributed with parameter  $\lambda$ . Determine the probability that an interval of 10 seconds elapses without job submission. (5)

- (b) Derive the expressions for reliability, failure density and hazard function of random variable X which denotes the life time of a component. (6)

Or

14. Describe in detail about Erlang and Gamma distributions with suitable examples. (11)

#### UNIT III

15. Show that the random process  $X(t) = A \cos(\omega_0 t + \theta)$  is a wide sense stationary, if A and  $\omega_0$  are constants and  $\theta$  is uniformly distributed random variable in  $(0, 2\pi)$ . (11)

Or

16. Explain briefly about the analysis of the ability of a system to provide the desired service. (11)

#### UNIT IV

17. A raining process is considered as two state Markov chain. If it rains, it is considered to be state 0 and if it does not rain, the chain is in state 1. The transition probability of the Markov chain is defined as

$$P \begin{bmatrix} 0.6 & 0.4 \\ 0.2 & 0.8 \end{bmatrix}$$

UNIT IV

17. Discuss in detail about JK flip flop with its truth table, state diagram and characteristics equation. (11)

Or

18. Design a 3 bit binary counter using T flip flop that has a repeated sequences of six states.  
000-001-010-100-101-110. Give the state table, state diagram and logic diagram. (11)

UNIT V

19. With neat diagram explain the RAM organization. (11)

Or

20. (a) Write short notes on Memory Decoding and Memory expansion. (6)  
(b) Discuss about Static RAM cell and Dynamic RAM cell. (5)

**5624078**

B.Tech. DEGREE EXAMINATION, APRIL/MAY 2016.

Fourth Semester

Electronics and Communication Engineering

DIGITAL CIRCUITS

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

All questions carry equal marks.

1. Compare fixed point and floating point numbers.
2. Why parity checker is needed?
3. Define the terms Boolean variable and complement.
4. Which gates are called as the universal gates? What are its advantages?
5. What is the limitation of half adder?
6. What is PLA and list the applications of PLA?
7. Identify the difference between truth table and excitation table.

8. Sketch the timing signals for a 4-bit ring counter.
9. Differentiate volatile and non-volatile memory.
10. What is access and cycle time?

PART B — (5 × 11 = 55 marks)

Answer ALL questions, ONE from each Unit.

All questions carry equal marks.

#### UNIT I

11. (a) Discuss about Checksum and Hamming code. (5)
- (b) Convert  $(110A.AB)_{16}$  to decimal, binary and octal. (6)

Or

12. (a) Given the two binary numbers  $X = 1010100$  and  $Y = 1000011$ , perform the subtraction
  - (i)  $X - Y$  and using 1's complements
  - (ii)  $Y - X$  using 2's complements. (6)
- (b) Discuss about m-out-of-n code and Gray code. (5)

#### UNIT II

13. (a) State the fundamental postulates of Boolean algebra. (5)
- (b) Convert the given expression into the canonical SOP form: (6)

$$Y = AB + A\bar{C} + BC$$

Or

14. Simplify the Boolean function using Quine-McCluskey method. (11)

$$F(A, B, C, D, E, F) =$$

$$\sum M = (0, 5, 7, 8, 9, 12, 13, 23, 24, 25, 28, 29, 37, 40, 42, 44, 46, 55, 56, 57, 60, 61).$$

#### UNIT III

15. Design a 4-bit parallel adder/subtractor and draw the logic diagram. (11)

Or

16. A combinational circuit is defined by the functions:  $F_1 = \sum m(3, 5, 7)$   $F_2 = \sum m(4, 5, 7)$ . Implement the circuit with a PLA having 3 inputs, 3 product terms and two outputs.

**4428170**

**B.Tech. DEGREE EXAMINATION, APRIL/MAY 2016.**

**Eighth Semester**

**Electronics and Communication Engineering**

**SATELLITE COMMUNICATION SYSTEMS**

**Time : Three hours**

**Maximum : 75 marks**

**PART A — (10 × 2 = 20 marks)**

**Answer ALL questions.**

**All questions carry equal marks.**

1. **Classify the satellite orbits.**
2. **What is meant by sub satellite point?**
3. **Define path loss.**
4. **What is intermodulation and how it can be avoided?**
5. **Define output backoff.**
6. **Differentiate between FDMA and CDMA.**
7. **Mention the laser source requirements for the laser satellite communication.**
8. **What is the need for beam acquisition?**

9. What is fixed satellite service?

10. What is meant by VSAT?

PART B — (5 × 11 = 55 marks).

Answer ALL questions ONE from each Unit.

All questions carry equal marks.

#### UNIT I

11. (a) State and explain Kepler's three laws of planetary motion. (6)

(b) Briefly describe the solar eclipse and sun transit outage. (5)

Or

12. With a neat sketch explain Telemetry, Tracking and Command subsystem.

#### UNIT II

13. Describe necessity of uplink and downlink analysis and explain the link budget calculations.

Or

14. Discuss in detail about performance impairments of the satellite communication and system reliability.

#### UNIT III

15. Draw and describe the TDMA frame and burst structure in detail.

Or

16. With the help of a neat sketch explain the principle of FH CDMA system.

#### UNIT IV

17. Describe laser cross link analysis in detail.

Or

18. Discuss the optical beam tracking and pointing.

#### UNIT V

19. (a) Write short note on broadcast satellite services. (5)

(b) Write short note on GPS systems. (6)

Or

20. Explain the role of satellite in future network.

**5625127**

**B.Tech. DEGREE EXAMINATION, APRIL/MAY 2016.**

**Third Semester**

**ECE**

**MICROPROCESSORS AND MICROCONTROLLERS**

**Time : Three hours**

**Maximum : 75 marks**

**PART A — (10 × 2 = 20 marks)**

**Answer ALL questions.**

**All questions carry equal marks.**

1. Why the data bus is bidirectional?
2. Write the addressing modes of 8085 instruction set.
3. List the operating modes of the 8255 programmable peripheral interface.
4. What are the features of 8259 programmable interrupt controller?
5. What is the difference between microprocessor and microcontroller?
6. What are the different addressing modes supported by the 8051?

7. What are the operations performed by data transfer instructions?
8. What flags are used in signed comparison of data?
9. What is the main function of an interface chip?
10. What is I<sup>2</sup>C bus?

PART B — (5 × 11 = 55 marks)

Answer ALL the questions.

All questions carry equal marks.

#### UNIT I

11. Explain the 8085 operations related to data manipulation.

Or

12. Explain how the information is stored and retrieved from the stack using the instructions PUSH and POP and the stack pointer register.

#### UNIT II

13. Explain the steps to initiate and implement the 8085 interrupt process.

Or

14. Draw the block diagram of the 8279 keyboard/display interface and explain its operation.

#### UNIT III

15. (a) Describe the various special function registers available in 8051 microcontroller.  
(b) Explain the modes of operation of timer/counter of the 8051 microcontroller.

Or

16. What is a PIC micro controller? Explain the architecture of PIC microcontroller. Write the advantages of PIC microcontroller.

#### UNIT IV

17. Explain in detail about the different modes of addressing the 8086.

Or

18. Describe the features of 80486 and Pentium processors.

#### UNIT V

19. Explain the application of microcontroller in stepper motor control system.

Or

20. Explain in detail about RTC interfacing using I<sup>2</sup>C standard.

**5623024**

**B.Tech. DEGREE EXAMINATION, APRIL/MAY 2016.**

**Third Semester**

**Electronics and Communication Engineering**

**ELECTRICAL ENGINEERING**

**Time : Three hours**

**Maximum : 75 marks**

**PART A — (10 × 2 = 20 marks)**

**Answer ALL questions.**

**All questions carry equal marks.**

1. Why are iron losses constant at all loads in a transformer?
2. State the losses in a transformer.
3. Define DC machine.
4. State any two applications of DC motor.
5. Define slip of an induction motor.
6. Why is single phase induction motor not self starting?

7. In what way synchronous motor is different from other motors?
8. What are the applications of servo motor?
9. What is electroplating and list its applications?
10. List the different types of domestic wiring.

PART B — (5 × 11 = 55 marks)

Answer ALL questions, ONE from each Unit.

All questions carry equal marks.

#### UNIT I

11. Describe the tests to determine core loss and full load copper loss of a transformer.

Or

12. Explain the construction and working principle of transform.

#### UNIT II

13. Describe with a neat diagram of the construction details of dc machines.

Or

14. What is meant by speed control of dc motor? Explain the various methods in brief.

#### UNIT III

15. Explain the principle of working of 3 phase induction motor. State how the direction of rotation of the motor can be reversed.

Or

16. Explain the principle of working of an alternator.

#### UNIT IV

17. What are stepper motors? Give their types. Discuss about any one type of motor in detail.

Or

18. Discuss briefly the construction and operation of the following single phase motors.

(a) Repulsion motor (6)

(b) Universal motor. (5)

#### UNIT V

19. Discuss briefly about electrical heating with necessary diagram.

Or

20. What is the importance of earthing? Give their types. Discuss about any one type in detail.

UNIT IV

17. Describe the principle involved in cellular CDMA systems and multipath propagation effects on CDMA.

Or

18. Explain the encoding steps for the two types of rate set vocoders used in IS-95 system.

UNIT V

19. (a) Explain in detail about the services of i-mode and limitations occurred in i-mode services. (6)
- (b) Discuss the reasons for choosing IP-based wireless networks for future than circuit switched wireless networks. (5)

Or

20. Explain in detail about the 3GPP and 3GPP2 international organizations standards for wireless IP networks.

5626174

B.Tech. DEGREE EXAMINATION, APRIL/MAY 2016.

Sixth Semester

Electronics and Communication Engineering

WIRELESS COMMUNICATION

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Mention the significance of frequency reuse in cellular networks.
2. Identify the basic requirements for wireless services.
3. Define Propagation model.
4. What is Diffraction and Scattering Mechanism?
5. State the principle of diversity.
6. What are the significances of linear and decision feedback equalizers?

7. Discuss the principle of OFDM modulation scheme.
8. List the advantages of third generation (3G) networks.
9. Mention the services and advantages of SMS.
10. List out the examples for advanced mobile data and multimedia applications.

PART B — (5 × 11 = 55 marks)

Answer ALL the questions; choosing ONE from each unit.

All questions carry equal marks.

#### UNIT I

11. (a) Explain about the principle of TDMA and FDMA. (8)
- (b) Explain how ISI is caused. (3)

Or

12. (a) Explain the methods for increasing the capacity of wireless cellular networks. (7)
- (b) Discuss briefly about the spectrum limitations. (4)

#### UNIT II

13. Discuss in detail about the two basic propagation mechanisms in a communication system.

Or

14. (a) Elaborate in detail about the various factors influencing small scale fading. (6)
- (b) List and explain the different model for characterizing narrow band (outdoor) channels. (5)

#### UNIT III

15. With neat block diagram explain how Rake receiver provides diversity to improve the performance of CDMA receiver.

Or

16. (a) Explain the frequency domain coding of speech signals. (8)
- (b) The generator matrix for a linear binary code is (3)

$G = [0011101; 0100111; 1001110];$

- (i) Express G in systematic [I/P] form
- (ii) Determine the parity check matrix H for the code.

**4428169**

**B.Tech. DEGREE EXAMINATION, APRIL/MAY 2016.**

**Eighth Semester**

**Electronics and Communication Engineering**

**CELLULAR MOBILE COMMUNICATION**

**Time : Three hours**

**Maximum : 75 marks**

**PART A — (10 × 2 = 20 marks)**

**Answer ALL questions.**

**All questions carry equal marks.**

1. Define trunking.
2. What is improving coverage in cellular system?
3. Define hand off.
4. Define radio link.
5. What is mean by mobility management?
6. What are the advantages of GSM?
7. Expand WAP.
8. Define catching.
9. What is the meaning of WLL?
10. Define blue tooth.

**PART B — (5 × 11 = 55 marks)**

**Answer ALL questions, ONE from each Unit.**

**All questions carry equal marks.**

**UNIT I**

**11. Explain the following:**

- (a) Cordless telephony**
- (b) Digital cellular system.**

**Or**

**12. Briefly explain the interference and system capacity.**

**UNIT II**

**13. In detail about the following :**

- (a) Roaming management,**
- (b) Channel assignment techniques.**

**Or**

**14. Explain the following :**

- (a) PACS network signals**
- (b) Radio link transfer IS-41.**

**UNIT III**

**15. Briefly explain the GSM mobility management and its operations.**

**Or**

**16. Write short note on:**

- (a) GSM short message service**
- (b) Mobile number portability's.**

**UNIT IV**

**17. Briefly explain the WAP model and gateway.**

**Or**

**18. Explain the following :**

- (a) WAP developer tool kits**
- (b) Wireless bearer for WAP.**

**UNIT V**

**19. Explain in detail about third generation mobile services.**

**Or**

**20. Briefly explain the wireless local loop.**

**5425007**

**B.Tech. DEGREE EXAMINATION, APRIL/MAY 2016.**

**Fifth Semester**

**Electronics and Communication Engineering**

**Elective — CONSUMER ELECTRONICS**

**(2013-2014 onwards)**

**Time : Three hours**

**Maximum : 75 marks**

**PART A — (10 × 2 = 20 marks)**

**Answer ALL questions.**

1. Define GPRS System.
2. List out the different types of Loudspeakers.
3. State different types of washing machines. How automation is achieved in it?
4. Define the advantages of MP4 format.
5. What are the advantages of LCD over conventional picture tube?
6. State the principle of microwave oven.
7. State the advantages of blue tooth technology.
8. Define the characteristics of Microphone.

9. How the audio signals are recorded on magnetic tape?
10. What are the types of colour system?

PART B — (5 × 11 = 55 marks)

Answer ALL questions.

UNIT I

11. Explain in detail about the working of dynamic loudspeaker, woofers and tweeters.

Or

12. Discuss in detail about carbon microphone with neat diagram and highlight its characteristics.

UNIT II

13. Describe in detail about the working of monochrome picture tube and colour picture tube with neat diagram.

Or

14. Explain in detail about the plasma TV and LCD TV with suitable diagram.

UNIT III

15. Explain in detail about the Magnetic tape/cassette recorder and different types of CD's.

Or

16. Draw and Explain block diagram of a theater sound system and sound track recording on film.

UNIT IV

17. Explain in detail about GPRS and Public switched telephone networks.

Or

18. Explain in detail about GPS navigation system and elements of PA system.

UNIT V

19. Explain Proximity sensors and accelerometer sensors that are used in home appliances.

Or

20. Explain in detail about the basic principal of microwave oven and washing machine.

**4627202**

**B.Tech. DEGREE EXAMINATION, APRIL/MAY 2016.**

**Seventh Semester**

**Electronics and Communication Engineering**  
**MICROWAVE AND OPTICAL ENGINEERING**

**Time : Three hours**

**Maximum : 75 marks**

**PART A — (10 × 2 = 20 marks)**

**Answer ALL questions.**

- 1. Explain the working of Magnetron**
- 2. Draw the Diagram of Reflex Klystron.**
- 3. What is a Circulator?**
- 4. Give the scattering matrix for N port device.**
- 5. What is VSWR?**
- 6. What is Reflected Voltage Wave?**
- 7. What is Acceptance Angle?**

8. What is Total Internal Reflection?
9. What is a Point To Multi-Point Communication?
10. What is a Downstream?

PART B — (5 × 11 = 55 marks)

Answer ALL the questions.

11. Explain the construction of IMPATT Diode.  

Or
12. Explain the Principle Of Operation of IMPATT Diode.
13. Explain Optical Circulator.  

Or
14. Explain Reflection Amplifier.
15. Explain the minimization of Systematic Error in S-Parameters.  

Or
16. Explain the Practical Relevance of Dielectric Constant.

17. Explain the Failure Mode of LED w.r.t Stress Mode.

Or

18. Explain the Characteristics of Attenuator and explain RF attenuator.
19. What is a Jitter and why it is an issue for the operators?

Or

20. Explain SDH Applications.

**5624075**

**B.Tech. DEGREE EXAMINATION, APRIL/MAY 2016.**

**Fourth Semester**

**Electronics and Communication Engineering**

**ELECTRONIC CIRCUITS AND ANALYSIS**

**Time : Three hours**

**Maximum : 75 marks**

**PART A — (10 × 2 = 20 marks)**

**Answer ALL questions.**

1. State the advantages of h-parameters.
2. Draw hybrid- $\Pi$  model for BJT.
3. What is the need of multistage amplifier?
4. Calculate the closed loop gain of a negative feedback amplifier if its open loop gain is 100,000 and feedback factor is 0.01.
5. State Barkhausen Criteria.
6. What is a Schmitt trigger?
7. Define time base generator.

8. Differentiate between positive clamper and negative clamper.
9. What is cross over distortion?
10. What are power amplifiers?

PART B — (5 × 11 = 55 marks)

Answer ALL questions, ONE from each Unit.

All questions carry equal marks.

#### UNIT I

11. Derive the expression for the small signal low frequency h-parameter model for BJT.

Or

12. Derive the expression for CE short circuit current gain of transistor at high frequencies.

#### UNIT II

13. Explain the operation of double tuned amplifier with circuit diagram and derive its bandwidth.

Or

14. What are the effects of feedback on gain, stability, distortion, bandwidth, input and output impedances?

#### UNIT III

15. Explain the working of RC Phase shift oscillator and derive its frequency of oscillation.

Or

16. Explain the working of Schmitt trigger using emitter coupled Bistable multivibrator with circuit diagram and waveforms.

#### UNIT IV

17. What is a clipper? With the help of circuit diagram and waveform describe the operation of positive and negative clipper.

Or

18. With suitable circuit diagram and waveform explain the working of UJT saw-tooth generator. Derive the expression for the oscillating frequency.

#### UNIT V

19. (a) Explain cross over distortion, its causes and remedy.

- (b) Write short notes on power transistor heat sink.

Or

20. Draw the circuit diagram of a class B push pull amplifiers and explain its operation. Derive an expression for its maximum conversion efficiency.

**5623025**

**B.Tech. DEGREE EXAMINATION, APRIL/MAY 2016.**

**Third Semester**

**Electronics and Communication Engineering**

**DATA STRUCTURES AND OBJECT ORIENTED  
PROGRAMMING**

**Time : Three hours**

**Maximum : 75 marks**

**PART A — (10 × 2 = 20 marks)**

**Answer ALL questions.**

**All questions carry equal marks.**

1. Define decision tree.
2. Mention the different criteria that every algorithm must satisfy.
3. Differentiate stack and queue.
4. What capabilities are needed to make linked representation?
5. Define inverse adjacency list.
6. With diagram define DFS and BFS spanning tree.

7. What is token? State the various tokens.
8. What is an inline function?
9. State the arithmetic operations that pointers can perform.
10. Name the tasks performed by exception handling.

PART B — (5 × 11 = 55 marks)

Answer ALL questions, ONE question from each Unit.

#### UNIT I

11. Explain in detail about quicksort with suitable example.

Or

12. With necessary diagrams, explain the representation of arrays in detail.

#### UNIT II

13. Write detailed notes on singly linked list.

Or

14. Explain elaborately about multiple stacks and queues.

#### UNIT III

15. Write in detail about binary tree representation.

Or

16. Give a detailed explanation about shortest path and analyse its algorithm.

#### UNIT IV

17. Write a detailed note on overloading binary operators using friends with an example program.

Or

18. Design a program for long-term fixed deposit system using dynamic initialization of constructor.

#### UNIT V

19. Explain Bubble sort using function template with an example.

Or

20. Write a program illustrating runtime polymorphism.

**5623026**

B.Tech. DEGREE EXAMINATION, APRIL/MAY 2016.

Third Semester

Electronics and Communication Engineering

**ELECTRONICS DEVICES AND CIRCUITS**

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

All questions carry equal marks.

1. Write the differences between Avalanche breakdown and Zener breakdown.
2. What is meant by static forward resistance?
3. What is early effect?
4. What is reverse saturation current?
5. Give the principle of operation of solar cell.
6. Why is photo diode used in reverse biased condition? Give reasons.
7. What are the requirements for biasing a circuit?

8. Define three stability factors.
9. What is meant by fold back limiting in a voltage regulator?
10. What is meant by switching regulator?

PART B — (5 × 11 = 55 marks)

Answer ALL questions, ONE question from each Unit.

#### UNIT I

11. Derive the expression for the transition capacitance and diffusion capacitance of a diode.

Or

12. Explain the operation of a PN junction diode under forward and reverse biased condition. Also explain the characteristics of a PN-Junction diode.

#### UNIT II

13. Explain Eber-moll model in detail.

Or

14. Explain the construction and working of n-channel J-FET.

#### UNIT III

15. Explain the construction and working of SCR and UJT with necessary diagrams.

Or

16. Explain the principle of operation and the characteristics of Laser diode and MESFET.

#### UNIT IV

17. Explain voltage divider bias and self-bias of J-FET in detail.

Or

18. Explain DC load line and Q-point of a transistor in detail.

#### UNIT V

19. Explain series voltage regulators in detail.

Or

20. Explain full wave rectifier and derive its ripple factor for C and LC filters.

**5425011**

**B.Tech. DEGREE EXAMINATION, APRIL/MAY 2016.**

**Sixth Semester**

**Electronics and Communication Engineering**

**Elective – VLSI DESIGN**

**(2013-2014 onwards)**

**Time : Three hours**

**Maximum : 75 marks**

**PART A — (10 × 2 = 20 marks)**

**Answer ALL questions.**

**All questions carry equal marks.**

1. Define photoresist layer.
2. Expand CVD.
3. Draw 2:1 Mux using Transmission gates.
4. Define D Latch.
5. What is Ripple carry?
6. Define Carry skip.
7. What is the sean?
8. What is meant by Boundary?
9. What are the difference between min and max delays?
10. Define Task.

PART B — (5 × 11 = 55 marks)

Answer ALL questions, ONE from each Unit.

All questions carry equal marks.

UNIT I

11. Explain the following:

- (a) Static Power Reduction
- (b) VLSI fabrication of CMOS.

Or

12. Briefly explain NMOS and CMOS inverter.

UNIT II

13. Explain the CMOS PLA.

Or

14. Briefly explain the memories DRAM cell, and RAM cell and Pseudo static RAM cell.

UNIT III

15. Write short notes on:

- (a) Domino CMOS logic
- (b) Carry Skip.

Or

16. Briefly explain Design of signed parallel adder.

UNIT IV

17. Briefly explain the system level test techniques(BIST) with neat diagram.

Or

18. In detail about the Automatic Test Pattern Generation and Fault simulation.

UNIT V

19. Differentiate between the sequential and Parallel Statement groups.

Or

20. Briefly explain the Basic of verilog operators and Data types.

**5626176**

**B.Tech. DEGREE EXAMINATION, APRIL/MAY 2016.**

**Sixth Semester**

**Electronics and Communication Engineering**

**ANTENNAS AND WAVE PROPAGATION**

**Time : Three hours**

**Maximum : 75 marks**

**PART A.— (10 × 2 = 20 marks)**

**Answer ALL the questions.**

**All questions carry equal marks.**

1. What is the significance of radiation resistance of an antenna?
2. Define gain and beam width of an antenna.
3. State Babinet's principle.
4. What are limitations of Len's antenna?
5. Mention any two application of helical antenna.
6. What are the parasitic elements and driven elements?
7. What are the advantages of patch antenna?

8. List the various methods used for measuring polarization.
9. Define Skip Zone.
10. What are the factors that cause attenuation in ground wave?

PART B — (5 × 11 = 55 marks)

Answer ALL the questions.

All questions carry equal marks.

#### UNIT I

11. (a) Derive the relationship between effective length and radiation resistance.  
Or  
(b) Describe a broadside array and derive an expression for the radiation pattern of a broadside array with two point sources.

#### UNIT II

12. (a) Show the relationship between dipole and slot impedance.  
Or  
(b) Discuss about the various types of Horn antenna and find the field components on the axis of E plane sectoral horn.

#### UNIT III

13. (a) Explain the construction, operation and design consideration for a rhombic antenna.

Or

- (b) Discuss about the geometry of a log periodic antenna and give the design equations and uses of log periodic antenna.

#### UNIT IV

14. (a) Explain the construction, operation and drive the directivity of patch antenna.

Or

- (b) Discuss about the two methods of measuring gain of an antenna.

#### UNIT V

15. (a) Explain the effect of earth's magnetic field on ionospheric radio wave propagation.

Or

- (b) Derive an expression for critical frequency of an ionized region in terms of its maximum ionization density.

**5626173**

**B.Tech. DEGREE EXAMINATION,  
APRIL/MAY 2016.**

**Sixth Semester**

**Electronics and Communication Engineering**

**DIGITAL COMMUNICATION**

**Time : Three hours**

**Maximum : 75 marks**

**PART A — (10 × 2 = 20 marks)**

**Answer ALL questions.**

**All questions carry equal marks.**

1. What are the applications of matched filter?
2. Define A law and  $\mu$  law.
3. What is the bandwidth requirement of M-ary PSK?
4. What are the advantages of QPSK?
5. What is CDMA?
6. Write the applications of spread spectrum systems.

7. What is coherent detection?
8. Define frame synchronization.
9. What is encryption?
10. What is information security?

PART B — (5 × 11 = 55 marks)

Answer ALL question ONE from each Unit.

All questions carry equal marks.

#### UNIT I

11. Explain the DPCM technique with suitable block diagram.

Or

12. Explain about the inter symbol interference problem in baseband channel and how to avoid ISI.

#### UNIT II

13. Discuss about the generation and detection of MFSK with suitable example.

Or

14. Explain about the coherent and non-coherent detection of ASK and FSK system.

#### UNIT III

15. Draw the block diagram of RAKE receiver and explain in details.

Or

16. Describe about the spread spectrum techniques with suitable diagrams.

#### UNIT IV

17. Explain about bit and symbol synchronization.

Or

18. Discuss about the closed loop transmitter synchronization.

#### UNIT V

19. Explain about the data encryption.

Or

20. Discuss about the RSA algorithm.