F 6416

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Fifth Semester

Branch : Electronics and Communication/Applied Electronics and Instrumentation Engineering

COMPUTER ORGANISATION AND ARCHITECTURE (LA)

(Old Scheme—Supplementary/Mercy Chance)

Time : Three Hours

Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries **4** *marks.*

1. Explain the importance of system software.
2. What do you mean by ripple carry adders ?
3. Write brief notes on PLA's.
4. Discuss the need for prefetching of microinstructions.
5. What do you mean by Cache memory ?
6. Write short notes on memory interleaving.
7. What do you mean by vectored interrupts ?
8. Write a brief note on interrupt resting.
9. List the advantages of parallel processing.
10. What do you mean by array processors ?

(10 × 4 = 40 marks)

Part B

Each full question carries **12** *marks.*

11. Explain the different addressing modes with suitable examples.

Or

12. With the help of suitable examples, explain how binary multiplication is performed using Booth's algorithm.

13. Explain about hardwired control in detail.

Or

Turn over

14. Write short notes on :

    (i) Microprogram sequencing.

    (ii) Branch address modification.

15. Discuss about semiconductor RAM memories in detail.

Or

16. What do you mean by virtual memory ? Explain how address translation is done.

17. Discuss about DMA in detail.

Or

18. What are the actions taken by a processor when it receives an interrupt request ?

19. Elaborate on the different firm parallel processing.

Or

20. Explain about the different interconnection networks.

(5 × 12 = 60 marks)

F 6435

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Fifth Semester

Branch : Electronics and Communication/Electronics and Instrumentation Engineering

MICROPROCESSORS AND MICROCONTROLLERS (LS)

(Old Scheme—Supplementary/Mercy Chance)

Time : Three Hours

Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. List various registers used in 8085.
2. Briefly explain different types of flags used in 8085.
3. Distinguish between Microprocessor and Microcontrollers.
4. Which addresses in 89C51 are bit addressable ? Explain briefly.
5. Draw and explain memory map of data RAM used in 89C51.
6. Explain different steps involved in executing an interrupt in 89C51.
7. What are the addressing modes available in 89C51 ? Give examples.
8. What is the role of the SCON register in serial data transfer ?
9. In what way 89C51 ports are different from 8255 ports ? Explain briefly.
10. What is meant by "Auto Reload" feature and where it is used.

(10 × 4 = 40 marks)

Part B

Each full question carries 12 *marks.*

11. Explain the internal architecture of 8085 microprocessor with neat diagram.

Or

12. (a) Explain memory mapped I/O and I/O mapped I/O schemes in detail. (6 marks)

    (b) Draw the timing diagram for the instruction MVIA, 32_H. (6 marks)

13. With a block diagram, describe the features of 89C51 in detail.

Or

Turn over

14. Write short notes on :

    (i) Register bank registers, their uses and its selection process. (6 marks)

    (ii) SFR registers and their usage. (6 marks)

15. List all instructions of data transfer group of 89C51 and give example for each one.

Or

16. Explain in detail, how the memory is organised in 89C51 controllers.

17. Explain the interrupt features of 89C51 in detail.

Or

18. Write an 89C51 program for converting 8 bit binary number into its equivalent BCD number.

19. Describe the operation of 89C51 timers in detail.

Or

20. (a) How does the time operate in 89C51 in model ? Explain. (5 marks)

    (b) If an 89C51 based system is to be connected to a PC in serial data transfer format. What mode should the serial logic of 89C51 be programmed. Describe the same. (7 marks)

[5 × 12 = 60 marks]

F 6406 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Fifth Semester

Branch : Electronics and Communication Engineering

APPLIED ELECTROMAGNETIC THEORY (L)

(Old Scheme—Supplementary/Mercy Chance)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 4 *marks.*

1. Two charges +Q and +2Q are placed along positive x-axis. +Q charge is placed at origin and 2Q charge is placed at $x = 8$ cm. Find point where not electric field is zero.
2. State Gauss law, and explain.
3. Distinguish between Stokes and Divergence theorems.
4. What is magnetic vector potential ? Explain.
5. State Maxwell's equations. Write them both in differential and integral forms.
6. Deduce Poisson's equation.
7. What is a dominant mode in wave guides ? Give its advantages.
8. Write transmission line equations. Also draw the equivalent circuit of transmission line.
9. What is a Smith chart ? Explain.
10. Distinguish between Phase velocity and Group velocity.

(10 × 4 = 40 marks)

Part B

Answer **all** *questions.*

Each full question carries 12 *marks.*

11. Write expressions for curl, divergence and gradient in rectangular cylindrical and spherical co-ordinate systems.

Or

12. Using Gauss theorem find the expression for electric field between two concentric metallic spheres.

Turn over

13. Find magnetic field intensity at centre of a infinitely long solenoid.

Or

14. A current carrying circular loop is kept in a horizontal plane (xy) centered around origin. Find the expression for magnetic field at a point of z-axis.

15. Write Maxwells equations in differential and integral forms. Explain the physical meaning of each theorem.

Or

16. Derive wave equations for free space.

17. Derive expressions for field components for TM modes in rectangular wave guides.

Or

18. What is advantage of TE_{10} mode in rectangular waveguides over other modes. Also explain why TM_{10} modes are not propagated through rectangular waveguides. Derive an expression for cut-off frequency of a wave guide.

19. Derive Smith chart equations. Explain how Smith chart can be used for the measurement of unknown load impedance.

Or

20. Draw the equivalent circuit of a transmission line. Derive expressions for voltage and current at any point in transmission line.

(5 × 12 = 60 marks)

F 6427 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Fifth Semester

Branch : ECE/ELI/Applied Electronics and Instrumentation Engineering

LINEAR INTEGRATED CIRCUITS (LAS)

(Old Scheme—Supplementary/Mercy Chance)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 4 *marks.*

1. Define slew rate. How it is measured ?
2. Draw circuits of inverting and non-inverting amplifiers. Derive expressions of gain.
3. Give four important features of an ideal operational amplifier.
4. Draw a single Op-amp circuit to realize V_1–V_2. Where V_1 and V_2 are two analog voltages.
5. Give advantages of switched capacitor filters.
6. Distinguish between Lock range and Capture range in a PLL.
7. Explain the need for offset minimizing resistor in Op-amp.
8. Draw the circuit diagram of a 555-timer based astable multivibrator.
9. Explain how FM is demodulated using PLL.
10. Explain what is fold back protection in IC 723.

(10 × 4 = 40 marks)

Part B

Answer **all** *questions.*
Each full question carries 12 *marks.*

11. Draw different stages of Op-amp as a block diagram and explain each block in detail.

Or

12. What is CMRR ? Explain how it is measured. How does CMRR varies with frequency ?

13. Sketch the circuit diagram of a differential amplifier with dual input and balanced output. Derive expression for gain.

Or

14. Draw a voltage to current convertor using Op-amp and explain its working.

Turn over

15. Distinguish between Log and Antilog amplifiers. Derive expressions for outputs.

Or

16. Draw the circuit of a triangular wave generator using Op-amp. Explain its working.

17. Explain how a band pass filter can be realized using low pass and high pass filters.

Or

18. Draw the circuit of a astable multivibrator using IC 555. Explain its working.

19. Explain the block schematic of a PLL.

Or

20. Explain the working of IC 566 as a VCO.

(5 × 12 = 60 marks)

F 6363 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Fifth Semester

Branch : Electronics and Communication Engineering

EC 010 504—ELECTRICAL DRIVES AND CONTROL (EC)

(New Scheme—Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions briefly.*
Each question carries 3 *marks.*

1. List the different types of excitation of DC generators.
2. Why is the rotor core loss in a three-phase induction motor negligible ?
3. Distinguish clearly between latching current and holding current of SCR.
4. List the parameters that affect the performance of choppers.
5. Sketch the speed-torque characteristics of a single-phase fully controlled rectifier drive.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. A d.c. shunt generator has an induced voltage on open circuit of 127 V. When the machine is on-load, the voltage is 120 V. Calculate the load current, if the field circuit resistance is 15 ohms, and armature resistance is 0.02 ohm. Neglect the armature reactance.
7. Define regulation of a transformer, and derive the formula for its voltage regulation.
8. Draw and explain the basic structure of a power diode. Explain its VI characteristics.
9. Explain the principle of step-up chopper circuit with neat diagrams.
10. Explain with schematic diagram the computer controlled four quadrant d.c. drive.

(5 × 5 = 25 marks)

Part C

Answer any **one** *full question from each module.*
Each full question carries 12 *marks.*

MODULE 1

11. (a) Explain the process of building-up of voltage in a d.c. generator ? What are the causes of failure for building up of voltage in a shunt generator ?

(6 marks)

Turn over

(b) What are the different methods by which the speed of a d.c. shunt motor can be controlled ? State the advantages and disadvantages of each method.

(6 marks)

Or

12. A 50 kW, 250 V d.c. shunt generator runs at 1200 r.p.m. If this machine is run as a motor taking 30kW at 250 V. What will be its speed ? The armature, and shunt field resistance are 0.1 ohm, and 125 ohm respectively. Brush drop is 2V.

MODULE 2

13. (a) Draw and explain the phasor diagram of a practical single-phase transformer supplying lagging load ?

(7 marks)

(b) What are the three voltage drops occurring in an alternator on-load ? Explain "synchronous impedance".

(5 marks)

Or

14. Explain with the help of neat diagrams, how rotating magnetic field is produced in a 3-phase induction motor ? Discuss the torque-slip characteristics of a 3-phase induction motor.

MODULE 3

15. With neat diagrams, describe the basic structure, static and dynamic characteristics of SCR ? Describe the different turn on methods.

Or

16. (a) With a neat diagrams, explain the static and switching characteristics of IGBT. (7 marks)

(b) Sketch and explain the important characteristics of MOSFET. (5 marks)

MODULE 4

17. With neat circuit diagram and waveforms explain the single-phase full converter with RL load. Derive expressions for $V_{d.c.}$ and $V_{r.m.s.}$

Or

18. (a) List and explain the different methods of output voltage control of single-phase inverters.

(6 marks)

(b) With neat block diagrams explain the on-line and off-line UPS ? (6 marks)

MODULE 5

19. (a) Explain the operation of a two-quadrant class-*c*-chopper supplying armature of a separately excited d.c. motor load. Draw the waveforms for load voltage and load current.

(7 marks)

(b) Explain with neat sketches a 3-phase half-wave converter drive system. (5 marks)

Or

20. (a) With necessary diagrams, describe the voltage and frequency control of 3-phase induction motor.

(6 marks)

(b) Explain the operation of a d.c. motor drive with chopper and maximum power point tracker.

(6 marks)

[5 × 12 = 60 marks]

F 6390 (Pages : 4) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Fifth Semester

Branch : Common to all branches except Computer Science and Engineering/ Information Technology

ENGINEERING MATHEMATICS–IV (CMELPASUF)

(Old Scheme—Supplementary/Mercy Chance)

Time : Three Hours Maximum : 100 Marks

Answer any **one** *question from each module.*
All questions carry equal marks.

Module I

1. (a) State Cauchy's integral formula and integral theorem. Use it to evaluate $\int_C \frac{\cos \pi z}{z^2-1}$ where C is the rectangle with vertices $2 \pm i$, $-2 \pm i$. (12 marks)

(b) Find the Laurent's series expansion of $\frac{1}{z-z^3}$ in $1 < |z+1| < 2$. (8 marks)

Or

2. (a) If $f(a) = \int_C \frac{4z^2+z+5}{z-a} dz$ where C is the ellipse $9x^2+4y^2=36$ find $f(3)$, $f'(1)$ and $f''(-1)$. (10 marks)

(b) Find the Taylor's series expansion of $f(z) = \frac{2z^3+1}{z^2+1}$ at $z = i$ and $z = -i$. (10 marks)

Module II

3. (a) Using method of false position, find a root of the equation $x^3 - x - 4 = 0$ lying between 1 and 2 correct to four decimal places. (10 marks)

(b) Find by Newton's method, the root of the equation $\log x = \cos x$. (10 marks)

Or

Turn over

4. (a) Apply Gauss-Seidel method to solve the equations :

$$10x - 2y + z = 12,$$
$$x + 9y - z = 10,$$
$$2x - y + 11z = 20.$$

(12 marks)

(b) Find a root of the equation $x^3 - x = 11$ which lies between 2 and 3, using bisection method.

(8 marks)

Module III

5. (a) Use Taylor's series method to find $y(0.1)$ and $y(0.3)$ correct to four decimal places, given that $\frac{dy}{dx} = y^2 - x$, $y(0) = 1$.

(10 marks)

(b) Using Milne's Predictor-Corrector method find $y(1.2)$ taking $h = 0.1$, given $\frac{dy}{dx} = xy - x^2$, $y(1) = 1$.

(10 marks)

Or

6. (a) Use Euler's modified method to compute $y(0.4)$, given that $\frac{dy}{dx} = x^2 + y^2$, $y(0) = 3$ taking $h = 0.2$. correct to four decimal places.

(10 marks)

(b) Apply Runge-Kutta method order four to find an approximate value of y at $x = 0.1$ if $\frac{dy}{dx} = xy + y^2$ and $y(0) = 1$.

(10 marks)

Module IV

7. (a) Prove Shifting rules and hence show that $Z\left(\frac{1}{n!}\right) = e^{\frac{1}{z}}$.

(8 marks)

(b) Using Z-transform solve $6y_{n+2} - y_{n+1} - y_n = 0$ with $y(0) = y(1) = 1$.

(12 marks)

Or

8. (a) Solve $u_{n+2} - 2u_{n+1} + u_n = 2^n$ with $u_0 = 2, u_1 = 1$.

(12 marks)

(b) Find $Z^{-1}\left[\frac{2z}{(z-1)(z^2+1)}\right]$.

(8 marks)

Module V

9. (a) Using graphical method solve the following L.P.P.

Minimize $Z = 3x + 2y$

subject to the constraints,

$5x + y \geq 10$,

$x + y \geq 6$,

$x + 4y \geq 12$ with

$x, y \geq 0$.

(8 marks)

(b) How will you identify unbounded solution of an L.P.P. from its simplex table ? Using simplex algorithm, solve the following L.P.P.

Maximize $Z = 3x + 2y + 5z$

subject to the constraints,

$x + 2y + z \leq 430$,

$3x + 2z \leq 460$,

$x + 4z \leq 420$ with

$x, y, z \geq 0$.

(12 marks)

Or

10. (a) Use Big-M method to solve the following L.P.P. :

Maximize $Z = x_1 + 2x_2 + 3x_3 - x_4$

subject to the constraints,

$x_1 + 2x_2 + 3x_3 = 15$,

$2x_1 + x_2 + 5x_3 = 20$,

$x_1 + 2x_2 + x_3 + x_4 = 10$ with

$x_1, x_2, x_3, x_4 \geq 0$.

(10 marks)

(b) The following table gives the cost matrix of transporting one unit of a product from the sources F, G and H to the destinations A, B and C. Compute the optimum allocations and minimum cost of transportation using MODI method.

	A	*B*	*C*	*Supply*
F	16	20	12	200
G	14	8	18	160
H	26	24	16	90
Demand	180	120	150	450

(10 marks)

[5 × 20 = 100 marks]

Module 5

19. Use dual simplex method to solve the L.P.P :

Minimize $z = 2x_1 + 3x_2 + 10x_3$

subject to $2x_1 - 5x_2 + 4x_3 \geq 30$

$3x_1 + 2x_2 - 5x_3 \geq 25$

$x_1 + 3x_2 + x_3 \leq 30$

$x_1, x_2, x_3 \geq 0.$

(12 marks)

Or

20. There are three factories F_1, F_2 and F_3 situated in different areas with supply capacities as 200, 400 and 350 units respectively. The items are shipped to five markets M_1, M_2, M_3, M_4 and M_5 with demands as 150, 120, 230,200, 250 units respectively. The cost matrix is given as follows :

	M_1	M_2	M_3	M_4	M_5
F_1	2	5	6	4	7
F_2	4	3	5	8	8
F_3	4	6	2	1	5

Determine the optimal shipping cost and shipping patterns.

(12 marks)

[5 × 12 = 60 marks]

F 6337 (Pages : 4) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Fifth Semester

Branch : Common to all branches except C.S. and I.T.

EN 010 501-A—ENGINEERING MATHEMATICS – IV

(Regular/Improvement/Supplementary—New Scheme)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. State the necessary and sufficient conditions for a function to be analytic. Write one example for an analytic function.

2. Evaluate $\int_0^{2+i} (\bar{z})^2 \, dz$, along the line $2y = x$.

3. Find a root of $x = \cos x$ using Bisection method.

4. Solve $y' = 3x^2 + y$ in $0 \leq x \leq 1$ by Euler's method taking $h = 0.1$, given $y(0) = 4$.

5. State the theorem on complementary slackness conditions.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Under the transformation $w = z^2$, obtain the map in the w-plane of the square with vertices $(0,0), (2,0), (2,2), (0,2)$ in the z-plane.

7. Expand $\frac{z^2 - 1}{(z+2)(z+3)}$, for $|z| > 3$ in Laurent's series.

8. Find a root of the equation $x^6 - x^4 - x^3 - 1 = 0$ correct to three decimal places using Regula-Falsi method.

9. Solve $\frac{dy}{dx} = z - x, \frac{dz}{dx} = y + x$ with $y(0) = 1$, $z(0) = 1$ to get $y(0.1)$ and $z(0.1)$, using Taylor's method.

10. Maximize $z = 3x_1 + 2x_2$
subject to $3x_1 + 4x_2 \le 12$
$2x_1 + 5x_2 \le 10$
$x_1, x_2 \ge 0$.

(5 × 5 = 25 marks)

Part C

Answer any **one** *full question from each module.*
Each full question carries 12 *marks.*

Module 1

11. (a) Show that the polar form of Cauchy-Riemann equations are $\frac{\partial u}{\partial r} = \frac{1}{r}\frac{\partial v}{\partial \theta}, \frac{\partial v}{\partial r} = \frac{1}{r}\frac{\partial u}{\partial \theta}$ and hence deduce $\frac{\partial^2 u}{\partial r^2} + \frac{1}{r}\frac{\partial u}{\partial r} + \frac{1}{r^2}\frac{\partial^2 u}{\partial \theta^2} = 0$.

(6 marks)

(b) Show that the map of the circle $|z| = 2$ under the transformation $w + 2i = z + \frac{1}{z}$ is an ellipse, and find its axes and centre.

(6 marks)

Or

12. (a) Prove that $u = x^2 - y^2 - 2xy - 2x + 3y$ is harmonic. Find a function V such that $f(z) = u + iv$ is analytic. Also express $f(z)$ in terms of z.

(7 marks)

(b) Find the image of the circle $|z| = 2$ under the transformation $w = z + 3 + 2i$.

(5 marks)

Module 2

13. (a) Evaluate $\oint_c \frac{z}{(z-1)(z-2)^2} dz$, where c is the circle $|z - 2| = \frac{1}{2}$. (5 marks)

(b) Evaluate by contour integration :

$$\int_{-\infty}^{\infty} \frac{\sin x}{x^2 + 4x + 5} dx.$$

(7 marks)

Or

14. (a) Using Cauchy's integral formula, evaluate $\int_c \frac{e^z}{(z+1)^4 (z-2)} dz$, where c is $|z - 1| = 3$.

(6 marks)

(b) Evaluate $\int_0^{\infty} \frac{dx}{x^4 + 1}$ by contour integration. (6 marks)

Module 3

15. (a) By using Gauss-Seidel iteration method, solve the following system of equations :

$$10x - 2y - z - u = 3$$
$$-2x + 10y - z - u = 15$$
$$-x - y - 10z - 2u = 27$$
$$-x - y - 2z + 10u = -9.$$

Carry out 2 iterations.

(7 marks)

(b) Find a root of $3x - 1 = \cos x$, correct to three decimals using Newton-Raphson's method.

(5 marks)

Or

16. (a) Find a root of $x^3 - 5x - 11 = 0$ correct to three decimals using iteration method. (5 marks)

(b) Find the root that lies between 0 and 1 for the equation $x^3 - 5x + 1 = 0$, using the bisection method. Carry out 4 iteractions.

(7 marks)

Module 4

17. Using 4th order Runge-Kutta method with step length $h = 0.2$, solve the initial value problem $y' = xy, y(1) = 2,$ and obtain $y(1.2)$.

(12 marks)

Or

18. With the usual assumptions, derive Milne's predictor and corrector formulas of order 4 to solve the initial value problem :

$y' = f(x, y), y(x_0) = y_0$.

(12 marks)

18. Determine the stability of the system whose open loop transfer function is $G(s)H(s) = \frac{1}{s(1+s)(1+2s)}$. What are the gain and phase margins ?

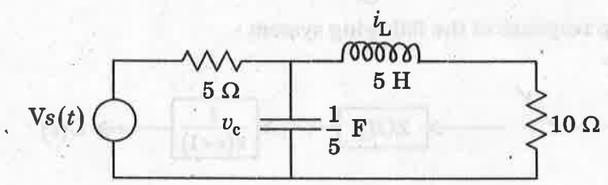
Module 5

19. Determine the eigen values and state transition matrix for the following system :

$$A = \begin{bmatrix} 0 & 1 \\ -4 & -5 \end{bmatrix} ; B = \begin{bmatrix} 1 \\ 1 \end{bmatrix} ; C = [0, \ 1] \ ; D = [0].$$

Or

20. (a) Obtain the state equations in the matrix form, for the following circuit :



(7 marks)

(b) Find the state transition matrix for the system given by

$$\dot{X} = \begin{bmatrix} 0 & 1 \\ -2 & -1 \end{bmatrix} X.$$

(5 marks)

[5 × 12 = 60 marks]

F 6343 (Pages : 4) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Fifth Semester

Branch : Electronics and Communication Engineering

EC 010 502—CONTROL SYSTEMS (EC)

(New Scheme—Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Graph sheets may be supplied.

Part A

Answer **all** *questions briefly.*
Each question carries 3 *marks.*

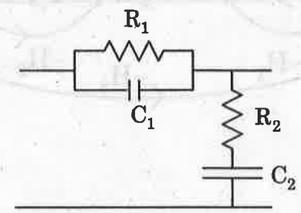
1. Define feedback. What are its effects on the output of the system ?
2. Define pole, zero and order of a system.
3. Draw circuits of phase lag and lag-lead compensators using RC network.
4. State Nyquist stability criteria.
5. Given $F = \begin{bmatrix} 0 & 1 \\ -3 & 4 \end{bmatrix}$. Determine state transition matrix F^k using z-transform technique.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Find the transfer function of the following network :



7. Define rise time, settling time, peak time and delay time of a second order underdamped system.

8. What is a compensator ? Discuss the need of the same in a control system ? Explain parallel compensation.

9. Explain the role of M and N circles in control system.

10. What are eigen values of a matrix ? How will you form diagonal matrix of a given matrix using eigen values ?

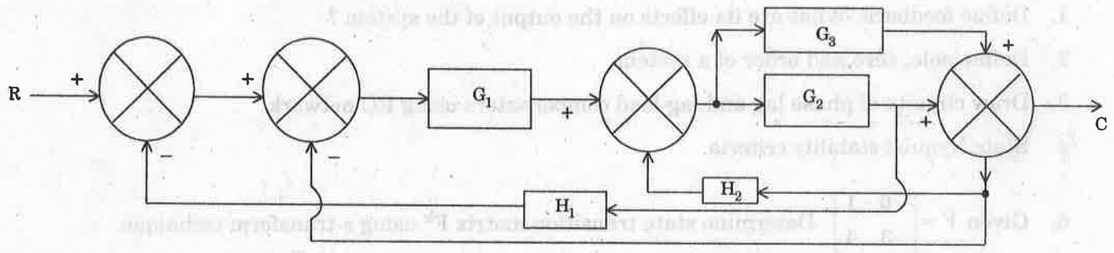
(5 × 5 = 25 marks)

Part C

Answer any **one** *full question from each module.*
Each full question carries 12 *marks.*

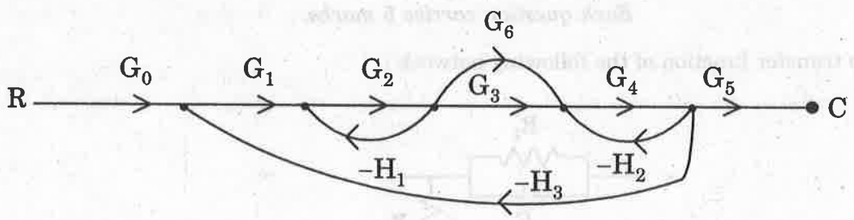
Module 1

11. Find the $\frac{C}{R}$ of the system shown below :



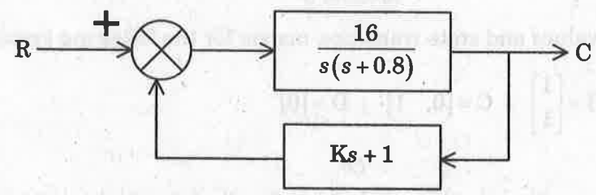
Or

12. Find the overall gain of the signal flow graph shown below :



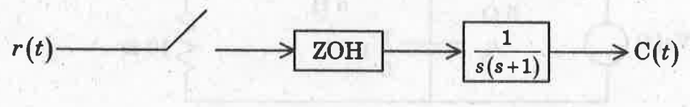
Module 2

13. The damping ratio of the following system is 0.5. Find an expression for unit step response. Also calculate the rise time, peak time, maximum overshoot and settling time.



Or

14. (a) Find the unit step response of the following system :



(7 marks)

(b) Define and explain BIBO stability and asymptotic stability. Distinguish between them.

(5 marks)

Module 3

15. Sketch the root locus for the system whose open loop transfer function is $\frac{k}{s(s+4)(s^2+4s+20)}$.

Or

16. The open loop transfer function of a unity feedback system is $G(s)=\frac{k}{s(1+0.1s)(1+0.2s)}$. Design a suitable phase lag compensator to meet the following specification :

$K_v = 20/\text{sec}$

phase margin $\geq 35°$.

Module 4

17. By using Nyquist criterion, determine whether the closed loop system having the open loop transfer function $G(s)=\frac{8s}{(s-1)(s-2)}$ is stable or not. How many closed loop poles lie in the left and in the right half s-plane ?

Or

F 6375 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Fifth Semester

Branch : Electronics and Communication Engineering

EC 010 505—APPLIED ELECTROMAGNETIC THEORY (EC)

(New Scheme—Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions briefly.*
Each question carries 3 *marks.*

1. State Stoke's theorem.
2. Define displacement current.
3. What do you understand by guided waves ?
4. What is the meaning of the subscripts m, n and p in a circular cavity resonator ?
5. What are the various dielectric substrate materials used in planar transmission line ?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Obtain the expression for the capacitance of a two parallel wire transmission line.
7. Calculate the frequency at which conduction current density and displacement current density are equal in a medium with $\sigma = 2 \times 10^{-4}$ s/m and $\epsilon_r = 80$.
8. Show that the group velocity in an air filled waveguide is less than the free space velocity. What is its value when the signal frequency is very much higher than the cut-off frequency ?
9. A circular waveguide has an internal diameter of 5 cm. Calculate the cut-off frequencies for the following modes : (i) TE_{11} ; and (ii) TM_{01}.
10. Discuss the properties and applications of Smith Chart.

(5 × 5 = 25 marks)

Turn over

Part C

Answer any **one** *full question from each module.*
Each full question carries 12 *marks.*

Module I

11. (a) Derive an expression for the potential due to a dipole and hence find an expression for $\vec{E}$ field.

(6 marks)

(b) Find the potential in the far field for the linear quadruple having three point charges located on the z-axis. Assume charges 2Q at $z = 0$, – Q at $Z = a$ and – Q at $Z = -a$.

(6 marks)

Or

12. (a) The magnetic vector potential is $A = \frac{5}{x^2 + y^2 + z^2} a_x$ weber/mt. Find the magnetic vector density in vector form.

(6 marks)

(b) Find the magnetic field intensity at the centre of a square of sides equal to 6 mt and carrying a current equal to 12 Amp.

(6 marks)

Module II

13. (a) Obtain the relationship between electric field intensity and magnetic field intensity for uniform plane wave.

(6 marks)

(b) For silver the conductivity is $\sigma = 3.1 \times 10^6$ s/m. At what frequency will the depth of penetration be 1 mm ?

(6 marks)

Or

14. (a) What is wave polarization ? Explain different types of polarization. (6 marks)

(b) Obtain the relation between E and H for uniform plane waves. (6 marks)

Module III

15. A rectangular air-filled waveguide has a cross-section of 45 × 90 mm. Find :

(a) the cut-off wavelength λ_{oc} for the dominant mode ;

(b) the relative phase velocity in the guide at 1.6 times the cut-off frequency ;

(c) the cut-off wavelength if the guide is filled with dielectric of $\epsilon_r = 1.7$.

Or

16. An air-filled waveguide with internal dimensions 2.29 cm and 1.02 cm is operated in the dominant mode. Calculate the cut-off frequency for the dominant mode and for the other three modes with the lowest cut-off frequencies. If the operating frequency is 8.2 GHz, find the guide wavelength for the dominant mode.

Module IV

17. Given a circular waveguide used for a signal at a frequency of 11 GHz propagated in the TE_{11} mode and the internal diameter is 4.5 cm. Calculate :

(i) cut-off wavelength ; (ii) guide wavelength ;

(iii) group velocity ; (iv) characteristic wave impedance.

Or

18. (a) With the aid of neat sketches, explain specifically how a cavity may be coupled to an electron beam ?

(6 marks)

(b) To a first approximation, show that the Q of a cavity resonator is proportional to the ratio of volume to total surface area.

(6 marks)

Module V

19. The open-circuit and short-circuit impedances measured at the input terminals of a lossless transmission line of length 1.5 m, which is less than a quarter wavelength, are $-j\,54.6\,\Omega$ and $j\,103\ \Omega$ respectively :

(a) Find z_0 of the line ;

(b) without changing the operating frequency, find the input impedance of a short-circuited line that is twice the given length ;

(c) How long should the short-circuited line be in order for it to appear as an open circuit at the input terminals ?

Or

20. (a) A transmission line at radio frequencies with characteristic impedance z_0 has to be matched to a complex load. Explain how this is done, with a suitable sketch.

(9 marks)

(b) What are the distinct advantages of double stub matching over a single stub matching.

(3 marks)

[5 × 12 = 60 marks]

F 6385 **(Pages : 3)** **Reg. No.....**

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Fifth Semester

Branch—Electronics And Communication Engineering

EC 010 506—MICROPROCESSORS AND APPLICATIONS (EC)

(New Scheme—Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions briefly.*
Each question carries 3 *marks.*

1. List the addressing modes of the following instructions :—
   (a) DAD H ;
   (b) PUSH B ;
   (c) MOV A, M.
2. State the functions of the following :—
   (a) Stack pointer ;
   (b) Program counter.
3. List the hardware interrupts available in 8085 in the order of increasing priority ?
4. What are the different keyboard modes of operating of 8279 keyboard/display controller ?
5. Explain even and odd memory addressing in 8086.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Draw and explain the timing diagram for 8085 for the execution of MOV E, A.
7. Explain the branching instructions available in 8085.
8. Draw the interfacing of a D/A converter with 8085 microprocessor and explain.
9. Explain different modes of operation and a control word of 8255 PPI.
10. What is meant by memory banking (in 8086) ? Explain its applications and merits.

(5 × 5 = 25 marks)

Turn over

Part C

Answer any **one** *full question from each module.*
Each full question carries 12 *marks.*

Module I

11. With neat circuit diagram, describe how a 4 KB RAM and 8 KB EPROM can be interfaced with 8085 ? Explain the decoding circuit clearly.

Or

12. (a) Draw the timing diagram to execute the instruction MVI A, data in 8085 and explain. (6 marks)

(b) Define instruction cycle, machine cycle and T-state and show these in the above timing diagram drawn and explain the functioning. (6 marks)

Module II

13. What is stack ? Where it is located ? Explain its function when the instructions PUSH, POP, RET and CALL are executed ? Give suitable examples. (12 marks)

Or

14. An array of '*n*' numbers are stored starting from 6000 H. Write an 8085 assembly language program to sort them in descending order and store the result starting from 6A00 onwards. Explain your program logic with the help of neat flowchart.

Module III

15. Interface a 8 bit ADC with 8085 using memory mapped I/O. Write an interrupt routine to read the output data of the converter, store it in memory and continue to collect data for the specified '*n*' number of times.

Or

16. Draw and explain the interrupt structure of 8085. Show clearly the priority input triggering, masking and vector locations. Mention the maskable and non-maskable interrupts.

Module IV

17. With a neat block diagram, explain the operation of programmable interrupt controller.

Or

18. Describe the principle of DMA data transfer. What are the facilities provided by 8237 for DMA data transfer ? Explain with the help of neat diagrams.

Module V

19. (a) Explain the register organisation of 8086. (5 marks)

(b) Describe the memory segmentation of 8086. What are its advantages ? Explain clearly. (7 marks)

Or

20. (a) Discuss how the physical address generation is carried out in 8086 ? (6 marks)

(b) Explain the interrupt structure of 8086. (6 marks)

[5 × 12 = 60 marks]

18. Design a sequential circuit for the given state diagram using JK flip-flops.

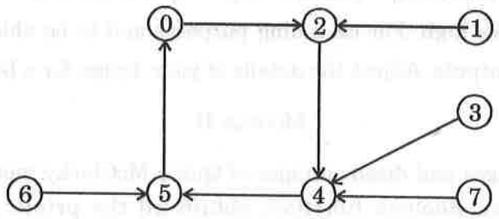


Fig. 2

MODULE V

19. Write a Verilog description for a multiplier bit. Using this multiplier bit write a verilog code for a 4 × 4 array multiplier.

Or

20. What is a barrel shifter ? Explain its principle. Using Verilog HDL, model a 4-bit barrel shifter ?

(5 × 12 = 60 marks)

F 6352 **(Pages : 4)** **Reg. No.....**

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Fifth Semester

Branch : Electronics and Communication Engineering

EC 010 503—DIGITAL SYSTEM DESIGN (EC)

(New Scheme—Regular / Improvement / Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions briefly.*
Each question carries 3 *marks.*

1. Using "assign" statement, write verilog code for the octal 2-to-1 MUX.
2. How can a decoder be used as a de-multiplexer ? Explain.
3. Draw the general model for a Mealy network using clocked D flip-flops.
4. What is a state assignment ? When *two* states are said to be equivalent states ?
5. What is a verilog test bench ? What are its functions ?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question caries 5 *marks.*

6. Write a Verilog description for a 101 sequence detector with an '*a*' input and a '*w*' output.
7. Implement $f = \Sigma(1, 3, 4, 6, 7)$ using decoder minimizing the number of inputs to be summed.
8. Obtain the state table and state diagram for the sequential circuit shown in Fig. 1.

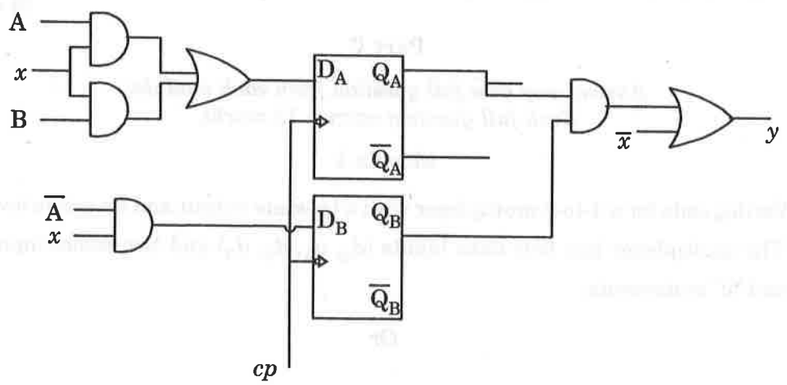


Fig. 1

Turn over

9. Reduce the following state table :—

Present State	*Next State*	
	i/p X = 0	*i/p* X = 1
A	D, 0	C, 1
B	H, 1	A, 1
C	E, 1	D, 1
D	D, 0	C, 1
E	B, 0	G, 1
F	E, 1	D, 1
G	A, 0	F, 1
H	C, 0	A, 1
I	G, 1	E, 1

10. Write the verilog code for the following up-down counter. The counter has a '*u*' input that controls its count direction. If $u = 1$, it counts 010, 011, 101, 011, 111, 001, ... If $u = 0$, it counts this same sequence in the opposite direction.

(5 × 5 = 25 marks)

Part C

Answer any **one** *full question from each module.*
Each full question carries 12 *marks.*

MODULE I

11. Write Verilog code for a 4-to-1 multiplexer with a tri-state output and an active low output Enable input. The multiplexer has four data inputs (d_0, d_1, d_2, d_3) and two select inputs (s_1, s_0,). Use "case" and "if" statements.

Or

12. Write Verilog code for a cascable 4-to-2 priority encoder. Your circuit should have an enable input, four data inputs, an enable output, an interrupt output and two source id outputs. All inputs and outputs must be active high. For cascading purposes and to be able to use wired-OR logic, use tri-state for your id outputs. Adjust the details of your design for a better cascading capability.

MODULE II

13. Mention the advantages and disadvantages of Quine McClusky method for obtaining the prime implicants of a given Boolean function, obtain all the prime implicants of the function $f = \Sigma_m (4, 5, 9, 11, 12, 14, 15, 27, 30) + d (1, 17, 25, 26, 31)$ using Quine-McClusky method.

Or

14. Explain a general structure of PLA. Explain its advantages. Implement $f = \Sigma_m (0, 1, 2, 4, 5)$ using $3 \times 4 \times 2$ PLA. Draw the logic diagram.

MODULE III

15. Design a sequence detector to detect the sequence 101 from 10101. Draw the logic diagram of your circuit.

Or

16. Design a sequential circuit with two D flip-flops A and B, and one input x. When $x = 0$, the state of the circuit remains the same. When $x = 1$, the circuit passes through the state transitions from 00 to 01 to 11 to 10 and back to 00 and repeats. Draw the logic circuit diagram.

MODULE IV

17. Design a synchronous circuit that has a single input variable and single output variable. The input data are received serially. Cause the first output bit to be the same value as the first input bit in the serial string (ie, if $x = 0$, then $z = 0$; if $x = 1$, then $z = 1$). Output z is to change thereafter only when three consecutive input bits have the same value. For example

x = 00100111011000

z = 00000001111110

(a) Construct an ASM diagram describing the system, decide whether a Mealy or Moore machine produces the fewest number of states.

(b) Create a state table, and reduce it.

Or