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18CS51

Fifth Semester B.E. Degree Examination, June/July 2024 Management and Entrepreneurship for IT Industry

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain management and discuss the functional areas of management. (08 Marks)
- b. Explain the steps involved in planning. (06 Marks)
- c. Discuss the staff selection process in detail (06 Marks)

OR

- 2 a. Bring out the nature of management and discuss the various roles of a manager. (08 Marks)
- b. List the types of organizations and explain any two highlighting its advantages and disadvantages. (06 Marks)
- c. Compare and contrast strategic and tactical planning. (06 Marks)

Module-2

- 3 a. Explain different leadership styles with their merits and demerits. (08 Marks)
- b. Discuss the characteristics and importance of coordination. (06 Marks)
- c. Discuss Herzberg's two factors theory. (06 Marks)

OR

- 4 a. Explain motivation. Discuss Maslow's need hierarchy theory of motivation. (08 Marks)
- b. Explain controlling and discuss the steps in controlling. (06 Marks)
- c. Explain the importance of communication. (06 Marks)

Module-3

- 5 a. Discuss the different types of entrepreneurs in detail. (10 Marks)
- b. Explain financial and technical feasibility study. (10 Marks)

OR

- 6 a. Explain the stages of entrepreneurial process in detail. (10 Marks)
- b. Discuss the role of entrepreneurs in the economic development of the country and list the barriers to entrepreneurship. (10 Marks)

Module-4

- 7 a. Explain the significance of project report and list down the planning commission guidelines for project report preparation. (08 Marks)
- b. Illustrate the functional areas of operation of management – Marketing and sales and supply chain management. (06 Marks)
- c. Write a note on project identification with sources. (06 Marks)

OR

- 8 a. Discuss the various contents of project report. (08 Marks)
- b. Illustrate the functional areas of operation of management – Accounting and finance and human resources. (06 Marks)
- c. Write a note on project selection. (06 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.

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Module-5

- 9 a. Discuss the steps involved in establishing micro and small enterprise. (08 Marks)
b. Discuss the case study of Infosys (N R Narayana Murthy). (06 Marks)
c. Explain the objectives and functions provided by SIDBI and KIADB (06 Marks)

OR

- 10 a. Explain the objectives and functions provided by
(i) KSFC (ii) DIC (iii) TECSOC (iv) KSSIDC (08 Marks)
b. Discuss the case study of Air Deccan (Captain G. R. Gopinath). (06 Marks)
c. Explain Trademark, Copy Rights and Patents. (06 Marks)

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Module-4

- 7 a. Explain the threats to network security. (08 Marks)
b. Explain RSA algorithm. Using RSA encrypt a message $m = 9$. Assume $p = 3$, $q = 11$ and $x = 3$. Compute y and show encryption and decryption. (08 Marks)
c. Explain encryption in advanced encryption standard. (04 Marks)

OR

- 8 a. In the Diffie Hellman key exchange protocol, prove that the two keys K_1 and K_2 are equal. (05 Marks)
b. With a neat diagram, discuss the steps in DES algorithm. (10 Marks)
c. Write a note on firewalls. (05 Marks)

Module-5

- 9 a. Explain multimedia streaming using HTTP. (08 Marks)
b. What are the properties of video? (04 Marks)
c. Discuss loss anticipation schemes used by VOIP applications. (08 Marks)

OR

- 10 a. Briefly discuss how DNS redirects a user request to a CDN server with an example. (08 Marks)
b. Explain setting up a call to a known IP address in SIP. (08 Marks)
c. Explain RTP packet header. (04 Marks)

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18CS53

Fifth Semester B.E. Degree Examination, June/July 2024 Database Management Systems

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Discuss the main characteristics of database approach over file-processing approach. (10 Marks)
b. Explain the operations of 2-Tier and 3-Tier client/server architecture of DBMS. (10 Marks)

OR

- 2 a. What is a weak entity type? Explain the role of partial key in design of weak entity type. (05 Marks)
b. Design an ER diagram for the mail order database considering the following requirements.
Employee takes order for parts from customers:
i) Employees are identified by unique employee ID, first name and last name, address, gender, zip code.
ii) Customer is identified by a unique customer ID, first and last name, address, location, zip code.
iii) Part is identified by a unique part number, part name, price and quantity.
iv) Order is identified by a unique order number, date of receipt, expected ship date, actual ship date. Each order contains specified quantities of one or more parts.
v) Each customer can place number of orders and each order is placed by one customer only.
vi) Each employee can take any number of orders but each order belongs to only one employee.
vii) Each part is placed by number of customers and each customer can place order for number of parts.
Write assumptions made. (10 Marks)
c. Differentiate specialization and generalization, giving suitable examples. (05 Marks)

Module-2

- 3 a. List and explain the different characteristics of relations. (08 Marks)
b. With an example, discuss the basic constraints that can be specified when you create a table in SQL. (06 Marks)
c. Write queries in relational algebra for the following: [Refer tables given in question 5(b)].
i) Retrieve the number of dependents for an employee named "Ram".
ii) Retrieve the name of managers working in location named "XYZ" who has no female dependents.
iii) Retrieve the name of employee who works in the same department as that of "Raj". (06 Marks)

OR

- 4 a. Briefly discuss the different types of update operations on relational database. Give examples for the violation of referential integrity in each of the update operation. (10 Marks)
b. With examples, explain the steps of ER to relational mapping algorithm. (10 Marks)

Module-3

- 5 a. What is a view in SQL? Explain with examples. Discuss the problems that may arise when one attempts to update a view. (10 Marks)
- b. Consider the following tables:
 Employee (Name, Ssn, Salary, Superssn, Dno)
 Department (Dname, Dno, Mgrssn, Mgrstartdate)
 Project (Pname, Pno, Plocation, Dno)
 Dept_Location (DNum, Dlocation)
 Works_on (Essn, Pnum, Hours)
 Dependent (Essn, Depname, Sex)
- List the names of managers who have at least one dependent.
 - For each employee, retrieve the employee's name and name of his or her immediate supervisor.
 - For each project on which more than two employees work, retrieve the project number, project name and the number of employees who work on that project.
 - Retrieve the name of employees whose salary is greater than salary of all the employees working in either department 5 or 6. (10 Marks)

OR

- 6 a. What is a cursor in embedded SQL? Explain with examples. (10 Marks)
- b. With examples, explain the following:
- Java Script
 - Style sheets. (10 Marks)

Module-4

- 7 a. List and explain the informal design guidelines for relation schema. (10 Marks)
- b. What are prime and non-prime attributes? Explain with examples. (04 Marks)
- c. Consider the relation $R = \{A, B, C, D, E, F, G, H, I, J\}$ and the set of functional dependencies (FDs) $F = \{AB \rightarrow C, BD \rightarrow EF, AD \rightarrow GH, A \rightarrow I, H \rightarrow J\}$. What is the key of R? Decompose R into ZNF and 3NF relations. (06 Marks)

OR

- 8 a. Consider the two sets of FD's:
 $F = \{A \rightarrow B, B \rightarrow C, AC \rightarrow D\}$ and $G = \{A \rightarrow B, B \rightarrow C, A \rightarrow D\}$. Show that they are equivalent. (06 Marks)
- b. Consider a relation $R(A, B, C, D)$ with $FDS = \{A \rightarrow BC, B \rightarrow C, A \rightarrow B, AB \rightarrow C\}$. Find the minimal cover for the set of FDs. (06 Marks)
- c. Write and explain the algorithm for dependency-preserving and non additive join decomposition into 3NF schemes with suitable example. (08 Marks)

Module-5

- 9 a. What is serializability? Explain serial, non serial and conflict-serializable schedules with appropriate examples. (10 Marks)
- b. Discuss the time stamp ordering algorithm for concurrency control. How does strict time stamp ordering differ from basic time stamp ordering? (10 Marks)

OR

- 10 a. What is a Deadlock? Consider the following sequences of actions listed in the order they are submitted to DBMS sequence $S1 : R1(A), W2(B), R1(B), R3(C), W2(C), W4(B), W3(A)$. Draw waits for graph in case of deadlock situation. (06 Marks)
- b. Explain shadow paging with suitable example. (06 Marks)
- c. Briefly explain the recovery techniques based on deferred update and immediate update. (08 Marks)

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18CS54

Fifth Semester B.E. Degree Examination, June/July 2024 Automata Theory and Computability

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define the following terms with examples:
 i) Alphabet ii) String iii) Language iv) Power of alphabet v) Σ^* (08 Marks)
- b. Design DFSM for the following languages:
 i) $L = \{W \text{ in } \{a, b\}^* : \text{string } W \text{ end with } abb \}$
 ii) $L = \{W \text{ in } \{0, 1\}^* : \text{string } W \text{ being with } 01 \}$
 iii) Set of all strings of 0's and 1's with substring 110 (12 Marks)

OR

- 2 a. i) Convert the following NDFSM to equivalent DFSM. [Refer Fig.Q2(a)]

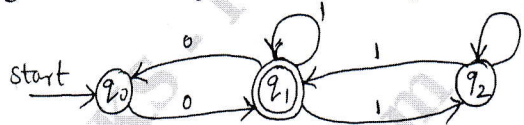


Fig.Q2(a)

(05 Marks)

- ii) Construct DFSM from the following ϵ -NDFSM.

δ	ϵ	a	b	c
$\rightarrow p$	{q, r}	ϕ	{q}	{r}
q	ϕ	{p}	{r}	{p, q}
*r	ϕ	ϕ	ϕ	ϕ

(05 Marks)

- b. Define Equivalent and Distinguishable pair of states. Construct minimum state DFSM for the following DFSM.

δ	a	B
$\rightarrow 1$	2	4
* 2	3	6
3	2	4
* 4	6	5
5	2	4
6	6	6

(10 Marks)

Module-2

- 3 a. Define Regular Expression. Design Regular Expression for the following Languages.
 i) $L = \{a^m b^n : (m + n) \text{ is even} \}$
 ii) $L = \{a^m b^n : m \geq 4, n \leq 3 \}$
 iii) Set of all strings of 0's and 1's with atleast one occurrence of 00 (08 Marks)
- b. Prove that Regular Grammar define exactly Regular Language. (06 Marks)
- c. Convert the following Regular expressions to equivalent FSM.
 (i) $(a + b)^* ab$ (ii) $(aa)^* + (bb)^*$ (06 Marks)

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OR

- 4 a. State and prove pumping theorem for Regular Languages. (08 Marks)
 b. Show that $L = \{a^n b^n : n \geq 1\}$ is not Regular Language. (06 Marks)
 c. Define Regular Grammar. Design Regular Grammar for the following Languages:
 i) $L = \{W \text{ in } \{a, b\}^* : |W| \text{ is even}\}$
 ii) Set of all strings of a's and b's which end with ab (06 Marks)

Module-3

- 5 a. Design Context Free Grammar for the following languages:
 (i) Set of all strings of a's and b's with equal number of each.
 (ii) $L = \{a^i b^j c^k : k = i + j\}$
 (iii) $L = \{a^{2m} b^n : m \geq 1, n \geq 1\}$
 (iv) $L = \{a^n b^n c^n : n \geq 1\}$ (10 Marks)
 b. Construct (i) left Most Derivation (ii) Right Most Derivation (iii) Parse tree for the string $W = aaabab$ using the grammar.
 $S \rightarrow AbB \quad A \rightarrow aA \mid \epsilon \quad B \rightarrow aB \mid bB \mid \epsilon$ (10 Marks)

OR

- 6 a. Define PDA. Design PDA for the following language.
 $L = \{W \text{ in } \{a, b\}^* : n_a(W) = n_b(W)\}$
 Number of a's is same as number of b's
 Write Transition diagram of PDA and instantaneous description of PDA for the input string $W = abba$. (14 Marks)
 b. Define CNF. Convert the following grammar to CNF.
 $S \rightarrow ABa \mid a$
 $A \rightarrow aab \mid b$
 $B \rightarrow Ac \mid c$ (06 Marks)

Module-4

- 7 a. Define Turing Machine. Design Turing Machine for $L = \{a^n b^n : n \geq 1\}$
 b. Write transition diagram of T.M and also write sequence of ID's of T.M for the input string $W = aabb$. (14 Marks)
 c. Explain the model of Linear Bounded Automata with a diagram. (06 Marks)

OR

- 8 a. Explain different techniques of Turing Machine Construction. (10 Marks)
 b. Explain Multitape Turing Machine with a diagram. (06 Marks)
 c. Explain Non-Deterministic Turing Machine. (04 Marks)

Module-5

- 9 a. Explain Post Correspondence Problem. (07 Marks)
 b. Explain Halting problem of Turing Machine. (07 Marks)
 c. Explain Decidability and Decidable languages. (06 Marks)

OR

- 10 a. Explain Quantum Computers. (07 Marks)
 b. Explain Church – Turing Thesis (06 Marks)
 c. Explain Class P and Class NP (07 Marks)

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18CS55

Fifth Semester B.E. Degree Examination, June/July 2024

Application Development using Python

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. List the salient features of python programming language. (06 Marks)
- b. Write a python program to find the area of sphere and volume of cube. Print the results. Take input from user. (06 Marks)
- c. List and explain the syntax of all flow control statements with example. (08 Marks)

OR

- 2 a. What is a function? How to define a function in python? Write a program using function to find out the given number is prime or not. (06 Marks)
- b. What is local and global scope of variable in python? Explain the different scenarios with an example snippet. (08 Marks)
- c. What is Exception Handling? How exceptions are handled in python? Write a python program with exception handling code to solve divide-by-zero error situation. (06 Marks)

Module-2

- 3 a. What is list? Explain the concept of slicing and indexing with proper examples. (06 Marks)
- b. What is Tuple? How it is different from list? Write a program to count the number of occurrences of character in a string. (06 Marks)
- c. What is Dictionary in Python? How it is different from list and tuples? Write a program to create, update and display the dictionary items. (08 Marks)

OR

- 4 a. List out five useful string methods. Explain with an example code for each method. (10 Marks)
- b. Compare copy.copy() and copy.deepcopy() functions with suitable examples for each. (05 Marks)
- c. Write a python program that accepts a sentence and find the number of words, digits, characters, uppercase letters and lowercase letters. (05 Marks)

Module-3

- 5 a. List and explain shorthand code for common character classes. Illustrate how do you define your own character class. (07 Marks)
- b. Explain the usage of caret and dollar sign characters in regular expression. (06 Marks)
- c. Write a python program to extract phone numbers and email addresses using regex. (07 Marks)

OR

- 6 a. What are the Ray properties of a file? Explain in detail file reading/writing process with an example of python program. (07 Marks)
- b. Explain briefly what are the different methods of file operations support in python shutil module. (07 Marks)
- c. Write a python program to create a folder PYTHON and under the hierarchy 3 files file1, file2 and file3. Write the content in file1 as "XXX" and in file 2 as "YYY" and file 3 content should be by opening and merge of file1 and file2. Check out necessary condition before writing file3. (06 Marks)

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Module-4

- 7 a. Define classes and objects in python. Create a class called employee and initialize it with employee id and name. Design methods to:
- SetAge – to assign age to employee. (08 Marks)
 - SetSalary – to assign salary to the employee. (05 Marks)
 - Display – to display all information of the employee. (07 Marks)
- b. Illustrate the concept of modifier with python code. (05 Marks)
- c. Explain `__init__` and `__str__` method with an example python program. (07 Marks)

OR

- 8 a. Define Polymorphism. Demonstrate polymorphism with function to find histogram to count the number of times each letter appears in a word and in a sentence. (07 Marks)
- b. Illustrate the concept of pure function with python code. (06 Marks)
- c. Define class diagram. Discuss the need for representing class relationships using class diagram with suitable example. (07 Marks)

Module-5

- 9 a. How do we download a file and save it to hard drive using request module? (06 Marks)
- b. Write a python program to give search keyword from command line arguments and open the browser tab for each result page. (06 Marks)
- c. Explain Selenium's web drive methods for finding elements. (08 Marks)

OR

- 10 a. Write a program that takes a number N from command line and creates an $N \times 100$ multiplication table in excel spread sheet. (08 Marks)
- b. Write short notes on:
Creating, copying and rotating pages with respect to pdf. (06 Marks)
- c. Write a program that find all CSV files in the current working directory, read in the full contents of each file, write out the contents, skipping the first line, to a new CSV file. (06 Marks)

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18CS56

Fifth Semester B.E. Degree Examination, June/July 2024 Unix Programming

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain with a neat diagram a architecture of UNIX OS. (08 Marks)
b. List and explain the salient features of UNIX OS. (07 Marks)
c. What are internal and external commands in UNIX? Explain with an example each. (05 Marks)

OR

- 2 a. Briefly explain different types of files supported in UNIX. (05 Marks)
b. Illustrate with a diagram, the typical UNIX file system. (05 Marks)
c. Explain Absolute and Relative pathnames with an example. (05 Marks)
d. Explain the following commands with the help of example :
i) cat ii) mv iii) cp iv) wc v) pwd. (05 Marks)

Module-2

- 3 a. Define File Permission. Describe different ways of changing file permission. (05 Marks)
b. Which command is used for listing file attributes? Explain the significance of each field in the output. (07 Marks)
c. File current permissions are rw__w_r___. Write chmod expression required to change them to relative and absolute mode for following.
i) r__r___x ii) rwx rwx__x
iii) r_xr_xr_x iv) rw__w__w__ (08 Marks)

OR

- 4 a. Explain three standard files with respect to UNIX OS. (06 Marks)
b. With the help of an example, explain grep command with all the options (any five options). (08 Marks)
c. Write a shell script to : i) display list of files ii) Process of user
iii) Today's date iv) Users of the system v) Content of a file. (06 Marks)

Module-3

- 5 a. Explain the following API's along with their prototype :
i) Open ii)fcntl iii) lseek. (12 Marks)
b. Define the following :
i) Read lock ii) Write lock iii) Mandatory lock iv) Advisory lock. (04 Marks)
c. Explain getrlimit and setrlimit functions with prototype. (04 Marks)

OR

- 6 a. With a neat diagram, explain how a C program is started and terminated in various ways. Demonstrate the use of atexit function with a sample program. (10 Marks)
b. With a neat sketch, explain memory layout of a C program. (05 Marks)
c. Write a C/C++ program to display :
i) Command line arguments ii) Environment variables. (05 Marks)

Module-4

- 7 a. What are Interpreter files? Give the difference between interpreter files and interpreter. (06 Marks)
- b. What are Pipes? What are its limitations? Explain how pipes are created and used in IPC, also write a program to send data from parent to child over a pipe. (12 Marks)
- c. What is Inter – Process Communication? List any 4 mechanisms of IPC. (02 Marks)

OR

- 8 a. With a neat block diagram, explain how FIFO can be used to implement client server communication model. (08 Marks)
- b. Briefly explain with example : (08 Marks)
- i) message queue ii) semaphores.
- c. What are Stream pipes? What are the different ways to view stream pipes? (04 Marks)

Module-5

- 9 a. What are Signals? Mention different sources of signals. Write a program to setup signal handlers for SIGINIT and SIGALRM. (10 Marks)
- b. What are Daemon process? Explain the characteristics and coding rules of a daemon process. (10 Marks)

OR

- 10 a. Explain Kill () API and alarm () API. (06 Marks)
- b. Write a C/C++ program to illustrate the use of 'Sigaction'. (06 Marks)
- c. Explain the sig.setjmp and sig.longjmp function with an example. (08 Marks)

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18AI643

Sixth Semester B.E. Degree Examination, June/July 2024 Web Programming

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What is HTML? Explain the structure of HTML document with an example. (08 Marks)
b. What are HTML elements and attributes? Explain with example. (06 Marks)
c. What is CSS? List and explain benefits of CSS. (06 Marks)

OR

- 2 a. With an example explain CSS Box model. (08 Marks)
b. How does you style the table? Explain with an example. (06 Marks)
c. List and explain different selectors available in CSS. (06 Marks)

Module-2

- 3 a. Write HTML code for the following table :

SEMINAR			
DAY	SCHEDULE		TOPIC
	BEGIN	END	
MONDAY	8.00 AM	5.00 PM	INTRODUCTION TO XML validity : DTD and NG
TUESDAY	11 : 00 AM	2:00 PM	XPATH
	11 : 00 AM	2:00 PM	XSL Transformation
	2 : 00 PM	5:00 PM	
WEDNESDAY	8 : 00 AM	5:00 PM	XSL Formatting object

- b. Explain Responsive design with its four key components. (08 Marks)

OR

- 4 a. Illustrate the construction of multi-column layouts with example. (08 Marks)
b. Explain the role of CSS preprocessors in the web development workflow. (06 Marks)
c. Write a note on CSS framework. (06 Marks)

Module-3

- 5 a. What is DOM? Briefly explain the different types of nodes. (08 Marks)
b. Write Javascript code that uses function for the following problems :
(i) For the string input, the output should be to display the position of left most vowels.
(ii) For the numeric input, output should be to display the reverse of the number. (08 Marks)
c. Briefly explain web servers responsibility. (04 Marks)

OR

- 6 a. With suitable code segments, explain two approaches for event handling in javascript. (08 Marks)
b. Write a PHP program to greet the user based on time. (04 Marks)
c. What are server side include files? Why are they important in PHP? (08 Marks)

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Module-4

- 7 a. What are the super global arrays in PHP? What function is used to determine if a value was sent via query string? (10 Marks)
- b. Explain the different error handling methods with suitable code segment. (10 Marks)

OR

- 8 a. Write a PHP program to create a class employer with the following specifications :
Data members : name, id, payment
Member functions : read and write
Use the above specification to read and print the information of 10 students. (08 Marks)
- b. How do you read and write a file on the server from PHP? (08 Marks)
- c. Write a note on classes and objects in PHP. (04 Marks)

Module-5

- 9 a. Explain different types of caching need to improve the performance of web applications. (08 Marks)
- b. What are HTTP cookies? How do you handle them in PHP? (08 Marks)
- c. How do you manage state in PHP? (04 Marks)

OR

- 10 a. What is AJAX? Using an XML diagram, explain how the synchronous request is handled. (08 Marks)
- b. Explain JS pseudo classes with example. (08 Marks)
- c. Explain converting a JASON string to JASON object in JavaScript with suitable code segment. (04 Marks)

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18CS643

Sixth Semester B.E. Degree Examination, June/July 2024 Cloud Computing and Its Applications

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain bird's view of cloud computing with a neat diagram. (06 Marks)
b. What are the characteristics and benefits of cloud computing with respect to CSC and CSP? (06 Marks)
c. Mention and explain cloud services provided by 4 different computing platforms. (08 Marks)

OR

- 2 a. With neat diagram, explain taxonomy of virtualization techniques. (08 Marks)
b. With neat diagram, explain Microsoft Hyper V architecture. (08 Marks)
c. Explain infrastructure management in cloud computing with respect to Hyper V. (04 Marks)

Module-2

- 3 a. Explain IaaS reference implementation with a neat diagram. (08 Marks)
b. Explain options to implement private clouds with a neat diagram. (08 Marks)
c. Who are the candidate actors for community cloud? Explain how they are related to cloud. (04 Marks)

OR

- 4 a. Explain Aneka Framework overview with a neat diagram. (10 Marks)
b. Explain logical organization of Aneka clouds with a neat diagram. (10 Marks)

Module-3

- 5 a. What is domain decomposition? Explain domain decomposition technique for parallel computation by taking matrix multiplication example in detail. (10 Marks)
b. What is context switching? Explain the relationship between thread and processes with a neat diagram. (10 Marks)

OR

- 6 a. List the frameworks used to support the execution of task-based applications. Explain in detail. (08 Marks)
b. With a neat diagram explain abstract model of a workflow system. Briefly explain technologies used for designing workflow based applications. (08 Marks)
c. Mention and explain different types of parameters specified in parameter sweep applications. (04 Marks)

Module-4

- 7 a. What is the role of Data grid in the evolution of data intensive computing? Explain with reference scenario. (10 Marks)
b. Explain how below mentioned file systems provide performance and storage for clouds:
i) Lustre ii) GPFS (iii) GFS (iv) Sector (v) Amazon S3 (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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OR

- 8 a. With neat diagram explain Google MapReduce infrastructure overview. (08 Marks)
b. Describe the alternatives to MapReduce. (06 Marks)
c. With neat diagram explain Aneka MapReduce infrastructure. (06 Marks)

Module-5

- 9 a. Discuss services used to develop applications in Google AppEngine. (10 Marks)
b. Explain Microsoft Azure platform architecture with a neat diagram. (10 Marks)

OR

- 10 a. Describe how cloud computing can be used to analyze data for cancer diagnostics using gene expression with a neat diagram. (10 Marks)
b. Describe EyeOS architecture with neat diagram. (10 Marks)

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18CS645

Sixth Semester B.E. Degree Examination, June/July 2024 System Modelling and Simulation

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What is Simulation? State the situations when simulation is considered as an appropriate tool. (10 Marks)
- b. Dr. Ramesh is a dentist who schedules all patients for 30 minutes appointments. Some of the patients take more or less than 30 minutes depending on the type of dental work to be done. The following table shows the various categories of work, their probabilities, time actually needed to complete the work and the fees charged for each.

Category	Filling	Crowning	Cleaning	Extraction	Checkup
Time taken (in min)	45	60	15	45	15
Probability of category	0.35	0.15	0.10	0.25	0.15
Fees charged	Rs.200	Rs.200	Rs.60	Rs.100	Rs.50

Simulate the dentist's clinic for 10 patients and determine the average waiting time for patients, total idle time for the doctor and the total fees collected. Assume that patients arrive at the clinic at exactly their scheduled time starting at 8.00am. Use the following random numbers to handle this problem 55, 18, 91, 01, 25, 86, 71, 39, 93, 48. (10 Marks)

OR

- 2 a. State the advantages and disadvantages of simulation. (10 Marks)
- b. Simulate a single server queuing system using event scheduling for 15 minutes and find
i) Server utilization ii) Number of customers who spend more than 3 minutes in the system. The interarrival times and service times are as given below:

Interarrival Time	5	1	1	1	5	3	5	3	3
Service Time	4	1	3	3	2	1	3	1	4

(10 Marks)

Module-2

- 3 a. Explain any two discrete and two continuous probability distributions with diagrams. (10 Marks)
- b. Explain the characteristics of a queuing system. (10 Marks)

OR

- 4 a. A production process manufactures computer chips on the average at 2% non conforming. Every day, a random sample of size 50 is taken from the process. If the sample contains more than two non conforming chips, the process will be stopped. Compute the probability that the process is stopped by the sampling scheme. (10 Marks)
- b. Illustrate with an example the queuing notation of Kendall. (05 Marks)
- c. Given the number of customers in the system at time, t , how do you compute the long-run time-average number of customers in system and in queue? (05 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.

Module-3

- 5 a. State the important considerations while developing random number generators. (05 Marks)
 b. Use the mixed congruential method to generate a sequence of five, two digit random integers between 0 and 24 and corresponding random numbers with $x_0 = 13$, $a = 19$ and $c = 35$. (05 Marks)
 c. Elaborate the need for generating random variates. Given probability mass function (pmf) of random variates and a set of uniform random numbers over the range (0, 1), describe the process of generating random variables. (10 Marks)

OR

- 6 a. Develop a random variate generator for a random variable X with the pdf.

$$f(x) = \begin{cases} e^{2x} & \text{for } -\infty < x < 0 \\ e^{-2x} & \text{for } 0 < x < \infty \end{cases}$$
 (10 Marks)
 b. Explain acceptance-rejection technique using Poisson distribution. (10 Marks)

Module-4

- 7 a. List the properties of any eight probability distributions. (08 Marks)
 b. The number of vehicles arriving at an intersection in a 5-minute period between 8:00am and 8:05am was monitored for five workdays over a 20-week period and the results are shown in the table. After analysis, it appeared to follow a poisson distribution. Using Chi-square test, should we accept or reject the hypothesis that it is Poisson-distributed at a level of significance $\alpha = 0.05$.

Arrivals/period	0	1	2	3	4	5	6	7
Frequency	16	19	21	17	10	8	6	3

(12 Marks)

OR

- 8 a. What are the suggested estimators for Poisson, exponential, Gamma, Normal and Lognormal distributions? (05 Marks)
 b. What are the steps in the development of a useful model of input data? What is the importance of histograms in this process? (05 Marks)
 c. Highlight the features of the types of simulations with respect to output analysis with examples for each. (10 Marks)

Module-5

- 9 a. Explain model building, verification and validation with respect to simulation models. (10 Marks)
 b. Which are the measures of performance of a simulated system? How do you estimate them? (10 Marks)

OR

- 10 a. Explain any two output analysis methods for steady state simulations. (10 Marks)
 b. Explain the Naylor and Finger 3-step approach to aid in the validation process. (10 Marks)

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