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**Sixth Semester B.E. Degree Examination, Aug./Sept. 2020**  
**UNIX System Programming**

Time: 3 hrs.

Max. Marks: 100

**Note:** Answer any FIVE full questions, selecting at least TWO questions from each part.

**PART – A**

1.
  - a. What are the major differences between ANSI C and K and R'C'? Explain each with example. (08 Marks)
  - b. Write a C/C++ program to check the POSIX defined system configuration limits.
    - i) Maximum number of characters allowed in a filename
    - ii) Maximum number of links a file may have
    - iii) Maximum capacity in bytes of a terminal's input queue. (03 Marks)
  - c. Describe the characteristics of FIPS standard. (05 Marks)
  - d. Explain the meaning of the following error status codes :
    - i) EACCESS
    - ii) EAGAIN
    - iii) EINTR
    - iv) EPERM (04 Marks)
  
2.
  - a. Explain directory file APIs with their prototypes. Write the snippet of code to show that the function is portable to the BSD Unix and to other versions of Unix for directory browsing. (05 Marks)
  - b. What are inodes? Differentiate between hard link and symbolic link. (06 Marks)
  - c. Explain a neat diagram the UNIX kernel support for files. (06 Marks)
  - d. Explain the following APIs with their prototype definitions and return values.
    - i) stat    ii) chown    iii) lseek (03 Marks)
  
3.
  - a. Write a C/C++ program to emulate the UNIX mv-command. (06 Marks)
  - b. Explain the significance of locking files? What are mandatory and advisory locks? Why is advisory lock considered to be safe? Explain at least one drawback of each of these locks. (10 Marks)
  - c. Explain the following flags of fcntl API.
    - i) F\_GETFL    ii) F\_SETFL    iii) F\_SETFD    iv) F\_DUPFD. (04 Marks)
  
4.
  - a. Write a C/C++ program to demonstrate the usage of at\_exit function. (05 Marks)
  - b. Explain the functions useful in handling the error and interrupts encountered in a low-level subroutine of a program in UNIX. (04 Marks)
  - c. Explain with a neat diagram the memory layout of a C – program. (06 Marks)
  - d. Explain with a neat block diagram the various ways a normal C-program can terminate. (05 Marks)

**PART – B**

5.
  - a. Explain fork API with an example. (06 Marks)
  - b. What is a controlling terminal? Explain its characteristics and relation to session and process groups. (10 Marks)
  - c. Explain system function with its prototype and example. (04 Marks)

- 6 a. What is signal mask? Explain with its prototype and example. (05 Marks)  
b. What are Daemon processes? List their characteristics and rules to code daemon. (08 Marks)  
c. Explain the meaning of the following signals:  
i) SIGALRM ii) SIGCHLD iii) SIGINT. (03 Marks)  
d. Explain the alarm function with its prototype. (04 Marks)
- 7 a. What are pipes? Write a C/C++ program to create a pipe from the parent to the child and send the data down the pipe. (07 Marks)  
b. What are message queues? Write the structure of the message queue and explain each member of the structure. (08 Marks)  
c. Explain kernel support for semaphores. (05 Marks)
- 8 Write short notes on the following :  
a. Stream pipes  
b. Client – Server properties  
c. FIFOs in IPC  
d. Race conditions. (20 Marks)

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**Sixth Semester B.E. Degree Examination, Aug./Sept.2020**  
**Compiler Design**

Time: 3 hrs.

Max. Marks:100

**Note:** Answer any FIVE full questions, selecting atleast TWO questions from each part.

**PART – A**

- 1
  - a. Explain with a neat diagram the various phases of a compiler. Mention the input and output at each phase. (08 Marks)
  - b. What are the applications of compiler technology? Explain any one application in detail. (07 Marks)
  - c. Construct the transition diagram to recognize  
(i) Relational operator in 'C' (ii) White space (iii) Keyword. (05 Marks)
- 2
  - a. With an example explain why left recursive grammar is not suitable for Top down parsing. (05 Marks)
  - b. Define FIRST and FOLLOW rules used in predictive parsing technique. (06 Marks)
  - c. Give the grammar  

$$S \rightarrow aB \mid aC \mid Sd \mid Se$$

$$B \rightarrow bBc \mid f$$

$$c \rightarrow g$$
 (i) Do the necessary changes to make it suitable for LL(1) parsing  
 (ii) Build the LL(1) parsing table. (09 Marks)
- 3
  - a. What is meant by handle pruning? Explain with the help of the grammar  

$$S \rightarrow SS+ \mid SS* \mid a$$
 and input string  $aaa^* a^{++}$ . (06 Marks)
  - b. Construct the LR(0) items for the following grammar  

$$S \rightarrow Ac$$

$$A \rightarrow AB \mid E$$

$$B \rightarrow aB \mid b$$
 Write an algorithm for constructing SLR parsing table and build the parsing table for the above grammar. (14 Marks)
- 4
  - a. Given the grammar  

$$S \rightarrow L = R \mid R$$

$$L \rightarrow *R \mid id$$

$$R \rightarrow L$$
 Find the canonical LR(1) items. (10 Marks)
  - b. Check whether the following grammar is LALR(1) or not. (10 Marks)

**PART – B**

- 5
  - a. Write a SDD for a simple desk calculator and show the annotated parse tree for  
 $1 * 2 * 3 * (4 + 5)$  (08 Marks)
  - b. Give the L attributed definition for constructing the syntax tree during topdown parsing. Also show the dependency graph for  $a - 4 + c$ . (08 Marks)
  - c. Give the SDD for simple type declaration. (04 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

- 6 a. Construct the DAG and identify the value number for the subexpression  $a + b + (a + b)$  (08 Marks)
- b. Translate the arithmetic expression  $a = b * - c + b * - c$  into  
(i) Syntax tree (ii) Quadruples (iii) Triples (iv) Indirect triples. (08 Marks)
- c. Write a note on type checking. (04 Marks)
- 7 a. What is an activation record? Explain the purpose of each item in the activation record with example. Give the general structure of the activation record. (07 Marks)
- b. What do you mean by calling sequence? Explain the actions performed during function call and return. (07 Marks)
- c. Briefly explain time safety and performance metrics to be considered while designing a garbage collector. (06 Marks)
- 8 a. With an example explain common sub expression and deadcode elimination methods. (10 Marks)
- b. What are the basic blocks and how do you partition a three address code into basic block. (05 Marks)
- c. Explain the code generator algorithm. (05 Marks)

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**Sixth Semester B.E. Degree Examination, Aug./Sept. 2020**  
**Computer Network – II**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting at least TWO questions from each part.****PART – A**

- 1 a. Differentiate connection oriented and connectionless services. (05 Marks)  
 b. Consider the network in Fig Q1(b). Use Dijkstras algorithm to find shortest path.

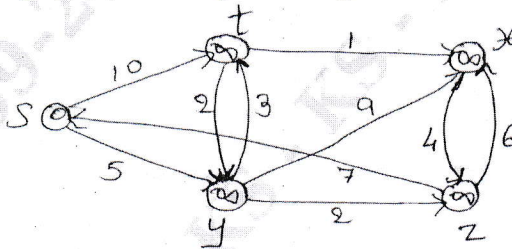


Fig Q1(b)

- c. Explain briefly the structure of generic packet switch with the help of diagram. (08 Marks)
- 2 a. Describe briefly the Random early detection. (05 Marks)  
 b. Explain Traffic management at flow aggregate level. (10 Marks)  
 c. Discuss FIFO and priority queue scheduling for managing traffic at packet level. (05 Marks)
- 3 a. Explain IPV4 Header in detail with neat diagram. (10 Marks)  
 b. Discuss the migration issues from IPV<sub>4</sub> to IPV<sub>6</sub>. (10 Marks)
- 4 a. Describe in detail the 3-way handshake for establishing a TCP connection. (06 Marks)  
 b. Discuss the Header fields of OSPF operation. (06 Marks)  
 c. Write a note on : i) DHCP ii) Mobile IP. (08 Marks)

**PART – B**

- 5 a. What do you mean by remote login and also Secure Shell (SSH) protocol? (06 Marks)  
 b. What is SNMP? List the PDU of SNMPV<sub>2</sub>? Explain SNMP PDU format. (08 Marks)  
 c. Apply RSA and do the following : (06 Marks)  
 i) Encrypt  $a = 3, b = 11, x = 3$  and  $m = 9$ .  
 ii) Find corresponding  $y$   
 iii) Decrypt the cipher text.
- 6 a. List the benefits of creating VPNs, explain VPN types. (10 Marks)  
 b. What is an MPLS network? Explain with diagram how the packets are forwarded using MPLS? (10 Marks)
- 7 a. Briefly explain various compression methods without loss. (12 Marks)  
 b. List and explain different servers of SIP. (08 Marks)
- 8 a. List the security issues in adhoc network. Explain types of attacks. (10 Marks)  
 b. Write note on : i) Zigbee Technology ii) Intra cluster routing protocols in WSN. (10 Marks)

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**Sixth Semester B.E. Degree Examination, Aug./Sept.2020**  
**Operations Research**

Time: 3 hrs.

Max. Marks:100

**Note:** Answer any FIVE full questions, selecting atleast TWO questions from each part.

**PART - A**

- 1 a. Explain six phases of Operation Research Study. (06 Marks)  
b. The Sigmaware manufacture company has discontinued the production of a certain unprofitable product which has created considerable excess production capacity. Management is considered devoting this excess capacity to one or more of 3 products. The available capacity on the machine is given below :

Machine Type	Milling machine	Lathe machine	Grinder
Available Time	400 hrs	300 hrs	150 hrs

The number of machine hours required for each unit of the respective product.

Machine Type	Product 1	Product 2	Product 3
Milling machine	9	4	6
Lathe	5	3	0
Grinder	4	0	1

The sales department indicates the sales potential for product 3 exceeds 20units/week. The unit profit will be \$15, \$20, \$25 respectively. The objective is to determine how much of each product the company should produce to maximize the profit. Formulate the LPP.

(07 Marks)

- c. Use Graphical method to solve the problem

$$\text{Maximize } Z = 2x_1 + x_2$$

$$\text{Subject to } x_2 \leq 10$$

$$2x_1 + 5x_2 \leq 60$$

$$x_1 + x_2 \leq 18.$$

(07 Marks)

- 2 a. Define Slack variable and Surplus variable. (04 Marks)

- b. Solve the following LPP by Simplex method.

$$\text{Maximize } Z = 5x_1 + 4x_2$$

$$\text{Subject to } 3x_1 + 5x_2 \leq 18$$

$$5x_1 + 2x_2 \leq 12$$

$$\text{where } x_1, x_2 \geq 0.$$

(10 Marks)

- c. Explain the concept of Tie – breaking in Simple method. (06 Marks)

- 3 a. Solve the following LPP by Big – M method.

$$\text{Maximize } Z = 3x - y$$

$$\text{Subject to } 2x + y \geq 2$$

$$x + 3y \leq 3$$

$$y \leq 4, x, y \geq 0.$$

(10 Marks)

- b. Solve the following LPP by Two – Phase method

$$\text{Maximize } Z = 15/2x - 3y$$

$$\text{Subject to } 3x - y - z \geq 3$$

$$x - y + z \geq 2$$

$$\text{where } x, y \geq 0.$$

(10 Marks)

- 4 a. Solve the following LPP by revised simplex method  
 Maximize  $Z = 2x_1 + x_2$   
 Subject to  $3x_1 + 4x_2 \leq 6$   
 $6x_1 + x_2 \leq 3$   
 where  $x_1, x_2 \geq 0$ . (12 Marks)
- b. Explain the following : (08 Marks)
- i) The essence of Duality theory      ii) Primal dual relationship.

**PART - B**

- 5 a. Use Dual Simple method to solve LPP.  
 Minimize  $Z = 2x_1 + x_2$   
 Subject to  $3x_1 + x_2 \geq 3$   
 $4x_1 + 3x_2 \geq 6$   
 $x_1 + 2x_2 \geq 3, x_1, x_2 \geq 0$ . (10 Marks)
- b. Briefly discuss about Sensitivity analysis. (10 Marks)
- 6 a. Explain the various steps involved in Hungarian method with example. (06 Marks)
- b. Solve the following assignment problem :

12	30	21	15
18	33	9	22
44	25	24	21
23	20	28	14

(04 Marks)

- c. A company is spending Rs 1000 everyday on transportation of its units from three plants to 4 distribution centers. The supply and demand units with unit cost of transportation are given as

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	↓ Capacity
P <sub>1</sub>	19	30	50	12	7
P <sub>2</sub>	70	30	40	60	10
P <sub>3</sub>	40	10	60	20	18
	5	8	7	15	

(10 Marks)

- 7 a. Define the following with respect to games : (06 Marks)
- i) Zero – sum game    ii) Pure – strategy    iii) Mixed strategy    iv) Pay off.
- b. Solve the following game by dominance property :

3	2	4	0
3	4	2	4
4	2	4	0
0	4	0	8

(08 Marks)

- c. Solve the following game by Graphical method :

		Player B			
		B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>	B <sub>4</sub>
Player A	A <sub>1</sub>	8	5	-7	9
	A <sub>2</sub>	-6	6	4	-2

(06 Marks)

- 8 Explain briefly the following :
- a. Tabu Search algorithm.
- b. Genetic algorithm.
- c. Metaheuristics.
- d. Simulated Annealing algorithm.

(20 Marks)