

Hall Ticket Number :																			
----------------------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

**R-17**

**Code: 7G141**

II B.Tech. II Semester Supplementary Examinations August 2021

**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 )

\*\*\*\*\*

**UNIT-I**

- 1. a) Draw the functional diagram of a computer and describe each block? 7M
  - b) Demonstrate r's complement and (r-1)'s complement of a number? Write the 1's and 2's complement for    i) 1011011                    ii)0110101 7M
- OR**
- 2. a) Explain various buses such as internal, external, I/O, system, address, and data bus? 7M
  - b) How many different ways a negative number can be presented? Illustrate with example? 7M

**UNIT-II**

- 3. a) Define instruction format? Draw and explain the basic computer instruction formats? 7M
  - b) How effective address is evaluated using Register Addressing Mode? Explain with an example? 7M
- OR**
- 4. a) Demonstrate different arithmetic micro-operation with examples? 7M
  - b) List and describe the logical micro-operations? Explain about applications of logical micro-operation? 7M

**UNIT-III**

- 5. a) Describe control memory with address sequence? 7M
  - b) Describe microinstruction sequencing in detail? 7M
- OR**
- 6. List and describe the design goals while designing the Control Unit? Explain the Hardwired control and Micro programmed control. Mention their advantages and disadvantages? 14M

**UNIT-IV**

- 7. a) Define ROM? Describe Read-Only memory with its types? 7M
  - b) Describe Cache memory? Explain the different mapping techniques used in the usage of Cache memory. 7M
- OR**

- 8. a) Define is Auxiliary memory? Explain the different auxiliary memory types with neat diagrams? 7M
- b) Perform the 2's complement multiplication for the signed integer operands: (-13) \* (-10) using Booth's recording scheme. 7M

**UNIT-V**

- 9. a) Elaborate on the process of Pipelining? 7M
  - b) Explain the connection of I/O bus to input-output devices 7M
- OR**
- 10. Define the handshaking signals? Explain the handshake control of data transfer during input and output operation. 14M

\*\*\*

Hall Ticket Number :									
----------------------	--	--	--	--	--	--	--	--	--

<b>R-17</b>
-------------

**Code: 7G142**

II B.Tech. II Semester Supplementary Examinations August 2021

**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 )

\*\*\*\*\*

**UNIT-I**

- 1. a) Describe and define Big oh, little oh Asymptotic notations in detail. 7M
- b) Distinguish between algorithm and pseudo code. 7M

**OR**

- 2. a) Write the algorithm for finding the factorial of a given number and find its time complexity. 7M
- b) Explain the space complexity in detail 7M

**UNIT-II**

- 3. a) Differentiate between divide and conquer and greedy method 7M
- b) What are the applications of divide and conquer 7M

**OR**

- 4. a) Solve the Job sequencing problem given  $n=5$ ,  $(p_1,p_2,p_3,p_4,p_5)=(1,5,20,15,10)$  deadlines  $(d_1,d_2,d_3,d_4,d_5)=(1,2,4,1,3)$  using greedy strategy. 7M
- b) What is spanning tree? Explain prims algorithm with an example. 7M

**UNIT-III**

- 5. a) What are the advantages of reliability design problem? 7M
- b) List the applications of all pairs shortest path problem. 7M

**OR**

- 6. a) Write the algorithm to compute 0/1 knapsack problem using dynamic programming. 7M
- b) What is the running time of 0/1 knapsack problem by using dynamic programming? 7M

**UNIT-IV**

- 7. a) Explain the general method analysis of backtracking 7M
- b) List the applications of backtracking method. 7M

**OR**

- 8. a) Describe travelling sales problem and discuss how to solve it by using branch and bound. 7M
- b) Write about L-C search algorithm in detail. 7M

**UNIT-V**

- 9. a) Differentiate between NP complete and NP hard. 7M
- b) Explain the classes of NP hard and NP complete. 7M

**OR**

- 10. Let S be an NP complete problem and Q and R be two other problems not known to be in NP. Q is polynomial time reducible to S and S is polynomial reducible to R. Then R is NP complete. Justify. 14M

\*\*\*

Hall Ticket Number :									
----------------------	--	--	--	--	--	--	--	--	--

**R-17**

**Code: 7G143**

II B.Tech. II Semester Supplementary Examinations August 2021

**Formal Languages and Automata Theory**

( Computer Science Engineering )

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 14 = 70 Marks )

\*\*\*\*\*

**UNIT-I**

- 1. a) Define Alphabets, Strings and Languages, with examples. 6M
- b) Draw a DFA which accepts strings with 0's and 1's such that string contain the substring Three consecutive ones. 8M

**OR**

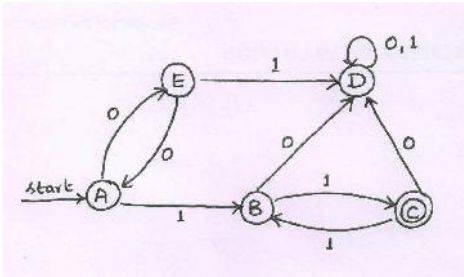
- 2. a) Write a procedure for convert NFA-ε moves it into DFA moves with example 7M
- b) Distinguish between Moore and Melay machines with an example. 7M

**UNIT-II**

- 3. a) Construct NFA for the Regular Expression (a\* + b\* + c\* ). 4M
- b) Construct a Finite Automata for the regular expression (0+1)\*1(1+0)\* 10M

**OR**

- 4. a) Write regular expression for the following
  - i) The set of all Strings of 0's and 1's string begin with 0 or 1 and not having two consecutive 0's.
  - ii) The set of all strings over {0,1} having even number of 0's and even number of 1's.
  - iii) The set of all strings with 1100 as substring over the ={0,1}9M
- b) Convert the following automation to a Regular Expression. 5M



**UNIT-III**

- 5. a) Define CFG. Write CFG for the following languages.
  - i.  $L = \{ a^i b^j c^k \mid i+j = k, i \geq 0, j \geq 0 \}$
  - ii.  $L = \{ a^n b^m c^k \mid n+2m = k \}$  7M
- b) Converting the following CFG into CNF  
 $S \rightarrow XA/BB, B \rightarrow b/SB, X \rightarrow b, A \rightarrow a$  7M

**OR**

6. a) What is ambiguous grammar? Show that the grammar shown below is ambiguous. 6M  
 $S \rightarrow AB \mid aaB, A \rightarrow Aa \mid a, B \rightarrow b$
- b) Define CNF and GNF. Convert the following grammar to CNF 8M  
 $S \rightarrow ASB \mid \epsilon, A \rightarrow aAS \mid a, B \rightarrow SbS \mid A \mid bb$

## UNIT-IV

7. a) Design a PDA to accept the following language  $L = \{ 0^{2n}1^n \mid n \geq 1 \}$  8M  
 b) Write procedure for constructing CFG for given PDA 6M

OR

8. a) Convert the following grammar to a PDA that accepts the same language by empty stack. 8M  
 $S \rightarrow aABB \mid aAA, A \rightarrow aBB \mid a, B \rightarrow bBB \mid A, C \rightarrow a$
- b) Explain the working of a PDA with a neat diagram. 6M

## UNIT-V

9. a) What is Turing machine? Explain different types of Turing machines? 6M  
 b) Design a Turing Machine to accept  $L = \{ ww^R \mid w \in (a+b)^* \}$  8M

OR

10. a) Explain Church's hypothesis. 5M  
 b) Explain 9M  
 i. Counter Machine  
 ii. Recursively Enumerable Languages

\*\*\*

Hall Ticket Number :									
----------------------	--	--	--	--	--	--	--	--	--

<b>R-17</b>
-------------

**Code: 7G144**

II B.Tech. II Semester Supplementary Examinations August 2021

**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 )

\*\*\*\*\*

<b>UNIT-I</b>
---------------

1. a) Explain the three OOPs principles briefly with examples. 7M  
b) Explain features of Java in brief. 7M

**OR**

2. a) What are class and objects? Explain how an object can be constructed from a class with suitable example. 7M  
b) Describe the various operators used in Java with their classifications. Explain left shift and right shift operators with suitable examples. 7M

<b>UNIT-II</b>
----------------

3. a) Explain the keywords this, static, super and final with one example each. 7M  
b) How do you achieve multiple inheritance in java? Give Example. 7M

**OR**

4. a) Explain the process of creating and accessing packages with suitable example 7M  
b) What is polymorphism? Explain runtime polymorphism with a program. 7M

<b>UNIT-III</b>
-----------------

5. a) What is the difference between checked and unchecked exception? Write the code segments for each type. 7M  
b) Explain thread life cycle in detail 7M

**OR**

6. What is an Exception? List out the keywords for exception handing and write steps to develop user defined exception. 14M

<b>UNIT-IV</b>
----------------

7. a) Write about the generic interfaces. 7M  
b) What are the three parts of a Lambda Expression? What is the type of Lambda Expression? 7M

**OR**

8. a) Explain the working of Stream interface? 7M  
b) Compare and contrast between ArrayList and LinkedList Classes 7M

<b>UNIT-V</b>
---------------

9. a) Give brief description about TreeSet class? 7M  
b) List the various constructors present in Scanner class. 7M

**OR**

10. a) Explain about LinkedList class in java with example. 7M  
b) What is Scanner class? Describe the details of Scanner class. 7M

\*\*\*

Hall Ticket Number :										
----------------------	--	--	--	--	--	--	--	--	--	--

<b>R-17</b>
-------------

**Code: 7G145**

II B.Tech. II Semester Supplementary Examinations August 2021

## **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 )

\*\*\*\*\*

<b>UNIT-I</b>
---------------

1. a) List the Operating System Operations. 7M  
b) Discuss about Special Purpose Systems. 7M
- OR**
2. a) Define a Process. Draw the Queuing-diagram of process scheduling 7M  
b) Solve the Producer\_Consumer problem using shared memory concept 7M

<b>UNIT-II</b>
----------------

3. a) Define Monitor. Recite the syntax of a Monitor 7M  
b) Identify the Importance of Atomic transactions in executing critical section. 7M
- OR**
4. a) Discuss in detail about threading Issues. 14M

<b>UNIT-III</b>
-----------------

5. a) Write in detail about Memory Allocation methods 7M  
b) Differentiate between internal fragmentation and External fragmentation. 7M
- OR**
6. a) Apply the FIFO and LRU page replacement algorithms for the following string. 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1. 10M  
b) Explain the Buddy System in kernel memory. 4M

<b>UNIT-IV</b>
----------------

7. a) List the File attributes and operations. 9M  
b) Explain about file system organization in detail 5M
- OR**
8. a) Discuss the importance of storage area network. 7M  
b) Describe the RAID level 3 in RAID structure 7M

<b>UNIT-V</b>
---------------

9. a) Discuss about different types of standard security attacks. 7M  
b) What is Cryptography? Explain about Encryption and Decryption mechanisms. 7M
- OR**
10. a) Draw and explain about PC bus structure. 10M  
b) Define Polling 4M

\*\*\*

**Code: 7GC42**

II B.Tech. II Semester Supplementary Examinations August 2021

**Probability & Statistics**

( Common to CE, ME and CSE )

Max. Marks: 70

Time: 3 Hours

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

\*\*\*\*\*

**UNIT-I**

1. a) Define the following (i) Sample Space (ii) event (iii) Outcome (iv) Probability 8M  
b) Two marbles are drawn in succession from a box containing 10 red, 30 white, 20 blue and 15 orange marbles, with replacement being made after each drawing. Find the probability that (i) both are white (ii) first is red and second is white. 6M

**OR**

2. a) State and prove Addition theorem on probability for two events. 8M  
b) If two dice are throw , Find the probability of getting a sum is 10 6M

**UNIT-II**

3. A random variable X has the following probability function

X	0	1	3	4	5	6	7
P(X)	0	K	2K	2K	3K	K <sup>2</sup>	7K <sup>2</sup> +K

Find the value of K , (ii) Evaluate  $p(0 < x < 5)$ , (iii) Evaluate  $p(x < 5)$  14M

**OR**

4. The mean and variance of a binomial variable X with parameters n and p are 16 and 8. Find  $P(x = 1)$  and  $P(x > 2)$  14M

**UNIT-III**

5. A population consists of the four numbers 3, 7, 11, 15. Consider all possible samples of size 2 which can be drawn with replacement from this population. Find the population mean and standard deviation, and mean and standard deviation of the sampling distribution of means. 14M

**OR**

6. It is desired to estimate the mean number of hours of continuous use until a certain computer will first require repairs. If it can be assumed that  $\mu = 48$  hours, how large a sample is needed so that one will be able to assert with 90% confidence that the sample mean is off by at most 10 hours. 14M

**UNIT-IV**

7. a) A sample of 64 students has a mean weight of 70 kg. can this be regarded as a sample from a population with mean weight 56kg. and standard deviation is 25 kg. 7M  
b) In a big city, 325 men out of 600 men were found to be smokers. Thus this information supports the conclusion that the majority of men in the city are smokers. 7M

**OR**

8. According to the norms established for a mechanical aptitude test, persons who are 18 years old have an average height 73.2 ( $\mu = 73.2$ ) with standard deviation of 8.6 ( $\sigma = 8.6$ ). If 45 ( $n = 45$ ) members randomly selected of that age average 76.7 ( $\bar{x} = 76.7$ ). Test the null hypothesis  $\mu = 73.2$ , against the alternative hypothesis  $\mu > 73.2$  at the 0.01 level of significance. 14M

**UNIT-V**

9. In an investigation on the machine performance, the following results are obtained

	No. of units inspected	No. of defectives
Machine I	375	17
Machine II	450	22

Test whether there is any significant performance of two machines at  $\alpha = 0.05$  14M

**OR**

10. 4 coins were tossed 160 times and the following results were obtained,

No. of Heads	0	1	2	3	4
Frequency	17	52	54	31	6

Under the assumption that coins are unbiased, find the expected frequencies of 0,1,2,3,4 heads and test the goodness of fit for  $\alpha = 0.05$  14M

\*\*\*