



K18F 0381

Reg. No. : .....

Name : .....

Fourth Semester B.Tech. Degree (Suppl. – Including Part Time)

Examination, May 2018

(2007 Admission Onwards)

PT2K6/2K6 CE/ME/EE/EC/CS/IT/AEI 401 : ENGINEERING MATHEMATICS – III

Time : 3 Hours

Max. Marks : 100

*Instruction : Answer all questions.*

PART – A

1. a) Show that the function  $u = 3x^2y - y^3$  is harmonic and find a corresponding analytic function  $f(z) = u(x, y) + iv(x, y)$ .
- b) Find the image of the semi-infinite strip  $x > 0, 0 < y < 2$  under the transformation  $w = iz + 1$ . Show the regions graphically.
- c) Using Cauchy's integral formula, evaluate  $\int_c \frac{\cos \pi z^2}{(z-1)(z-2)} dz$  where  $c: |z| = \frac{3}{2}$ .
- d) Expand  $f(z) = \sin z$  in a Taylor's series about  $z = \frac{\pi}{4}$ .
- e) Show that the correlation coefficient is less than or equal to 1 in magnitude.
- f) Define joint probability mass function on two random variables X and Y.
- g) Find a solution of the Laplace equation  $u_{xx} + u_{yy} = 0$  by the method of separation of variables.
- 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 displacement  $f(x) = a \sin^2(\pi x)$ . (8×5=40)

PART – B

2. a) Find the bilinear transformation which maps the point  $z = -2i, i, \infty$  onto the points  $w = 0, -3, \frac{1}{3}$  respectively. Find the image of  $|z| < 1$ . 15

OR

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- b) 1) Derive the Cauchy-Riemann differential equations of analytic functions. 8  
 2) Show that  $u = xy$  is harmonic and find a corresponding analytic function  $f(z) = u + iv$ . 7

3. a) 1) Evaluate  $\int_0^{2\pi} \frac{1}{(25 + 7 \cos \theta)} d\theta$  using residues. 8

2) Prove that  $\int_0^{\infty} \frac{x^2}{(x^2 + 1)(x^2 + 4)} dx = \frac{\pi}{6}$ . 7

OR

b) 1) Find Laurent's series in the region  $2 < |z| < 3$  if  $f(z) = \frac{z^2 - 1}{(z + 2)(z + 3)}$ . 8

2) State and prove Cauchy's residue theorem. 7

4. a) For the joint probability distribution of two random variables X and Y is given below.

X \ Y	1	2	3	4	Total
1	$\frac{4}{36}$	$\frac{3}{36}$	$\frac{2}{36}$	$\frac{1}{36}$	$\frac{10}{36}$
2	$\frac{1}{36}$	$\frac{3}{36}$	$\frac{3}{36}$	$\frac{2}{36}$	$\frac{9}{36}$
3	$\frac{5}{36}$	$\frac{1}{36}$	$\frac{1}{36}$	$\frac{1}{36}$	$\frac{8}{36}$
4	$\frac{1}{36}$	$\frac{2}{36}$	$\frac{1}{36}$	$\frac{5}{36}$	$\frac{9}{36}$
Total	$\frac{11}{36}$	$\frac{9}{36}$	$\frac{7}{36}$	$\frac{9}{36}$	1

Find :

- 1) Marginal distributions of X and Y.  
 2) Conditional distribution of X given the value of  $Y = 1$  and that of Y given the value of  $X = 2$ .

OR

(7+8=15)



- b) From the following data, find
- 1) The two regression equations
  - 2) The coefficient of correlation between the marks in Economics and Statistics.
  - 3) The most likely marks in Statistics when marks in Economics are 30. 15

Marks in Economics	25	28	35	32	31	36	29	38	34	32
Marks in Statistics	43	46	49	41	36	32	31	30	33	39

5. a) A string of length  $l$  is initially at rest in equilibrium position and each of its points is given the velocity  $\left(\frac{\partial u}{\partial t}\right)_{t=0} = b \sin^3\left(\frac{\pi x}{l}\right)$ . Find the displacement  $y(x, t)$ . 15

OR

- b) 1) Derive one dimensional heat flow equation. 7
- 2) Solve the equation  $\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}$  with boundary conditions  $u(x, 0) = 3 \sin n\pi x$ ,  $u(0, t) = 0, u(1, t) = 0$ , where  $0 < x < 1, t > 0$ . 8
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**Fourth Semester B.Tech. Degree (Suppl.- Including Part Time)**  
**Examination, May 2018**  
**(2007 Admission Onwards)**  
**2K6 CS/IT 402 : DATA STRUCTURES AND ALGORITHMS**

Time : 3 Hours

Max. Marks : 100

**Instructions : Q. I -All 8 questions compulsory. Q. II to Q. V - Answer A or B.**

## PART – A

(8×5=40)

- I. a) What is recursion ? List down the properties of recursive algorithms.
- b) Define a set. What are the different operations on sets ?
- c) Write a note on circular queues.
- d) What are the different types of linked list ?
- e) Explain inorder, preorder and postorder tree traversals with suitable example.
- f) Define graphs and trees. What are their applications ?
- g) Explain selection sort with suitable example.
- h) Compare and contrast sequential search and binary search.

## PART – B

(4×15=60)

- II. A) i) Write a note on 'big O' notation. 8
- ii) What is meant by space complexity of algorithms ? Explain. 7
- OR
- B) i) Write notes on : 8
  - a) Scalar Types
  - b) Enumerated types.
- ii) Write an algorithm to merge two arrays into a single array. 7
- III. A) Write algorithms to insert and delete elements from a singly linked list. 15
- OR
- B) i) Explain the stack implementation using array. Give the PUSH and POP algorithm. 9
- ii) Compare and contrast stack and queue data structures. 6

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- IV. A) i). Explain Breadth First Search algorithm with a suitable example. **8**  
ii) Write short notes on : **7**  
a) Spanning trees      b) Heaps
- OR
- B) i) Write Kruskal's algorithm. How is it different from Prim's algorithm ? **8**  
ii) Explain Priority Queue in detail. **7**
- V. A) Write algorithms for bubble sort and insertion sort. Also illustrate the bubble sort and insertion sort algorithms on input [35, 21, 11, 58, 72, 45]. **15**
- OR
- B) i) Give the algorithm to perform heap sort. **8**  
ii) Draw a binary, search tree for the following input sequence 12, 27, 33, 15, 22, 8, 11. Also write its inorder, preorder and postorder traversals. **7**
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**Fourth Semester B.Tech. Degree (Supple. – Including Part Time)  
Examination, May 2018  
(2007 Admission Onwards)  
2K6 CS/IT 403 : SYSTEMS PROGRAMMING**

Time : 3 Hours

Max. Marks : 100

*Instructions : Q. I – All 8 questions compulsory. Q. II to Q. V – Answer  
A or B.*

**PART – A**

**(8×5=40)**

- I. a) Write notes on SIC machine architecture.
- b) Describe the basic assembler functions.
- c) Write short notes on automatic library search.
- d) Write notes on bootstrap loaders.
- e) Describe the features of MASM macro processor.
- f) Write a note on general purpose macro processors.
- g) Differentiate between Timesharing systems and Real-time systems.
- h) Briefly explain about code generation with suitable example.

**PART – B**

**(4×15=60)**

- II. A) Explain the RISC machine architecture in detail with the help of suitable examples.

15

OR

- B) Explain the machine independent assembler features in detail.

15

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- III. A) Explain the machine independent loader features in detail. 15
- OR
- B) Explain the features of MS-DOS linker in detail. 15
- IV. A) Explain the features of ANSI-C Macro language. 15
- OR
- B) Explain conditional macro expansion and recursive macro expansion in detail. 15
- V. A) Explain the storage structure and storage hierarchy of computer system with suitable diagrams. 15
- OR
- B) Explain in detail the need of hardware protection. Also explain the different methods for hardware protection. 15

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**Fourth Semester B.Tech. Degree (Supple. – Including Part Time)  
Examination, May 2018  
(2007 Admission Onwards)  
2K6 CS/IT 404 : MICROPROCESSORS AND MICROCONTROLLERS**

Time : 3 Hours

Max. Marks : 100

*Instructions : Q. I – All 8 questions compulsory. Q. II to  
Q. V – Answer A or B.*

**PART – A**

- I. a) Discuss the functions of segment registers of 8086 with example. (8×5=40)
- b) Write short notes on assembler.
- c) List out the features of Programmable interrupt controller.
- d) What is 8279 ? Write features of 8279.
- e) Differentiate between real mode and protected mode memory system.
- f) Write a note on Branch prediction logic.
- g) Mention the different data types supported by 80196.
- h) What is an interrupt ? Explain its different types.

**PART – B**

(4×15=60)

- II. A) i) List and explain the addressing modes supported by 8086. 9
  - ii) Write an 8086 Assembly Language Program to find the factorial of given number. 6
- OR
- B) i) With a neat diagram, explain the minimum mode system of 8086 microprocessor. 9
  - ii) Explain the timing diagram of read operation in 8086 microprocessor. 6

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III. A) Explain with neat diagram internal organization of 8255. Also discuss different modes of 8255. 15

OR

B) Explain with the help of a figure, 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

IV. A) Discuss the different descriptors and selectors supported by 80386. 15

OR

B) What are the advantages of memory paging ? Illustrate the concept of paging with neat diagram. 15

V. A) i) Explain in detail about PWM timers. 8

ii) Explain the minimum system configuration of 80196 microcontroller. 7

OR

B) Explain the special modes of operation supported by 80196 microcontroller. 15



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**Fourth Semester B.Tech. Degree (Suppl.- Including Part Time)  
Examination, May 2018  
(2007 Admission Onwards)  
2K6 CS 405 : COMPUTER ORGANIZATION AND DESIGN**

Time : 3 Hours

Max. Marks : 100

**PART – A**

**(8×5=40)**

- I. a) List out the different classes of computer.
- b) With the help of a neat diagram, explain the five classic components in the organization of a computer.
- c) Explain division procedure in a computer system with example.
- d) Write notes on floating point representation.
- e) How exceptions are handled in MIPS architecture ?
- f) Mention the steps in creating a data path.
- g) Define bus. Explain different types of buses.
- h) Explain interfacing of I/O devices in detail.

**PART – B**

**(4×15=60)**

- II. A) Describe in detail, the different types of performances and the different ways for measuring each of them. 15  
OR  
B) Explain in detail the different operations and operands in computer hardware with suitable examples. 15
- III. A) Explain floating point multiplication algorithm and the hardware structure with suitable block diagram and example. 15  
OR  
B) Write notes on :
  - i) Signed and Unsigned numbers with example. 8
  - ii) Addition and subtraction procedure in a system. 7

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- IV. A) Explain the different R type instructions available. Explain the data path in operation for load instruction in detail with example. **15**
- OR
- B) Define exceptions. Explain how to set up a data path to handle exceptions with control using simple example. **15**
- V. A) Explain the following in detail : **15**
- i) Virtual memory.
  - ii) Page fault
  - iii) TLB.
- OR
- B) i) With the help of diagram explain the structure of memory hierarchy. **9**
- ii) What is cache memory ? Explain the advantages. **6**

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Fourth Semester B.Tech. Degree (Supple.–Including Part Time)

Examination, May 2018

(2007 Admission Onwards)

2K6 CS 406 : ELECTRIC CIRCUITS AND SYSTEMS

Time : 3 Hours

Max. Marks : 100

PART – A  
(Answer all questions)

1. State and explain superposition theorem.
2. What is tree incidence matrix ?
3. Explain the concept of time constant. What is the expression for time constant of an RL circuit ?
4. Obtain the Laplace transform of  $f(t) = \sin \omega t$ .
5. Explain the working principle of Schering's bridge.
6. Explain the procedure to determine the admittance parameters of a two port network.
7. Draw the frequency response of a second order system.
8. What are poles and zeros ? Draw the pole zero plot of  $F(s) = \frac{(s+1)(s+2)}{(s-7)(s+5)}$ .

(8×5=40)

## PART – B

9. Find the current in the 1 kΩ load resistor of Fig.1 using Thevenin's theorem. 15

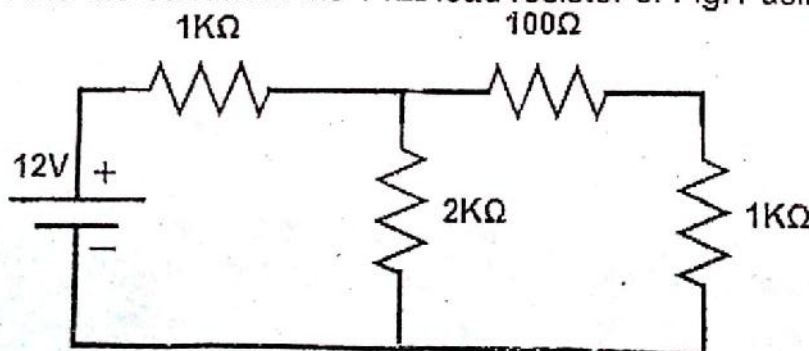


Fig.1

OR

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10. For the network of Fig.2, draw the oriented graph and obtain the tie set matrix. Also obtain the loop equations.

15

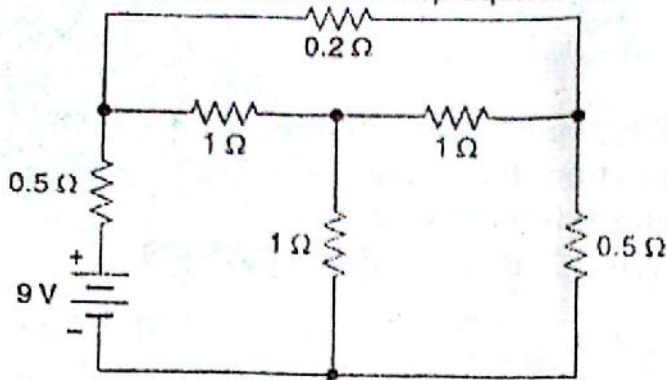


Fig.2

11. a) What is the relationship between phase and line currents of a star-connected system?  
 b) Explain 3 wattmeter method for three phase power measurement.

8

7

OR

12. Obtain the expression for current in an RL circuit when subjected to a sinusoidal voltage when the switch is closed at  $t = 0$ .

15

13. a) Explain in detail the working of Weins bridge. Obtain the balance equations for the bridge.

7

- b) Find the z parameters for circuits of fig.3.

8

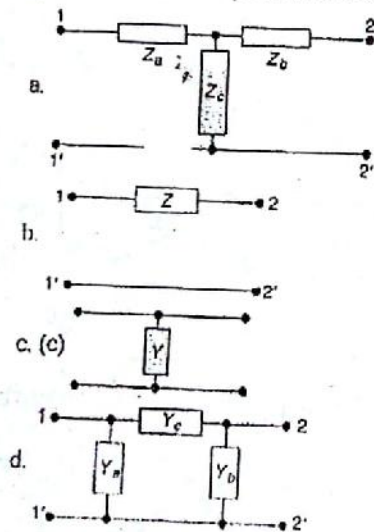


Fig.3

OR

14. Write short notes on a) Andersons bridge b) Maxwells bridge.  
 15. Obtain the time domain specifications of an underdamped second order system.

15

OR

16. Draw the bode plot of the transfer function and obtain the gain and phase margins

15

$$H(s) = \frac{100}{s + 30}$$

15