148

6E6021

Roll No. _____ [Total No. of Pages : 2

6E6021

B.Tech. VI Semester (Main/Back) Examination, April/May - 2017
Computer Sc. & Engg.
6CS1A Computer Networks
CS, IT

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) What is Distance vector Routing? Explain count to Infinity problem and give its solution? **(8)**

   b) Explain Flooding and shortest path routing an describe how and when they are used in link state routing. **(8)**

OR

1. a) What are the basic design issues of a Network layer? Also explain what are the services provided by the network layer to the transport layer? **(8)**

   b) Differentiate between the static and dynamic routing with their pros and cons. Give examples of some routing protocol used in both type of routing. **(8)**

Unit - II

2. a) Explain the concept of fragmentation. Why fragmentation is done and how? **(8)**

   b) What do you understand by layering and protocol? Explain your answer using the Internet architecture. **(8)**

OR

2. a) Define Network address translation. How the outgoing and incoming packets are made to reach to its destination in the presence of a MAT bax? Explain. **(8)**

   b) Explain the difference between IPV4 and IPV6. **(8)**

Unit - III

3. a) Describe why an application developer may choose to run its application over U.D.P rather than TCP and draw the format of UDP header. **(8)**

   b) Write short note on : **(4+4)**

      1) Addressing in Transport layer.

      2) Flow control and Buffering.

OR

3. Explain the working of Go-Back-N protocol and compare it with selective repeat protocol. **(16)**

Unit - IV

4. Explain the TCP connection management. What is the significance of sequence number and acknowledgement number fields of TCP segment. Explain with example. **(16)**

OR

4. a) Explain the concept of Round Trip Time (RTT) and Retransmission Time Out (RTO). **(6)**

   b) Explain working of Transport layer in the Internet. **(6)**

   c) Consider sending a series of packets from sending host to receiving host over a fixed route. Explain delay components encountered in the end to end delay for single packet? **(4)**

Unit - V

5. a) What is Proxy server and how it is related to HTTP. **(6)**

   b) What is URL and what are its components? Explain. **(4)**

   c) In electronic mail, what is MIME? **(6)**

OR

5. a) Compare SMTP with HTTP. **(8)**

   b) What is DNS? Explain how DNS works. **(8)**

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150

6E6022

Roll No. _____ [Total No. of Pages : 3

6E6022

B.Tech. VI Semester (Main&Back) Examination, April/May - 2017
Computer Sc. & Engg.
6CS2A Design and Analysis of Algorithms
CS, IT

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Explain and write an algorithm for greedy method of algorithm design. Given 10 activities along with their start and finish time as **(8)**

$S = \{A_1, A_2, A_3, A_4, A_5, A_6, A_7, A_8, A_9, A_{10}\}$

$S_i = \{1, 2, 3, 4, 7, 8, 9, 9, 11, 12\}$

$F_i = \{3, 5, 4, 7, 10, 9, 11, 13, 12, 14\}$

Compute a schedule where the largest number of activities take place.

b) i) Solve the recurrence **(4×2)**

$T(n) = T(n-1)+T(n-2)+1$, when $T=0$

$T(1) = 1$

ii) if $f(n) = 100*2^n + n^3 + n$ show that $f(n) = O(2^n)$

OR

1. a) Determine the best case complexity of Merge sort algorithm. **(4)**

b) Consider the following function **(4)**

```
int Sequential Search (int A[], int & x, int n)
{
    Int i;
For (int i =0, i < n & & a[i]!=x;i++)
If(i= = n) return i ;
}
```

Determine the average and worst case complexity of the function Sequential Search.

c) Show all the steps of Strassen's matrix multiplication algorithm to multiply the following matrices. **(8)**

$$X = \begin{bmatrix} 3 & 2 \\ 4 & 8 \end{bmatrix} \text{ and } Y = \begin{bmatrix} 1 & 5 \\ 9 & 6 \end{bmatrix}$$

Unit - II

2. a) Discuss Knapsack problem with respect to dynamic programming approach. Find optimal solution for given problem, w(weight set) = {5, 10, 15, 20} and size of knapsack is 8. **(8)**

b) Discuss Dynamic programming solution to Longest common subsequence problem. Write an algorithm to compute an LCS of two given strings. **(8)**

OR

2. a) Write an algorithm for solving n-queen problem. Trace it for N=6 using backtracking approach. **(8)**

b) Describe Travelling salesman problem. Show that a TSp can be solved using backtracking method in the exponential time. **(8)**

Unit - III

3. a) Explain and write Knuth Morris Pratt algorithm for pattern matching and also comment on its running time. **(8)**

b) Let P = rrllrrll be a pattern and T = lrrrlrrlllrrrlrrlrrllrlrrlrrlr be a text in a string matching problem : **(8)**

i) How many shifts (both valid and invalid) will be made by the Naïve string matching algorithm?

ii) Provide the algorithm to compute the transition function for a string matching automation.

iii) Find out the state transition diagram for the automation to accept the pattern P given above.

OR

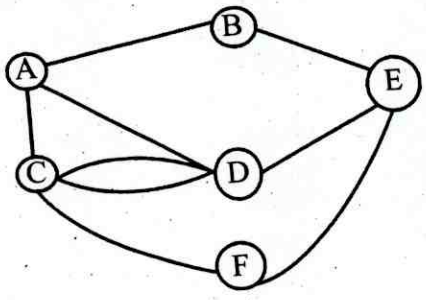
3. a) Discuss Boyer moore pattern matching algorithm with appropriate example of good prefix and bad character. **(8)**

b) State the assignment problem and solve the following assignment problem using branch and bound for which cost matrix is given below. **(8)**

$$\text{Cost} = \begin{matrix} 4 & 7 & 5 \\ 2 & 6 & 1 \\ 3 & 9 & 8 \end{matrix}$$

Unit - IV

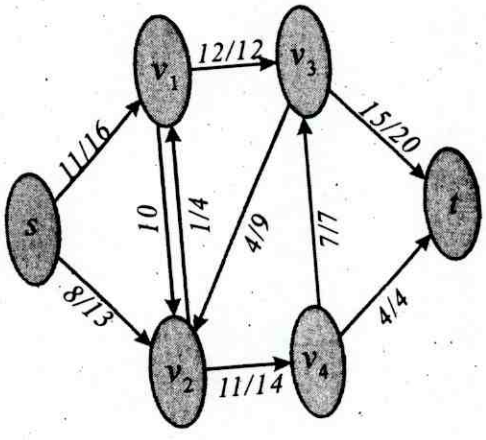
4. a) Give randomized algorithm for min cut of the following graph. **(8)**



b) Write and explain ford Fulkerson algorithm **(8)**

OR

4.



a) Find Maximum flow in above network. **(5)**

b) Find the corresponding minimum cut and check that its capacity is same as that value of maximum flow found in a) part. **(5)**

c) Compare Las vegas and Monte carlo algorithm approaches. **(6)**

Unit - V

5. a) Prove that circuit satisfiability problem belongs to the class NP. **(8)**

b) Assuming 3 CNF satisfiability problem to be NP-complete, prove clique problem is also NP-complete. **(8)**

OR

5. a) Explain approximation algorithm for vertex cover. **(8)**

b) Write short note on : **(8)**

- NP-completeness
- Cook's theorem and its application

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153

6E6023

Roll No. _____ [Total No. of Pages : 4

6E6023

B.Tech. VI Semester (Main &Back) Examination, April/May - 2017
Computer Sc. & Engg.
6CS3A Theory of Computation
CS,IT

Time : 3 Hours

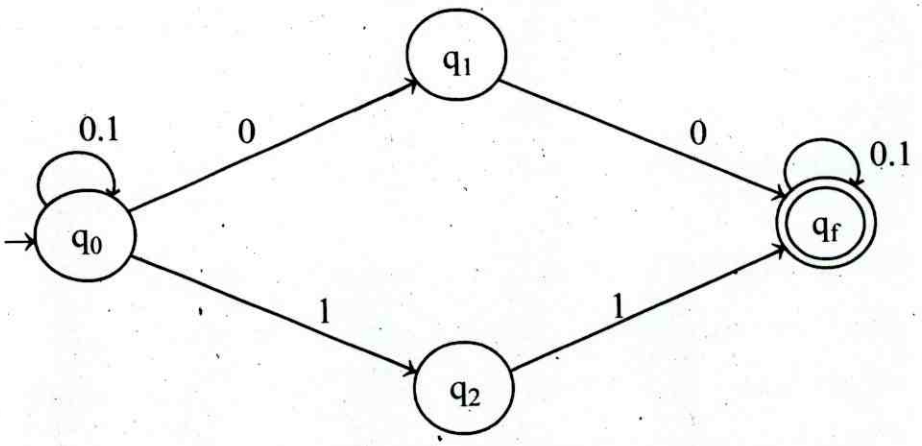
Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit-I

1. a) Differentiate between deterministic and non-deterministic finite automata. convert the following non-deterministic transition system into deterministic system. **(2+8=10)**

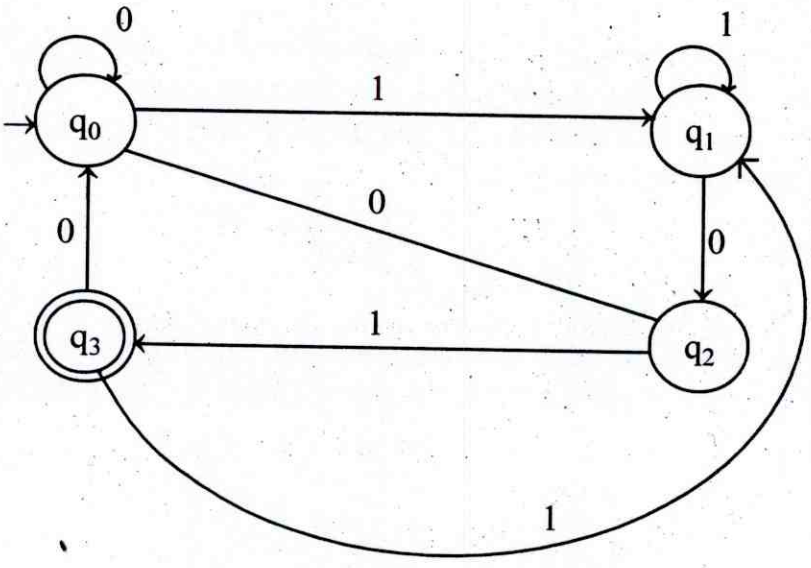


b) Construct a Moore machine equivalent to the Mealy machine M defined by the table given below : **(6)**

Present state	Next state			
	a = 0		a = 1	
	State	Output	State	Output
→ q_1	q_1	1	q_2	0
q_2	q_4	1	q_4	1
q_3	q_2	1	q_3	1
q_4	q_3	0	q_1	1

OR

1. a) Construct a regular expression for the given below deterministic finite automata. **(12)**



b) Convert the following regular expression into an E–NFA **(4)**

R.E. = 00 (0+1)*

Unit-II

2. a) Find a regular expression corresponding to each of the following subset of {0, 1} **(3×4=12)**

i) The language of all strings containing at least two o's

ii) The language of all strings containing at most two o's

iii) The language of all strings ending with 1 and don't contain 00.

iv) The language of all strings in which both the number of o's and number of 1's are odd.

b) Construct a regular grammar for $L = \{a^m b^n | m, n \geq 1\}$ (4)

OR

2. a) Construct a DFA (Deterministic finite Automata) set of all strings over {0, 1} whose length is divisible by 3. (12)

b) Construct a finite automation recognizing L(G), where G is the Grammar. (4)

$S \rightarrow aS|bA$

$A \rightarrow aA|a$

Unit-III

3. a) Construct a push Down Automata (PDA) for language (12)

$L = \{a^n b^{n+m} a^m | n, m \geq o\}$

b) Show that the grammar (4)

$S \rightarrow a|ab\ Sb|aAb$

$A \rightarrow bS|aAAb$ is ambiguous

OR

3. a) Write a short notes on chomsky normal forms. (4)

b) Construct a Grammar in Greiback Normal Form (GNF) equivalent to grammar (12)

$S \rightarrow AB,\ A \rightarrow BS|b\ B \rightarrow SA|a$

Unit-IV

4. a) Given the Grammar $S \rightarrow AB, A \rightarrow a, B \rightarrow C|b, C \rightarrow D, D \rightarrow E, E \rightarrow a$ find an equivalent grammar which is reduced and has no unit production. (10)

b) Consider the following production : (6)

$S \rightarrow aB|bA$

$A \rightarrow aS|bAA|a\ \ B \rightarrow bS|a\ BB|b$

for string aaabbabbba, find left most and right most Derivation Trees.

OR

4. Construct a Turing machine for $L = \{a^n\ b\ c^n | n \geq 1\}$ (16)

Unit-V

5. a) Explain the model of Linear Bounded Automata (LBA). (6)

b) Find a context-free grammar for $L = \{a^n\ b^n\ c^n | n \geq 1\}$ (10)

OR

5. Write short notes on : **(4×4=16)**

a) Recursive and recursively enumerable language

b) Chomsky Hierarchy of languages

c) Variation of Turing machine

d) Properties of context-free language

157

6E6024

Roll No. _____ [Total No. of Pages : 2

6E6024

B.Tech. VI Semester (Main/Back) Examination, April/May - 2017
Computer Sc. & Engg.
6CS4A Computer Graphics and Multimedia Techniques

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit-I

1. a) Explain various application areas of computer graphics. Differentiate beam penetration method of colored CRT with shadow mask method. **(4+4=8)**

   b) What steps are required to plot a line whose slope in between 0° and 45° using Bresenham's method? Indicate the raster locations would be chosen by Bresenham's algorithm when scan converting a line from screen coordinate (20,10) to (30,18). **(4+4=8)**

(OR)

1. a) If a TV screen has 525 scan lines and an aspect ratio of 3:4 and if each pixel contains 12 bits of intensity information, how many bits are required for refresh rate 30 frames per second? **(8)**

   b) Give the advantages and disadvantages of DDA line algorithm. Explain mid point circle algorithm. **(2+6=8)**

Unit-II

2. a) Show rotation of a 2D Box represented by (5,5) to (10,15) with respect to (5,5) by 90° in anticlockwise direction. **(8)**

   b) Explain flood fill algorithm. Differentiate it with Boundary fill algorithm. **(5+3=8)**

(OR)

2. a) Explain Cohen Sutherland line algorithm. **(8)**

b) Show that the composition of two rotations is additive by concatenating the matrix representation for $R(\theta_1)$, and $R(\theta_2)$ to obtain : **(8)**

$R(\theta_1).\ R(\theta_2) = R(\theta_1+\theta_2)$

Unit-III

3. a) Explain the scan line method for displaying the visible surface of a given polyhedron. **(8)**

b) Differentiate B-splines with Bezier curves. Briefly describe B-spline curve. **(3+5=8)**

(OR)

3. a) What is hidden surface problem? Write and explain Z-buffer algorithm for visible surface detection. **(2+6=8)**

b) What is parametric representation of a curve? Explain Bezier curve in detail. **(2+6=8)**

Unit-IV

4. a) Explain following terms : **(3×3=9)**

i) Diffuse reflection

ii) Specular reflection

iii) Illumination model

b) Explain phong shading. Compare it with Gouraud shading. **(4+3=7)**

(OR)

4. a) What is Ray Tracing? Explain Basic ray tracing algorithm. **(2+6=8)**

b) Explain color model RGB. Compare it with HSV. **(5+3=8)**

Unit-V

5. a) Define Animation. Explain principles of animation briefly. **(2+6=8)**

b) What is compression of data? Explain MPEG in detail. **(2+6=8)**

(OR)

5. a) Explain various presentation tools. **(8)**

b) Explain Authority tools with their uses. **(8)**

159

6E6025

Roll No. _____ [Total No. of Pages : 2

6E6025

B.Tech. VI Semester (Main/Back) Examination, April/May-2017
Computer Sc. & Engg.
6CS5A Embedded System Design

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable by assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

Unit-I

1. a) Define embedded systems and also define the components of embedded system hardware. **(8)**

   b) What are the requirements before designing an embedded system? **(8)**

OR

1. a) What is the microcontroller and what is the use of microcontroller? **(8)**

   b) Define an embedded system give specific feature of embedded system. In this context how is microcontroller different from a micro processor. **(8)**

Unit-II

2. a) Explain scheduling of multiple tasking in real time by RTOS and define Interrupt handling. **(8)**

   b) Explain benefits that an interrupt address table has over fixed and vectors interrupt methods. **(8)**

OR

2. a) Explain different types of scheduling models. **(8)**

   b) Explain Round Robin scheduling with suitable example? **(8)**

Unit-III

3. a) Explain the meaning of "No Blocking" and "No RTOS calls without fair warning" for intrrupt Routines in an RTOS Environment with examples. **(8)**

   b) Write short notes on : **(4×2)**

      i) TCB

      ii) Market window

OR

3. Write short note on : **(4×4)**

   a) Fixed block Allocation

   b) Preemptive Scheduling

   c) Mutex

   d) Pipe

Unit-IV

4. Write short note on : **(4×4)**

   a) JTAG

   b) QNX

   c) Windows CE

   d) Locator

OR

4. a) Explain the requirement of RTOS? What are the criteria to achieve it? **(8)**

   b) Explain software Architecture of RTOS kernel. And also define types of RTOS kernel. **(8)**

Unit-V

5. Write short note on : **(4×4)**

   a) CPU performing issue

   b) Data acquisition system

   c) Energy meter

   d) Debugging Techniques

OR

5. a) Explain pros and cos of leaving the debugging software in final embedded system firmware. **(8)**

   b) What is the complex testing in Embedded system? And define the function of ICE. **(8)**

161

6E6095

Roll No. _____ [Total No. of Pages : 3

6E6095

B.Tech. VI Semester (Main & Back) Examination, April/May-2017
Information Technology
6IT5A Information Theory and Coding

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable by assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

Unit-I

1. a) State and prove Shannon-Hartley theorem. How it can give trade off between bandwidth and channel capacity? What is the maximum value of channel capacity? **(8)**

b) A discrete source emits one of 5 symbols once every millisecond. The symbol probabilities are $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{16}$ respectively. Calculate H,R. **(8)**

(OR)

1. a) Define entropy. Under what condition the maximum entropy is achieved? Obtain the value of maximum entropy for a binary system. **(8)**

b) Verify the following equation : **(8)**

i) $H(x, y) = H(x/y) + H(y)$

ii) $H(x,y) = H(x) + H(y)$

Unit-II

2. a) Write short notes on :

i) Types of errors encountered in communication systems. **(4)**

ii) Error control coding used for controlling errors. **(4)**

b) Determine the Hempel ziv code for the following bit stream : **(8)**

0100111110010100000101010110011000000

Recover the original sequence from the encoded stream.

(OR)

2. a) The following set of messages with their probabilities are given below : **(8)**

$x = \{x_1, x_2, x_3, x_4,\}$

$$P\left\{\frac{1}{2}\frac{1}{4}\frac{1}{8}\frac{1}{8}\right\}$$

Find average code word length of a suitable binary code to above message.

b) State channel coding theorem. What is the fundamental limit on the rate at which reliable transmission can take place? **(8)**

Unit-III

3. a) What is linear block code, error correcting code, systematic linear block code? **(4)**

b) For an (n, k) block code with k=8, find the value of n and hence calculate the error correcting capability of this code? **(8)**

c) For block code (n, k), define rate of code or rate efficiency? **(4)**

(OR)

3. a) Explain the relation between generator matrix and parity check matrix H? **(8)**

b) Explain matrix description of cyclic codes? **(8)**

Unit-IV

4. a) A three-error correcting (23, 12) golay code is a cyclic code with a generator polynomial $g(x) = x^{11} + x^9 + x^7 + x^6 + x^5 + x + 1$ Determine the code words for the data vectors. **(8)**

000011110000, 101010101010, 11000101011110

b) Draw a block diagram of an encoder and syndrome calculator for the code $g(x) = 1 + x + x^2$ verify the operation using message vector (1010). **(8)**

(OR)

4. a) Specify the properties of $g(x)$, a generator polynomial for cyclic codes? **(8)**

b) Describe encoding and decoding steps of BCH codes? **(8)**

Unit-V

5. a) Draw the tree diagram for a suitable convolutional coder. Assume 5 bit message input. How it can be used for decoding the message? **(5)**

   b) Define burst error. Why does it occur and how it is different from random errors. **(5)**

   c) Compare the three ARQ schemes? **(6)**

(OR)

5. a) What is transfer function? Explain its role in convolutional codes? **(8)**

   b) Write short notes on the following : **(4×2=8)**

   i) Catastrophic code

   ii) Viterbi algorithm

6E6026

Roll No. _____ [Total No. of Pages : 2

6E6026

B.Tech. VI Semester (Main&Back) Examination, April/May - 2017
Computer Sc. & Engg.
6CS6.1A Advance Topics in Operating Systems
CS, IT

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. i) What are the functions of operating systems? **(4)**

   ii) What are the designing issues related to message passing system? **(4)**

   iii) What is a thread library? Explain various types of thread library. **(8)**

(OR)

1. i) What is operating system? Compare the features of monolithic, layered structure, microkernel & Exokernel? **(8)**

   ii) Short note on following : **(2×4=8)**

   a) Threading issue b) Mail box

   c) RMI d) System calls

Unit - II

2. i) How can a virtual file system layer allow multiple file system support? **(4)**

   ii) Explain the Directory implementation. **(4)**

   iii) Compare RAIO 0, RAIO 1 & RAIO 5 in terms of performance improvement, ability to with stand failure & space overload require to implement the particular RAIO layer. **(8)**

(OR)

2. i) What are the general goals of system security? **(4)**

ii) What is disk buffering? How can improve performance using buffering? Explain. **(4)**

iii) Explain the following : **(2×4=8)**

a) File allocation methods b) User Authentication

Unit - III

3. i) What do you mean by shell? Explain different types of shell in linux. **(8)**

ii) Explain the kernel modules in linux & their management process? **(8)**

(OR)

3. i) Explain the kernel structure of linux. **(8)**

ii) What do you mean by network file system? How passing of data between processes using NFS? **(4)**

iii) Describe the process management in linux. **(4)**

Unit - IV

4. i) Explain the different design principals in windows O.S. **(8)**

ii) Explain the following : **(2×4=8)**

a) Environmental Subsystem b) Memory Management

(OR)

4. i) What are process? Explain the process scheduling & Process synchronization. How we can provide security in it? **(8)**

ii) Explain the following : **(2×4=8)**

a) POSIX subsystem b) FAT & NTFS

Unit - V

5. i) What do you mean by multiprocessor systems? Explain the different architectures of multiprocessor system in brief. **(8)**

ii) Explain the following : **(2×4=8)**

a) Process synchronization b) Multimedia DS

(OR)

5. i) Explain the kernel structure of multiprocessor systems. **(4)**

ii) Explain the different audio & video file formats. **(4)**

iii) Write short notes on : **(2×4=8)**

a) Palm OS b) Symbian OS

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186

6E6094

Roll No. _____ [Total No. of Pages : 2

6E6094

B.Tech. VI Semester (Back) Examination, April/May - 2017
Computer Sc. & Engg.
6CS4(O) Programming in Java
(Common with IT(Main))

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit-I

1. a) Explain primitive data types supported by Java. **(8)**

   b) How can you implement one dimensional arrays, multidimensional arrays in Java. Also give examples. **(4+4=8)**

(OR)

1. a) Explain how to declare variables in Java? Explain dynamic initialization, scope and lifetime of variables. **(2+2+2+2=8)**

   b) Explain the working of Java virtual machine in detail. **(8)**

Unit-II

2. a) Describe the following selection statements in Java (using examples) **(2×4=8)**

      i) Break

      ii) Continue

   b) Explain constructors in Java with examples. **(8)**

(OR)

2. a) Explain about explicitly garbage collectors and finalize ( ) method with an example. **(4+4=8)**

   b) Describe how access control implemented in Java. **(8)**

Unit-III

3. a) How do you add a class or an interface to a package? Explain with examples. **(8)**

   b) Write all similarities and differences between interfaces and class with examples. **(4+4=8)**

(OR)

3. a) What is a string buffer? Give three ways of creating a string object. **(4+4=8)**

   b) Describe the various levels of access protection available in packages and their implications with an example program. **(4+4=8)**

Unit-IV

4. a) Explain how exception handling mechanism can be used for debugging a program. **(8)**

   b) i) Is it possible to have multiple catch blocks? Give example? **(4+4=8)**

   ii) Is it possible to have nested try statement? Give example.

(OR)

4. a) Explain how files can be read and write in Java with example. **(8)**

   b) How are the various stream classes classified in Java? **(8)**

Unit-V

5. a) What are the difference between threads and process? How can extend the thread class? Explain with example (code)? **(4+4=8)**

   b) Explain the structure of applet with the help of example. **(8)**

(OR)

5. a) How an applet differ from application program **(8)**

   b) Briefly explain : **(4+4=8)**

   i) Thread synchronization

   ii) Thread execution