

**VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA**  
**Mid Semester Examination November - 2019**

COURSE NAME: B. tech

SEMESTER: 5<sup>th</sup>

BRANCH NAME: Computer Science & Engg

SUBJECT NAME: Operating System

FULL MARKS: 20

TIME: 2 Hours

Answer All Questions.

The figures in the right hand margin indicate Marks. *Symbols carry usual meaning.*

- Q1. Answer all Questions. [1 × 5]
- a) What are the operating system services? - CO1
  - b) Write the utility of PCB. - CO2
  - c) Is it possible to have deadlock involving only two processes? Justify your answer. - CO3
  - d) State the differences between process and thread. - CO2
  - e) Differentiate between multiprogramming and multitasking operating systems - CO1

- Q2. [5]
- a) Write down the main services of an operating system? state the essential properties of the following types of operating Systems: - CO1
- i. Batch
  - ii. Time Sharing
  - iii. Real Time
  - iv. Distributed

OR

- b) What is a process? Explain state process transition with neat diagram? - CO1

- Q3. [5]
- a) Explain different CPU scheduling Algorithms. Consider the following set of jobs: - CO2

Job	Arrival Time	Burst time (msec)	Priority
1	0	15	2
2	2	3	1
3	5	5	5
4	6	8	4
5	7	12	3

Assume that jobs have arrived in ready queue in the order 1, 2, 3, 4 and 5. Draw gantt chart and calculate average Turnaround Time and Waiting Time Using SRTF and Priority algorithms.

OR

- b) What is IPC? Describe different models of IPC. - CO2

Q4.

- a) What is critical section problem? Discuss the Peterson's solution to critical section problem.

[5]

- CO3

OR

- b) Consider the following snapshot of a system:

- CO3

	Allocation			max			Available		
	A	B	C	A	B	C	A	B	C
P0	0	1	0	7	5	3	3	3	2
P1	2	0	0	3	2	2			
P2	3	0	2	9	0	2			
P3	2	1	1	2	2	2			
P4	0	0	2	4	3	3			

Answer the following questions using the Banker's algorithm:

- What is the content of the matrix need?
- Is the system in a safe state?
- If a request from process P1 arrives for (1, 0, 2), can the request be granted immediately?
- If a request from process P0 arrives for (3, 3, 0), can the request be granted immediately?



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Mid Semester Examination – 2019

Semester – 5<sup>th</sup>

Time – 2 Hours

Branch – CSE

Full Mark – 20

Subject: Graph Theory

Question no. 1 is compulsory. Answer any three questions from rest.

Q.1. Answer the following questions

[1 x 5 = 5]

- Define Pendant vertex, Isolated Vertex.
- An undirected complete graph has 8 vertices what is the total no of edge possible.
- Write two conditions for isomorphic graph.
- Define walk, Path, Trail, Circuit.
- A Bipartite graph has 6 vertices what is the total no of edge possible.

Q.2. a)

- Prove that in a tree there is at least 2 pendant vertex.
- Prove that a graph is a tree if it is minimally connected.

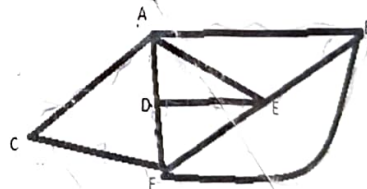
[2.5]

[2.5]

OR

b)

- Draw a Walk of Length 6
- Is there a Euler Graph? Give Reason
- Is there a Hamiltonian Path in the graph? Give Reason
- Find atleast 2 Complete Subgraph.
- Identify 2 spanning tree of the graph

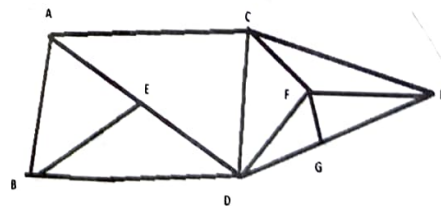


Q.3. a)

- Suppose a graph G is 2-connected prove that for all pair of vertex G has internally disjoint Path [2.5]

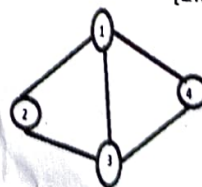
- Find the eccentricity, Radius, diameter of the given graph. [2.5]

OR



- Explain 2-connected graph with example and Illustrate Whitney's theorem.
- Find the number of Spanning Tree of the given graph with the help of Kirchhoff's Matrix Tree Theorem. Explain the steps. [2.5]

[2.5]



- Prove that number of vertices with odd degree in a graph is always even. Define Dirac's theorem. [2.5]
- Explain Ramsey's Theorem and Mengers' Theorem (Proof not needed) [2.5]

OR

- Explain Cut vertex, Cut Edge, and Prove Whitney's Inequality Theorem with example. [2.5]
- G is a Graph with 11 edges and minimum degree is 3. What is the maximum no. of vertices? [2.5]

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**Mid Semester Examination November - 2019**

**COURSE NAME:** B. Tech

**SEMESTER:** 5<sup>th</sup>

**BRANCH NAME:** Computer Science & Engineering / Information Technology

**SUBJECT NAME:** Cryptography and Network Security

**FULL MARKS:** 20

**TIME:** 2 Hours

Answer All Questions.

The figures in the right hand margin indicate Marks. *Symbols carry usual meaning.*

Q1. Answer all Questions. [1 × 5]

- a) Differentiate security services and security mechanism. Give two examples of each. - CO1
- b) List the security attacks that can threaten the three goals of security. Categorize the listed attacks into passive or active attack. - CO1
- c) Encrypt the message "This is an exercise" using the following cipher. Ignore the spaces between the words - CO2
  - i. Additive cipher with key=20
  - ii. Affine cipher with key = (15, 20)
- d) Distinguish between a substitution cipher and a transposition cipher. - CO2
- e) Explain the advantages of symmetric key cryptography over asymmetric key cryptography and vice-versa. - CO3

Q2. [5]

- a) i. Describe the key principles of Security. [2.5] - CO1
- ii. What do you mean by cryptanalysis? List four kinds of cryptanalysis attacks. [2.5]

OR

- b) Alice often need to encipher plaintext made of both letters (a to z) and digits (0 to 9). - CO1  
Consider the upper case and lowercase alphabets are same.
  - i. If she uses an additive cipher, what is the key domain? What is the modulus? [1]
  - ii. If she uses a multiplication cipher, what is the key domain? What is the modulus? [2]
  - iii. If she uses an affine cipher, what is the key domain? What is the modulus? [2]

Q3. [5]

- a) i. Use a Hill cipher to encipher the message "we live in an insecure world". - CO2  
Use the key  $K = \begin{bmatrix} 03 & 02 \\ 05 & 07 \end{bmatrix}$ . [2.5]
- ii. Use the Vigenere cipher with keyword "HEALTH" to encipher the message "Life is full of surprise". [2.5]

OR



- b) i. Generate elements of the field  $\text{GF}(2^4)$  using the irreducible polynomial  $f(x) = x^4 + x^3 + 1$ . [2.5] - CO2
- ii. In  $\text{GF}(2^4)$ , find the inverse of  $(x^2 + 1)$  modulo  $(x^4 + x^3 + 1)$  using extended Euclidean algorithm. [2.5]

Q4.

[5]

- a) Describe the process of round key generation in DES with a neat diagram. Compare the substitution in DES and AES. Why do we have only one substitution table (S-Box) in AES, but several in DES. - CO3

OR

- b) Write the encryption and decryption process of AES with neat diagram. - CO3

**VEFR SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA**  
**Mid Semester Examination November - 2019**

COURSE NAME: B.Tech

SEMESTER: 5th

BRANCH NAME: Computer Science and Engineering

SUBJECT NAME: Microprocessor and Microcontroller

FULL MARKS: 20

TIME: 2 Hours

Answer All Questions.

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Q1. Answer all Questions.

[1 × 5]

- a) Justify with the block diagram that how a microprocessor is different from a microcontroller. - CO1
- b) Draw the programming model of 8085 microprocessor. - CO1
- c) Mention all the interrupt pins present in the 8085 microprocessor. - CO1
- d) Explain the concept of segmentation used in 8086 microprocessor. - CO2
- e) Explain the concept of memory bank used in 8086 microprocessor. - CO2

Q2.

[5]

- a) An instruction MOV C, A (Hex code 4FH) is stored at a memory location 2050H. Explain various steps involved in different clock cycle when the 8085 microprocessor fetches the instruction from 2050H. Draw the timing diagram for the above opcode fetch machine cycle. - CO1
- OR
- b) Assume that data-1 is stored at the address 2000H and data-2 is stored at the address 2001H in the physical memory. Write an assembly language program to multiply these two data present at their respective locations. Explain the use of flag register while a 8085 microprocessor performs any arithmetic operation. - CO1

Q3.

[5]

- a) If each chip contains 256 registers then How many chips can be accommodated in a 8085 microprocessor? Find the minimum and maximum addresses for the chip-0. If in the next chip-1, A<sub>15</sub> bit is altered, then find the minimum and maximum addresses for the chip-1. - CO1
- OR
- b) If 2K×8 ROM and 1K×8 RAM are interfaced with 8085 microprocessor through a 74LS73 latch and A<sub>15</sub> is used as chip select, then find the maximum and minimum addresses of both the RAM and ROM. - CO1

Q4.

[5]

- a) Draw the pin diagram of 8086 microprocessor and list out various pins being involved when the 8086 microprocessor is operated in the min mode? - CO2
- OR
- b) Draw the timing diagram of the read cycle of 8086 micro processor in the min mode and explain various operations being performed at different clock cycle. - CO2