M 23172

Reg. No. : .....

Name : .....

IV Semester B.Tech. Degree (Reg./Sup./Imp. – Including Part Time) Examination, May 2013
(2007 Admn. Onwards)
PT 2K6/2K6 CE/ME/EE/EC/CS/IT/AEI 401 :
ENGINEERING MATHEMATICS – III

Time: 3 Hours Max. Marks : 100

Instruction : *Answer* ***all*** *questions.*

1. a) If f(z) = u + iv is analytic in a region R, prove that u and v are harmonic in R, if they have continuous partial derivatives in R. **5**

   b) State and prove the necessary condition for a function to be analytic. **5**

   c) If f(z) is analytic in a region R and if C_1 and C_2 are any two paths in R joining two points z_0 and z_1 in R and having no other common points, then show that

   $$\int_{C_1} f(z)\,dz = \int_{C_2} f(z)\,dz .$$ **5**

   d) Explain with examples :

   1) Isolated singularity 2) Removable singularity. **5**

   e) Fit a straight line to the following data by this method of least squares.

x	0	1	2	3	4
y	1	1.8	3.3	4.5	6.3

5

   f) If $\sigma_X \neq 0$, show that $\rho(X, X) = 1$ and $\rho(-X, X) = -1$. **5**

   g) Classify the equation $x^2 \frac{\partial^2 u}{\partial x^2} + (1 - y^2) \frac{\partial^2 u}{\partial y^2} = 0; -\infty < x < \infty$ and $-1 < y < 1$. **5**

   h) Using D'Alembert's method find the deflection of a vibrating string of unit length having fixed ends with initial velocity zero and initial deflection, $f(x) = a(x - x^3)$. **5**

P.T.O.

2. a) i) Constant the analytic function $f(z) = u + iv$, if $u = \frac{1}{2}\log(x^2 + y^2)$ by Milne Thompson method. 8

ii) Find the image of the circle $|z - 2i| = 2$ under the map $w = 2z$. 7

OR

b) i) If $u + iv$ is analytic, prove that $\left[\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right]|f(z)|^2 = 4|f'(z)|^2$. 7

ii) Explain :

i) Translation

ii) Rotation and magnification

iii) Inversion and reflection. 8

3. a) i) State and prove Cauchy's Residue Theorem. 6

ii) Evaluate $\int_C \frac{4 - 3z}{z(z-1)(z+2)} dz$ where C is $|z| = 3/2$ using Cauchy's Residue Theorem. 9

OR

b) i) Find $\int_0^\infty \frac{dx}{(1+x^2)^2}$. 8

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

4. a) i) The following data gives the rainfall and discharge in a certain river. Obtain the line of regression of y on x. 8

Rainfall x (cm)	1.53	1.78	2.60	2.95	3.42
Discharge y (1000 cc)	33.5	36.3	40.0	45.8	53.5

ii) The joint probability distribution of two random variables X and Y is given by $f(x, y) = \frac{3y + x}{24}$, $x = 1, 2$; $y = 1, 2$. Find

a) The marginal distributions

b) Cov(X, Y)

c) $\rho(X, Y)$. 7

OR

b) i) The joint probability distribution of two discrete random variables X and Y is given by $f(x, y) = \begin{cases} kxy ; & x = 1, 2, 3 ; y = 1, 2, 3 \\ 0 ; & \text{otherwise} \end{cases}$. Find

a) k

b) $P[1 \leq X \leq 2, Y \leq 2]$

c) $P[Y < 2]$

d) $P[X = 1]$. **8**

ii) A club basket ball team will play a 44 game season. 26 of these games are against class A teams + 18 are against class B teams. Suppose that the team will win each game against a class A team with probability 0.4 and will win each game against a class B team with probability 0.7. Assume also that the results from the different games are independent. Approximate the probability that

a) The team wins 25 games or more

b) The team wins more games against class A teams than it does against class B teams. **7**

5. a) i) Derive this 1-dimensional heat equation. **5**

ii) A string of length l has its ends fixed. The mid point is taken to a small height h and released from rest at time t = 0. Find the displacement function y(x, t). **10**

OR

b) An infinitely long metal plate of width 1 with insulated surfaces has its temperature zero along both the edges y = 0 and y = 1 at infinity. If the edge x = 0 is kept at fixed temperature. To, find the temperature T at any point (x, y) of the plate in steady state. **15**

M 23191

Reg. No. : .....

Name : .....

IV Semester B.Tech. Degree (Reg./Sup./Imp. – Including Part Time) Examination, May 2013
(2007 Admn. Onwards)
2K6 CS/IT 402 : DATA STRUCTURES AND ALGORITHMS

Time: 3 Hours Max. Marks : 100

Answer **all** questions :

I. a) Illustrate the primitive data types.
b) Write a note on 'big ob' notation.
c) Demonstrate the different operations performed on a stack.
d) Illustrate circular queues.
e) Differentiate the complete binary tree and the strictly binary tree.
f) Define cut.
g) Explain with example the sequential search method.
h) How to resolve collisions in hashing ? **(8×5=40)**

II. a) i) Illustrate in detail arrays ? **8**
ii) Define set. Describe the operations associated with a set. **7**
(8+7=15)

OR

b) i) Explain recursion with example. What are its types ? **8**
ii) Explain the different string manipulation functions. **7**
(8+7=15)

III. a) i) List out the advantages and disadvantages of linked list. **8**
ii) What are the different types of linked list ? **7**
(8+7=15)

OR

b) i) Demonstrate the basic operations performed on linked list. **10**

ii) Bring out the application of linked list. **5**

(10+5=15)

IV. a) Explain the following :

i) BFS **8**

ii) DFS. **7**

(8+7=15)

OR

b) Illustrate with example the following shortest path algorithms :

i) Prim's **8**

ii) Keuskal's. **7**

(8+7=15)

V. a) Define BST. Explain the operations on BST. **15**

OR

b) Explain the sorting techniques :

i) Heap sort **8**

ii) Merge sort. **7**

(8+7=15)

(15×4=60)

M 23192

Reg. No. : .....

Name : .....

IV Semester B.Tech. Degree (Reg./Sup./Imp. – Including Part Time) Examination, May 2013
(2007 Admn. Onwards)
2K6 CS/IT 403 : SYSTEMS PROGRAMMING

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions.*

I. a) Write notes on Pentium Pro Architecture. **(8×5=40)**

b) Write notes on program relocation in machine dependent assembler with an example.

c) Write notes on how to design an absolute loader.

d) Write notes on relocation.

e) Write notes on macro processor algorithm and data structures with suitable examples.

f) Write notes on general purpose macro processors.

g) With the help of a neat diagram, explain the translation and execution process using a P-code compiler.

h) Write notes on multi programmed systems.

II. a) Explain in detail the Simplified Instructional computer, its architecture and working with the help of sample programs. **15**

OR

b) Explain in detail the basic functionalities of an assembler with suitable examples. **15**

P.T.O.

III. a) Explain the machine-independent loader features in detail. **15**

OR

b) Explain in detail the linkage editor and dynamic linking with suitable diagrams. **15**

IV. a) Explain in detail the machine independent macro processor features. **15**

OR

b) Explain in detail the macro processor design options. **15**

V. a) Explain syntactic analysis in detail with suitable example. **15**

OR

b) Explain in detail the different methods for hardware protection. **15**

M 23193

Reg. No. : .....

Name : .....

IV Semester B.Tech. Degree (Reg./Sup./Imp. – Including Part Time) Examination, May 2013
(2007 Admn. Onwards)
2K6 CS/IT 404 : MICROPROCESSORS AND MICROCONTROLLERS

Time: 3 Hours Max. Marks : 100

PART – A

Answer **all** questions :

1. Explain the functions of ALE. MN/$\overline{MX}$, B$\overline{HE}$ and $\overline{DEN}$ signals of 8086 microprocessor. **5**

2. Explain the following instructions of 8086 microprocessor:
   i) AAM
   ii) TEST
   iii) SAHF
   iv) XLAT
   v) RCR. **5**

3. Explain the mode 1 operation of 8255. **5**

4. Discuss the priorities of DMA request inputs of 8257. **5**

5. Explain the physical address formation in real address mode of 80386. **5**

6. Explain the advantage of having separate code and data Cache in Pentium. **5**

7. Explain the use of PWM timer in a microcontroller. **5**

8. What do you mean by H windows ? **5**

P.T.O.

PART – B

9. Write an 8086 assembly language program to sort the given array of numbers in ascending order. The numbers are in the data segment. **15**

OR

10. With the help of a block diagram explain the internal architecture of 8086. **15**

11. With the help of a figure explain how 8259A can be connected in a system containing one master and eight slaves (maximum) to handle upto 64 priority levels and explain how interrupts is serviced in this system. **15**

OR

12. Draw and explain the interfacing of DMA controller 8257 with 8086 so that the channel 0 DMA address register has an I/O address 80 H and mode set register has an address 88 H. Initialize the 8257 with normal priority, TC stop and non-extended write. Auto load is not required. The transfer is to take place using channel 0. Write an assembly language program to move 2 kB of data from a peripheral device to memory address 2000 : 5000 H with the above initialization. **15**

13. Draw and discuss the paging mechanism of 80386 in detail. **15**

OR

14. Draw and discuss the structures of the different descriptors supported by 80386. **15**

15. Draw and discuss the internal architecture of 80196. **15**

OR

16. i) Explain the different addressing mode supported by 80196. **7**

    ii) Draw and explain the minimum system configuration of 80196. **8**

M 23194

Reg. No. : .....

Name : .....

IV Semester B.Tech. Degree (Reg./Sup./Imp. – Including Part Time) Examination, May 2013
(2007 Admn. Onwards)
2K6 CS 405 : COMPUTER ORGANIZATION AND DESIGN

Time : 3 Hours Max. Marks : 100

I. a) Explain with the help of a neat diagram, the five classic components in the organisation of a computer.

b) Explain the CPU performance with the help of an example.

c) Explain with the help of an example, the multiplication procedure.

d) Write short notes on floating point representation.

e) Explain the steps in creating a data path.

f) What is microprogramming ? Give its advantages and disadvantages.

g) Write notes on the following :

i) direct-mapped cache,
ii) tag
iii) valid bit,
iv) cache index and
v) miss penalty.

h) Define bus. Explain the different type of busses. **(8×5=40)**

II. a) Explain with the help of an example how instructions are represented in computer ? **15**

OR

b) Explain in detail about the supporting procedures in computer hardware. **15**

P.T.O.

III. a) Explain in detail the division algorithm and hardware with suitable block diagrams and example. **15**

OR

b) i) Explain the logical operations in 80×86 with suitable examples. **10**

ii) Write notes on signed and unsigned numbers with examples. **5**

IV. a) Explain with the help of a neat diagram and a simple example, an exception occurring due to an arithmetic overflow in an addition instruction. **15**

OR

b) Explain the different R type instructions available. Explain the data path for a 'branch or equal' R-type instruction in detail. **15**

V. a) i) Explain virtual memory in detail. **5**

ii) Explain page faults. **5**

iii) Explain how to make translation fast by using TLB. **5**

OR

b) i) Explain the structure of a memory hierarchy with the help of a diagram. **8**

ii) Explain in detail the interfacing of I/O devices to processor. **7**

M 23195

Reg. No. : .....

Name : .....

IV Semester B.Tech. Degree (Reg./Sup./Imp. – Including Part-Time) Examination, May 2013
(2007 Admn. Onwards)
2K6 CS 406 : ELECTRIC CIRCUITS AND SYSTEMS

Time: 3 Hours Max. Marks: 100

PART – A

All questions **compulsory** : **(8×5)**

1. 1) Define superposition theorem. Explain it with an example. **5**
   2) Explain cut-set with an example. **5**
   3) Obtain the step response of RL series circuit. **5**
   4) Obtain the Laplace transform of $f(t) = 1 - e^{-\alpha t}$, α being a constant. **5**
   5) Explain the working principle of Wien's bridge. **5**
   6) Explain the procedure to obtain admittance parameters of a 2 port network. **5**
   7) Draw the block diagram of an RL circuit. **5**
   8) What are relative and absolute stability. **5**

PART – B

2. a) Apply superposition theorem and find the voltage V_{12} in fig. (i) Q. 2 (a). **15**

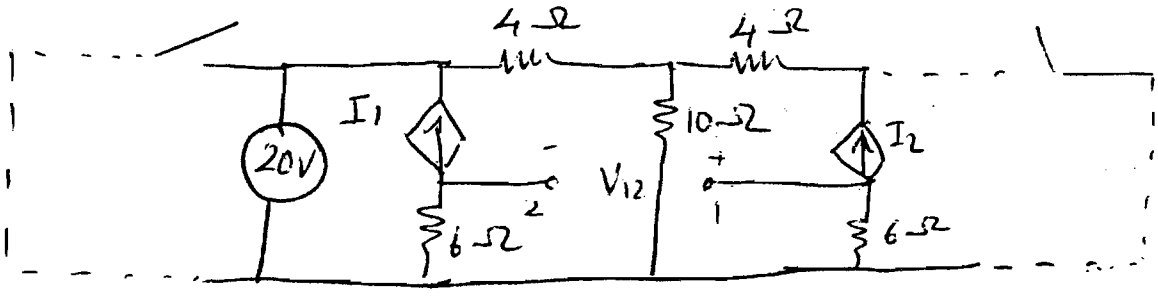

Fig. (i) Q. 2 (a)

OR

b) Draw the graph of the following circuit and write the tie-set matrix Fig. (ii) Q. 2 (b). **5**

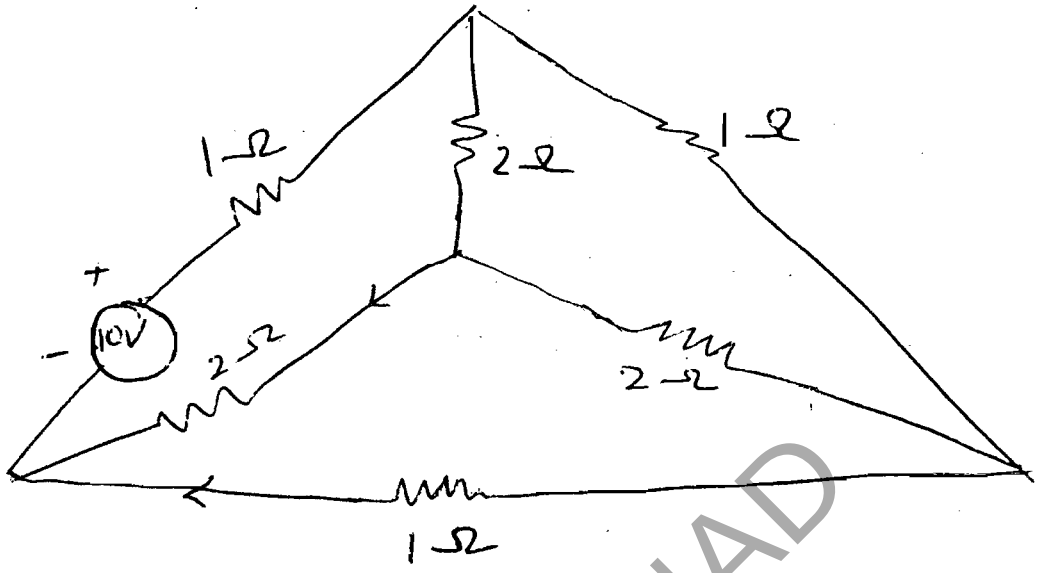

Fig. (ii) Q.2 (b)

c) Find the power dissipated in the 20Ω resistor of the circuit using nodal analysis shown in Fig. (iii) Q. 2 (c). **10**

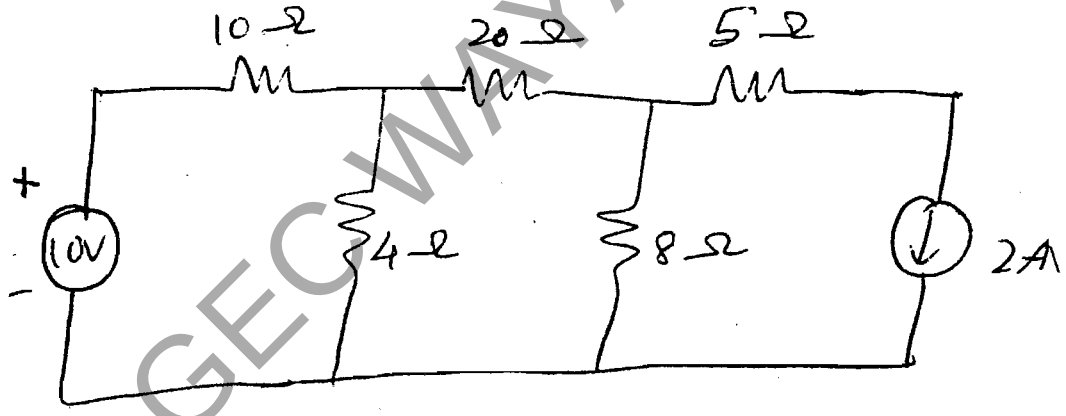

Fig. (iii) Q. 2 (c)

3. a) A series RL circuit with R = 100Ω and L = 1G has a sinusoidal voltage source 200 sin (500t + ϕ) applied at a time when $\phi = 0$. **10**

   i) Find the expression for the current

   ii) At what value of the angle ϕ must the switch be closed so that the current indirectly enters the steady state.

   b) Explain 3 Wattmeter method for 3-phase power measurement. **5**

   OR

   c) Obtain the transient response of an RC circuit. **5**

d) For the circuit shown in Fig. (iv) Q. 3 (d) write the general mesh equations including all initial condition and calculate the voltage across the capacitor. **10**

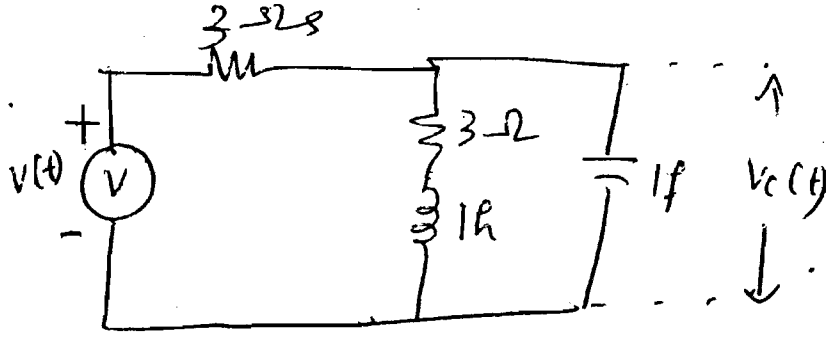

Fig. (iv) Q. 3 (d)

4. a) Write short note on : **10**

i) Scherring bridge

ii) Anderson's bridge.

b) Find the driving point impedance z(s) for the network shown in Fig. (v) Q. 4 (b). **5**

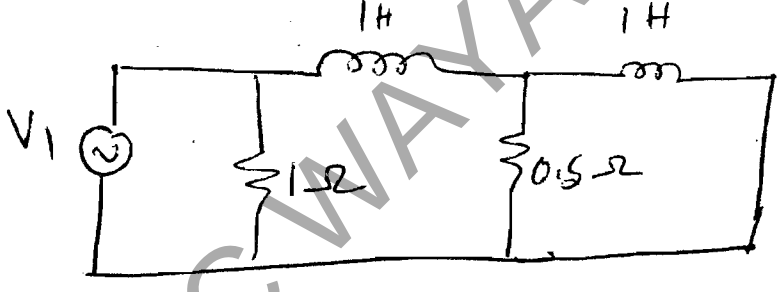

Fig. (v) Q. 4 (b)

OR

c) Write short notes on the principle of working Maxwell's bridge. **5**

d) Find the admittance parameter for the RC ladder network shown in Fig. (vi) Q. 4 (d). **10**

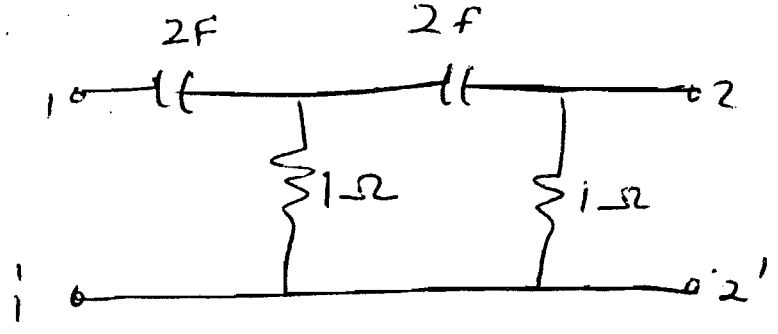

Fig. (vi) Q. 4 (d)

5. a) Draw the Bode plot for the transfer function

$$G(s) = \frac{16(1+0.5s)}{s^2(1+0.125s)(1+0.1s)}$$ **15**

Find :

i) Phase margin

ii) Gain margin

iii) Stability of the system.

OR

b) For the function $f(s) = \frac{(s+1)(s+2)}{(s+3)(s+1+j)(s+1-j)}$. **5**

Find the poles and zeros and also plot pole zero map.

c) Determine the transfer function using block reduction technique. Fig. (vii) Q 5 (c). **10**

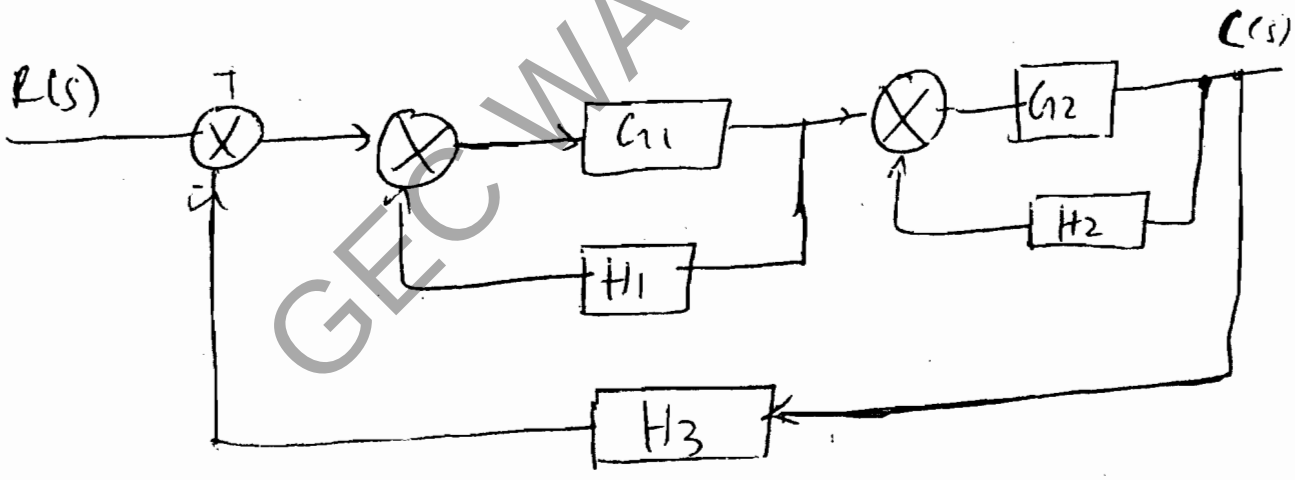

Fig. (vii) Q 5 (c)