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R-17

Code: 7G144

II B.Tech. II Semester Supplementary Examinations May / June 2022

Object Oriented Programming using JAVA

(Computer Science and Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

Marks

UNIT-I

- 1. a) Write a sample java program to find the GCD of two numbers. 7M
- b) What is an array? How arrays are declared and initialized? Explain with examples. 7M

OR

- 2. a) What is method overloading? Define two methods in class that have identical method names and parameter profile with different return values types or different modifier? 7M
- b) Write a Java program to check whether two strings are equal or not without using built-in functions. 7M

UNIT-II

- 3. a) Explain inheritance and its types? How runtime polymorphism can be achieved using inheritance, explain with a suitable program? 7M
- b) Explain abstract class with an example and compare with interface. 7M

OR

- 4. a) "Interface variables are static and final by default in Java" - Support this statement with proper explanation. 7M
- b) With the help of a code segment, Taking three classes into consideration represent multilevel inheritance between them using the code as well as diagram. 7M

UNIT-III

- 5. a) What is an Exception? Explain the exception hierarchy and how to throw, catch and handle Exceptions with example. 7M
- b) With the help of an example, explain multithreading by extending Thread class. 7M

OR

- 6. a) What is multithreading? Explain how multithreading in single processor system is different from multithreading in multiprocessor system. 7M
- b) Write a program for example of try and catch block. In this check whether the given array size is negative or not. 7M

UNIT-IV

- 7. a) Discuss in detail about the collection interfaces 14M

OR

- 8. a) What are the three parts of a Lambda Expression? What is the type of Lambda Expression? 7M
- b) Write about Method reference feature in Lambda expressions with example. 7M

UNIT-V

- 9. a) Explain any four legacy classes of Java's collection Framework 7M
- b) Explain the methods defined by List Iterator interface. 7M

OR

- 10. a) What is a List interface in Java? Explain the operations on List. 7M
- b) Define TreeSet class. Illustrate any five methods of TreeSet class. 7M

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II B.Tech. II Semester Supplementary Examinations May / June 2022

Operating Systems

(Computer Science and Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

Marks

UNIT-I

1. Explain the different type of Operating System Structures with neat diagrams. 14M

OR

2. a) Design the execution of RPC for Client-Server Communication 7M

b) Create a Process in UNIX using fork () /system call. 7M

UNIT-II

3. a) Describe the Multithreading Models with related diagrams 7M

b) Summarize the differences between Single threaded and multi-threaded processes. 7M

OR

4. a) Develop a C program for Multithreaded concept using the Pthreads API. 7M

b) Develop a code for Dining – Philosophers problem using Monitors. 7M

UNIT-III

5. a) Discus protection in paging. 7M

b) What is Thrashing? Mention the cause of Thrashing. 7M

OR

6. a) In memory management how users view of a program represented? Discuss in detail. 7M

b) What is a page fault? Explain the procedure for handling page faults with a neat diagram 7M

UNIT-IV

7. a) List the Directory implementation methods. 7M

b) Draw and explain Magnetic disk structure with a diagram. 7M

OR

8. a) Discus about Windows XP access control list management 7M

b) Evaluate SCAN scheduling for the given Queue. 98, 183, 37, 122, 14, 124, 65, 67 7M

UNIT-V

9. a) Explain in detail about Transforming I/O request to hardware operations 8M

b) List the goals and principles of Protection. 6M

OR

10. a) Write about password vulnerabilities and OTP's 7M

b) What is DMZ? Explain its importance in Firewalls's 7M

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R-17

Code: 7GC42

II B.Tech. II Semester Supplementary Examinations May/June 2022

Probability and Statistics

(Common to CE, ME & CSE)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

Marks

UNIT-I

1. a) Given $P(A)=1/4$, $P(B)=1/3$ and $P(A \cup B) = 1/2$, then evaluate (i) $P(A/B)$, (ii) $P(B/A)$, (iii) $P(A \cap B^c)$, (iv) $P(A^c/B^c)$ 8M
- b) A card is drawn from a pack of 52 playing cards. What is the probability of drawing black card. 6M

OR

2. a) A class consists of 6 girls and 10 boys. If a committee of 3 is chosen at random from the class, find the probability that (i) 3 boys are selected, (ii) exactly 2 girls are selected. 8M
- b) Two dice are thrown and their sum is 7. Find the probability that at least one of the dice shows up 2 6M

UNIT-II

3. a) A die is thrown 6 times. If getting an even number is a success, find the probabilities of (i) at least one success (ii) 3 successes (iii) 4 successes 7M
- b) A continuous random variable x has a probability density function
- $$f(x) = \begin{cases} \frac{(x+1)}{2}, & -1 \leq x \leq 1 \\ 0 & \text{else where} \end{cases}$$
- represents the density of a random variable x , then find $P(X \leq 0)$, mean and variance. 7M

OR

4. For the normal distribution with mean 2 and standard deviation 4, evaluate (i) $P(-6 < x < 3)$, (ii) $P(x \geq 5)$ and (iii) $P(-4 < x < 4)$ 14M

UNIT-III

5. a) The variance of population is 2. The size of the sample collected from the population is 169. What is the standard error of mean 7M
- b) A population consists of 5, 10, 14, 18, 13, 24. Consider all possible samples of size 2 which can be drawn without replacement from this population. Find the population mean and standard deviation, and mean and standard deviation of the sampling distribution of means. 7M

OR

6. a) A random sample of 100 teachers in a large metropolitan area revealed a mean weekly salary of Rs.487 with a standard deviation rs 48. With what degree of confidence can assert that the average weekly salary of all teachers in the metropolitan area is between 472 to 502? 7M
- b) What is the size of the smallest sample required to estimate an unknown proportion to within a maximum error of 0.06 with at least 95% confidence. 7M

UNIT-IV

7. In a random sample of 60 works, the average time taken by them to get work is 33.8min with a S.D of 6.1 min can we reject the null hypothesis $\mu = 15150$ min in the favour of alternative hypothesis $\mu > 15150$ at 0.05 level of significance. 14M

OR

8. A manufacturer of electronic equipment subjects sample of two completing brands of transistors to an accelerated performance test. If 45 of 180transistors of the first kind and 34 of 120 transistors of the second kind fail the test. What he conclude at the level of significance $\alpha = 0.05$ about the difference between the corresponding sample proportions. 14M

UNIT-V

9. The following data give the number of air-craft accidents that occurred during the various days of a week

Day	Mon	Tue	Wed	Thu	Fri	sat
No.of accidents	15	29	13	12	16	15

Test whether the accidents are uniformly distributed over the week. 14M

OR

10. Two random sample drawn from two normal populations have the variable values as below

Sample1	19	17	16	28	22	23	19	24	26			
Sample2	28	32	40	37	30	35	40	28	41	45	30	36

Obtain the estimate of the variance of the population and f test whether the two population have the same variance. 14M

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II B.Tech. II Semester Supplementary Examinations May/June 2022

Computer Organization

(Computer Science and Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

Marks

UNIT-I

- 1. a) Define a Bus? Draw and describe the functioning of a single bus structure? 7M
- b) Perform the arithmetic operation in binary using 2's complement representation.
 (i). (+42) + (-13) (ii) (-42) – (-13). 7M

OR

- 2. a) List and discuss the different functional units of a computer? 7M
- b) Distinguish between Fixed point and Floating-point representation of a given Number? 7M

UNIT-II

- 3. a) Define is register transfer language? Explain the basic symbols used in register Transfer? 7M
- b) Elaborate about shift micro-operations with examples? 7M

OR

- 4. a) Illustrate different types of instructions with examples. Compare their relative merits and demerits? 7M
- b) For the pattern, $X = (A+B)*(C+D)$, Explain Three, Two, One, and Zero-address instructions by giving the syntax? 7M

UNIT-III

- 5. a) Describe microinstruction sequencing in detail? 7M
- b) Define is a micro-operation? Explain the four different types of micro-operations? 7M

OR

- 6. a) Define microprogramming? Explain the microprogrammed control? 7M
- b) Explain microprogram sequencer organization with a neat diagram? 7M

UNIT-IV

- 7. a) Define Memory? With a neat diagram explain memory hierarchy? 7M
- b) Elaborate about Virtual Memory in detail? 7M

OR

- 8. a) Draw and explain the flow chart for the division algorithm? 7M
- b) Discuss the significance of transaction look aside buffer in virtual memory? 7M

UNIT-V

- 9. a) Describe, the possible way for executing multiple functional units with a processor. 7M
- b) Elaborate on the significance of parallel processing? 7M

OR

- 10. a) Define is Direct Memory Access (DMA) transfer? Describe the working of DMA controller? 7M
- b) Describe the techniques for handling control hazards in pipelining? 7M

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II B.Tech. II Semester Supplementary Examinations May/June 2022

Design and Analysis of Algorithms
(Computer Science and Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

Marks

UNIT-I

- 1. a) Explain omega notation with suitable example 7M
- b) Explain how the time complexity of an algorithm is computed. 7M

OR

- 2. a) Write the non-recursive algorithm for finding the Fibonacci series and derive its time complexity. 7M
- b) Describe the performance analysis in detail 7M

UNIT-II

- 3. a) Write the general method of divide and conquer approach 7M
- b) Describe algorithm analysis of binary search 7M

OR

- 4. a) Write divide and conquer recursive merge sort algorithm and derive the time complexity 7M
- b) Suggest refinements to merge sort make it in place. 7M

UNIT-III

- 5. a) List the features of dynamic programming. 7M
- b) Show the general procedure of dynamic programming. 7M

OR

- 6. a) Write the pseudo code of the dynamic programming algorithm for optimal binary search tree. 7M
- b) Discuss the dynamic programming solutions for the travelling sales person problem. 7M

UNIT-IV

- 7. a) Draw the portion of state space tree for 4 queen's problem using variable tuple sized approach. 7M
- b) List the applications of branch and bound method. 7M

OR

- 8. a) Write an algorithm of FIFO branch and bound. 7M
- b) Distinguish between backtracking and branch and bound 7M

UNIT-V

- 9. a) Explain the strategy to prove that a problem is NP hard 7M
- b) Explain non-deterministic sorting problem 7M

OR

- 10. a) Differentiate between deterministic and non-deterministic algorithms. 7M
- b) How are P and NP problems related? 7M

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II B.Tech. II Semester Supplementary Examinations May/June 2022

Formal Languages and Automata Theory

(Computer Science and Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

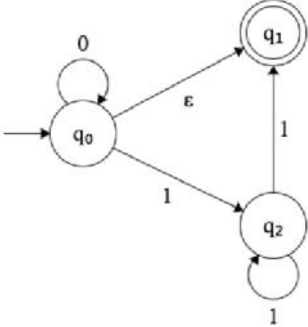
Marks

UNIT-I

- | | | |
|----|--|----|
| 1. | a) List the applications of finite automata. | 7M |
| | b) Define Chomsky hierarchy of languages. | 7M |

OR

2. a) Consider the following NFA-ε



- i. Compute the ε - closure of each state
- ii. Remove ε-Moves for the given NFA-ε.

8M

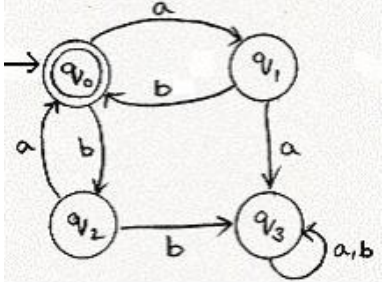
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|----|----------------------------------|----|
| b) | Distinguish between DFA and NFA. | 6M |
|----|----------------------------------|----|

UNIT-II

- | | | |
|----|--|----|
| 3. | a) Construct a DFA for the regular expression $r = (a+b)^*abb$ | 9M |
| | b) Define recursive definition of Regular Expression | 5M |

OR

4. a) Construct the regular expression accepted by following finite automaton.



8M

- | | | |
|----|--|----|
| b) | Describe a pumping lemma. What are its applications? | 6M |
|----|--|----|

UNIT-III

- | | | |
|----|---|-----|
| 5. | a) Convert the following CFG to GNF
$S \rightarrow AA / a$
$A \rightarrow SS / b$ | 14M |
|----|---|-----|

b)

OR

6. a) Define ambiguity of the grammar. Show that the following grammar is ambiguous.
 $S \rightarrow a / Sa / bSS / SSb / SbS$ 7M
- b) Using pumping Lemma prove that the following language is context free or not.
 $L = \{ x^n y^n z^n / n \geq 1 \}$ 7M

UNIT-IV

7. a) Design PDA for the language $L = \{ a^n b^n / n \geq 1 \}$ 7M
- b) Construct PDA equivalent to the following CFG.
 $E \rightarrow +EE / *EE / id$ 7M

OR

8. a) Define PDA, DPDA and DCFL. 7M
- b) Describe Final state acceptability and Empty Stack acceptability in PDA. 7M

UNIT-V

9. a) Explain various types of Turing machines. 6M
- b) Construct Turing Machine to compute addition function for two unary numbers $f(X,Y) = X+Y$ 8M

OR

10. a) Construct LR(0) items for the grammar given, find its equivalent DFA.
 $S' \rightarrow S$
 $S \rightarrow A S \mid \}$
 $A \rightarrow a A \mid b \quad \lambda \text{ is null.}$ 9M
- b) Explain about the Post's Correspondence Problem 5M
