RTSPLESE21_Theoretical Foundation of Computer Science_15B11CI212_09Aug21

Nikunj Gupta | 09 Aug 2021

Test Name::

RTSPLESE21_Theoretical Foundation of Computer Science_15B11CI212_09Aug21

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Question-Wise Details

Section 1
Section #1

50	1h 30m	30.1/35
question(s)	Time taken	Marks Scored

Q. 1

Question 1

Time taken: 53s | Marks Scored: 0/0.7

How many elements in the Power set of set A= {{Φ}, {Φ, {Φ}}}?

Response:

OPTIONS	RESPONSE	ANSWER
a. 4		✓
b. 2	✓	
c. 6		
d. 5		

Q. 2

Question 2

Time taken: 31s | Marks Scored: 0.7/0.7

If x is a set and the set contains an integer which is neither positive nor negative then the set x is _____.

Response:

OPTIONS	RESPONSE	ANSWER
a. Set is Empty		
b. Set is Non-empty		
c. Set is Finite.		
d. Set is both Non- empty and Finite.	✓	✓

Q. 3

Question 3

Time taken: 5m 6s

Marks Scored: 0.7/0.7

Let S be a set of n>0 elements. Let be the number Br of binary relations on S and let Bf be the number of functions from S to S. The expression for Br and Bf, in terms of n should be _____

Response:

OPTIONS	RESPONSE	ANSWER
a) n^2 and $2(n+1)^2$		
b) n^3 and $n^{(n+1)}$		
c) n and $n^{(n+6)}$		
d) $2^{(n*n)}$ and n^n	✓	✓

Q. 4

Question 4

Time taken: 43s

Marks Scored: 0.7/0.7

Two sets are called disjoint if there _____ is the empty set.

Response:

OPTIONS	RESPONSE	ANSWER
a) Union		
b) Difference		
c) Intersection	✓	✓
d) Complement		

Q. 5

Question 5

Time taken: 6m 10s

Marks Scored: 0/0.7

Let R be a relation between A and B. R is asymmetric if and only if _____

Response:

OPTIONS	RESPONSE	ANSWER
a) Intersection of D(A) and R is empty, where D(A) represents diagonal of set	✓	
b) R^{-1} is a subset of R, where R^{-1} represents inverse of R		
c) Intersection of R and R^{-1} is D(A)		✓
d) D(A) is a subset of R, where D(A) represents diagonal of set		

Q. 6

Question 6

Time taken: 3m 57s

Marks Scored: 0.7/0.7

How many injections are defined from set A to set B if set A has 4 elements and set B has 5 elements?

Response:

OPTIONS	RESPONSE	ANSWER
a. 24		
b. 64		
c. 144		
d. 120	✓	✓

Q. 7

Question 7

Time taken: 1m 26s

Marks Scored: 0.7/0.7

Power set of empty or Null set has exactly _____ subset.

Response:

OPTIONS	RESPONSE	ANSWER
a. One	✓	✓
b. Two		
c. Zero		
d. Three		

Q. 8

Question 8

Time taken: 2m 1s

Marks Scored: 0.7/0.7

Let the players who play cricket be 12, the ones who play football 10, those who play only cricket are 6, then the number of players who play only football are _____, assuming there is a total of 16 players.

Response:

OPTIONS	RESPONSE	ANSWER
a. 16		
b. 8		
c. 4	✓	✓
d. 10		

Q. 9

Question 9

Time taken: 4m 43s

Marks Scored: 0.7/0.7

How many relations exist from set X to set Y if the set X and set Y has 7 and 8 elements?

Response:

OPTIONS	RESPONSE	ANSWER
a.2^{56}	✓	✓
b. 2^{72}		
c. 3^{56}		
d. 56		

Q. 10

Question 10

Time taken: 1m 20s

Marks Scored: 0.7/0.7

What is the identity element in the group G = {2, 4, 6, 8) under multiplication modulo 10?

Response:

OPTIONS	RESPONSE	ANSWER
A. 5		
B. 9		
C. 6	✓	✓
D. 12		

Q. 11

Question 11

Time taken: 1m 54s

Marks Scored: 0.7/0.7

This is an abelian group { – 3 n : n ε Z } under?

Response:

OPTIONS	RESPONSE	ANSWER
A. division		
B. subtraction		
C. addition	✓	✓
D. multiplication		

Q. 12

Question 12

Time taken: 34s

Marks Scored: 0/0.7

How many properties can be held by a group?

Response:

OPTIONS	RESPONSE	ANSWER
a. 5		✓
b.4	✓	
c.3		
d. 2		

Q. 13

Question 13

Time taken: 1m 42s

Marks Scored: 0.7/0.7

If the binary operation * is defined on a set of ordered pairs of real numbers as (a, b) * (c, d) = (ad + bc, bd) and is associative, then (1, 2) * (3, 5) * (3, 4) equals

Response:

OPTIONS	RESPONSE	ANSWER
A (74,40)	✓	✓
B (32,40)		
C (23,11)		
D (7,11)		

Q. 14

Question 14

Time taken: 2m

Marks Scored: 0.7/0.7

Which sentence is true?

Response:

OPTIONS	RESPONSE	ANSWER
A. Set of all matrices forms a group under multiplication		
B. Set of all rational negative numbers forms a group under multiplication		
C. Set of all non-singular matrices forms a group under multiplication	✓	✓
D. Both (b) and (c)		

Q. 15

Question 15

Time taken: 2m 30s

Marks Scored: 0.7/0.7

The set of all real numbers under the usual multiplication operation is not a group since

Response:

OPTIONS	RESPONSE	ANSWER
a) multiplication is not a binary operation		
b) multiplication is not associative		
c) identity element does not exist		
d) zero has no inverse	✓	✓

Q. 16

Question 16

Time taken: 37s

Marks Scored: 0.7/0.7

A cyclic group can be generated by a/an _____ element.

Response:

OPTIONS	RESPONSE	ANSWER
A singular	✓	✓
B non-singular		
C inverse		
D multiplicative		

Q. 17

Question 17

Time taken: 2m 46s

Marks Scored: 0.7/0.7

Let domain of m includes all students, P (m) be the statement “m spends more than 2 hours in playing polo”. Express ∀m ¬P (m) quantification in English.

Response:

OPTIONS	RESPONSE	ANSWER
a) A student is there who spends more than 2 hours in playing polo		
b) There is a student who does not spend more than 2 hours in playing polo		
c) All students spend more than 2 hours in playing polo		
d) No student spends more than 2 hours in playing polo	✓	✓

Q. 18

Question 18

Time taken: 1m 37s

Marks Scored: 0.7/0.7

Translate ∀x∃y(x < y) in English, considering domain as a real number for both the variable.

Response:

OPTIONS	RESPONSE	ANSWER
a) For all real number x there exists a real number y such that x is less than y	✓	✓
b) For every real number y there exists a real number x such that x is less than y		
c) For some real number x there exists a real number y such that x is less than y		
d) For each and every real number x and y such that x is less than y		

Q. 19

Question 19

Time taken: 1m 53s

Marks Scored: 0.7/0.7

“The product of two negative real numbers is not negative.” Is given by?

Response:

OPTIONS	RESPONSE	ANSWER
a) ∃x ∀y ((x < 0) ∧ (y < 0) → (xy > 0))		
b) ∃x ∃y ((x < 0) ∧ (y < 0) ∧ (xy > 0))		
c) ∀x ∃y ((x < 0) ∧ (y < 0) ∧ (xy > 0))		
d) ∀x ∀y ((x < 0) ∧ (y < 0) → (xy > 0))	✓	✓

Q. 20

Question 20

Time taken: 2m 43s

Marks Scored: 0.7/0.7

(p → r) ∨ (q → r) is logically equivalent to _____

Response:

OPTIONS	RESPONSE	ANSWER
a) (p ∧ q) ∨ r		
b) (p ∨ q) → r		
c) (p ∧ q) → r	✓	✓
d) (p → q) → r		

Q. 21

Question 21

Time taken: 1m 34s

Marks Scored: 0.7/0.7

The statement," Every comedian is funny" where C(x) is "x is a comedian" and F (x) is "x is funny" and the domain consists of all people.

Response:

OPTIONS	RESPONSE	ANSWER
a) ∃x(C(x) ∧ F (x))		
b) ∀x(C(x) ∧ F (x))		
c) ∃x(C(x) → F (x))		
d) ∀x(C(x) → F (x))	✓	✓

Q. 22

Question 22

Time taken: 4m 30s

Marks Scored: 0.7/0.7

Use quantifiers and predicates with more than one variable to express, “There is a pupil in this lecture who has taken at least one course in Discrete Maths.”

Response:

OPTIONS	RESPONSE	ANSWER
a) ∃x∃yP (x, y), where P (x, y) is “x has taken y,” the domain for x consists of all pupil in this class, and the domain for y consists of all Discrete Maths lectures	✓	✓
b) ∃x∃yP (x, y), where P (x, y) is “x has taken y,” the domain for x consists of all Discrete Maths lectures, and the domain for y consists of all pupil in this class		
c) ∀x∀yP(x, y), where P (x, y) is “x has taken y,” the domain for x consists of all pupil in this class, and the domain for y consists of all Discrete Maths lectures		
d) ∃x∀yP(x, y), where P (x, y) is “x has taken y,” the domain for x consists of all pupil in this class, and the domain for y consists of all Discrete Maths lecture		

Q. 23

Question 23

Time taken: 2m 6s

Marks Scored: 0.7/0.7

The compound propositions p and q are called logically equivalent if _____ is a tautology.

Response:

OPTIONS	RESPONSE	ANSWER
a) p ↔ q	✓	✓
b) p → q		
c) ¬ (p ∨ q)		
d) ¬p ∨ ¬q		

Q. 24

Question 24

Time taken: 1m 14s

Marks Scored: 0.7/0.7

How many ways are there to arrange 7 chocolate biscuits and 12 cheesecake biscuits into a row of 19 biscuits?

Response:

OPTIONS	RESPONSE	ANSWER
a) 52347		
b) 50388	✓	✓
c) 87658		
d) 24976		

Q. 25

Question 25

Time taken: 43s

Marks Scored: 0.7/0.7

In how many ways can 8 different dolls be packed in 5 identical gift boxes such that no box is empty if any of the boxes hold all of the toys?

Response:

OPTIONS	RESPONSE	ANSWER
a) 2351		
b) 365		
c) 2740		
d) 1260	✓	✓

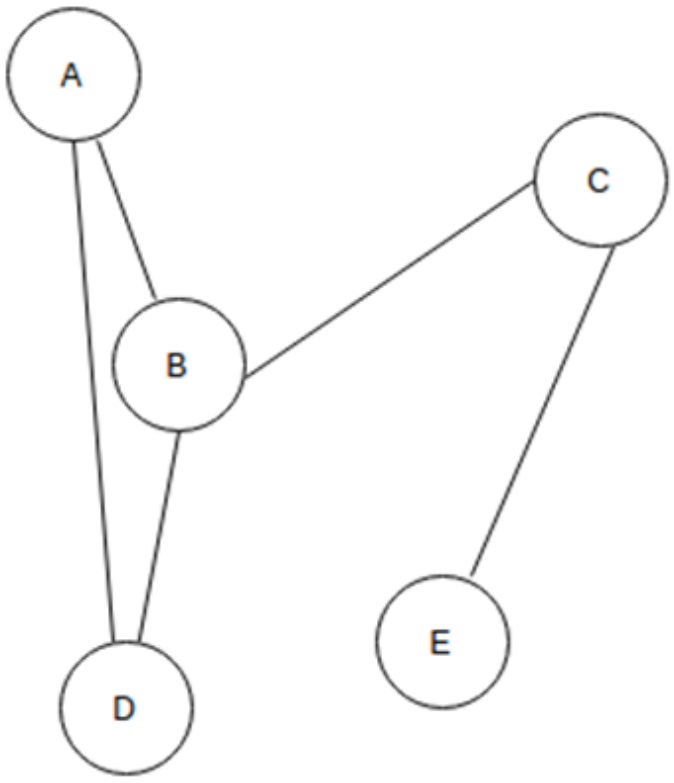
Q. 26

Question 26

Time taken: 1m 8s

Marks Scored: 0.7/0.7

In the given graph identify the cut vertices.



Response:

OPTIONS	RESPONSE	ANSWER
a) B and E		
b) C and D		
c) A and E		
d) C and B	✓	✓

Q. 27

Question 27

Time taken: 3m 51s

Marks Scored: 0/0.7

How many ways are there to divide 4 Indian countries and 4 China countries into 4 groups of 2 each such that at least one group must have only Indian countries?

Response:

OPTIONS	RESPONSE	ANSWER
a) 6		✓
b) 45		
c) 12	✓	
d)76		

Q. 28

Question 28

Time taken: 37s

Marks Scored: 0.7/0.7

A drawer contains 12 red and 12 blue socks, all unmatched. A person takes socks out at random in the dark. How many socks must he take out to be sure that he has at least two blue socks?

Response:

OPTIONS	RESPONSE	ANSWER
a) 18		
b) 35		
c) 28		
d) 14	✓	✓

Q. 29

Question 29

Time taken: 1m 23s

Marks Scored: 0.7/0.7

There are six movie parts numbered from 1 to 6. Find the number of ways in which they be arranged so that part-1 and part-3 are never together.

Response:

OPTIONS	RESPONSE	ANSWER
a) 867		
b) 480	✓	✓
c) 654		
d) 237		

Q. 30

Question 30

Time taken: 2m 2s

Marks Scored: 0.7/0.7

From a group of 8 men and 6 women, five persons are to be selected to form a committee so that at least 3 women are there on the committee. In how many ways can it be done?

Response:

OPTIONS	RESPONSE	ANSWER
a) 686	✓	✓
b) 438		
c) 732		
d) 549		

Q. 31

Question 31

Time taken: 1m 29s

Marks Scored: 0.7/0.7

The number of words of 4 consonants and 3 vowels can be made from 15 consonants and 5 vowels, if all the letters are different is _____

Response:

OPTIONS	RESPONSE	ANSWER
a) $3! * {}^{12}C_5$		
b) ${}^{16}C_4 * {}^{4}C_4$		
c) 15! * 4		
d) ${}^{15}C_4 * {}^{5}C_3 * 7!$	✓	✓

Q. 32

Question 32

Time taken: 45s

Marks Scored: 0.7/0.7

If a, b, c, d and e are five natural numbers, then find the number of ordered sets(a, b, c, d, e) possible such that a+b+c+d+e=75.

Response:

OPTIONS	RESPONSE	ANSWER
a) ${}^{65}C_5$		
b) ${}^{58}C_6$		
c) ${}^{72}C_7$		
d) ${}^{74}C_4$	✓	✓

Q. 33

Question 33

Time taken: 54s

Marks Scored: 0.7/0.7

There are 2 twin sisters among a group of 15 persons. In how many ways can the group be arranged around a circle so that there is exactly one person between the two sisters?

Response:

OPTIONS	RESPONSE	ANSWER
a) 15 *12! * 2!	✓	✓
b) 15! * 2!		
c) $^{14}C_2$		
d) 16 * 15!		

Q. 34

Question 34

Time taken: 1m 7s

Marks Scored: 0.7/0.7

The least number of computers required to connect 10 computers to 5 routers to guarantee 5 computers can directly access 5 routers is _____

Response:

OPTIONS	RESPONSE	ANSWER
a) 74		
b) 104		
c) 30	✓	✓
d) 67		

Q. 35

Question 35

Time taken: 5m 34s

Marks Scored: 0/0.7

When four coins are tossed simultaneously, in _____ number of the outcomes at most two of the coins will turn up as heads.

Response:

OPTIONS	RESPONSE	ANSWER
a) 17		
b) 28	✓	
c) 11		✓
d) 43		

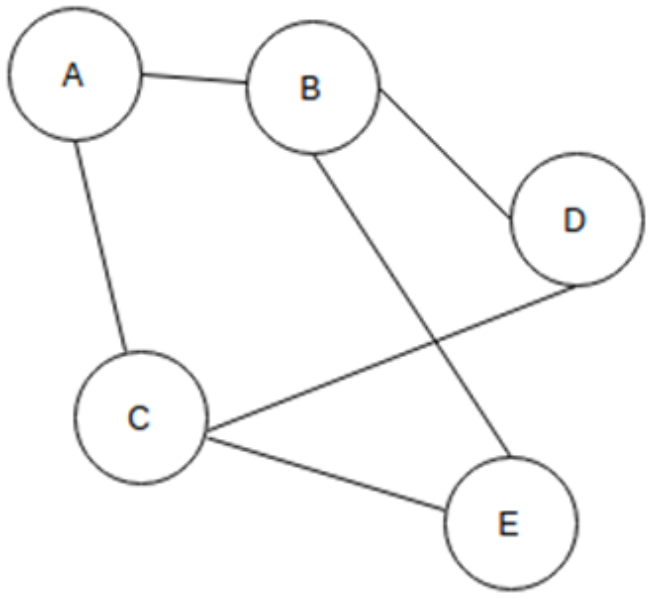
Q. 36

Question 36

Time taken: 1m 11s

Marks Scored: 0.7/0.7

For the given graph(G), which of the following statements is true?



Response:

OPTIONS	RESPONSE	ANSWER
a) G is a complete graph		
b) G is not a connected graph		
c) The vertex connectivity of the graph is 2	✓	✓
d) The edge connectivity of the graph is 1		

Q. 37

Question 37

Time taken: 2m 7s

Marks Scored: 0/0.7

Which of the following is true?

Response:

OPTIONS	RESPONSE	ANSWER
a) A graph may contain no edges and many vertices	✓	
b) A graph may contain many edges and no vertices		✓
c) A graph may contain no edges and no vertices		
d) A graph may contain no vertices and many edges		

Q. 38

Question 38

Time taken: 1m 6s

Marks Scored: 0.7/0.7

Which of the following ways can be used to represent a graph?

Response:

OPTIONS	RESPONSE	ANSWER
a) Adjacency List and Adjacency Matrix		
b) Incidence Matrix		
c) Adjacency List, Adjacency Matrix as well as Incidence Matrix	✓	✓
d) No way to represent		

Q. 39

Question 39

Time taken: 56s

Marks Scored: 0.7/0.7

Which of the following properties does a simple graph not hold?

Response:

OPTIONS	RESPONSE	ANSWER
a) Must be connected	✓	✓
b) Must be unweighted		
c) Must have no loops or multiple edges		
d) Must have no multiple edges		

Q. 40

Question 40

Time taken: 15s

Marks Scored: 0.7/0.7

What is the maximum number of edges in a bipartite graph having 10 vertices?

Response:

OPTIONS	RESPONSE	ANSWER
a) 24		
b) 21		
c) 25	✓	✓
d) 16		

Q. 41

Question 41

Time taken: 14s

Marks Scored: 0.7/0.7

A graph with all vertices having equal degree is known as a _____

Response:

OPTIONS	RESPONSE	ANSWER
a) Multi Graph		
b) Regular Graph	✓	✓
c) Simple Graph		
d) Complete Graph		

Q. 42

Question 42

Time taken: 20s

Marks Scored: 0.7/0.7

For which of the following combinations of the degrees of vertices would the connected graph be eulerian?

Response:

OPTIONS	RESPONSE	ANSWER
a) 1,2,3	✓	✓
b) 2,3,4		
c) 2,4,5		
d) 1,3,5		

Q. 43

Question 43

Time taken: 19s

Marks Scored: 0.7/0.7

RR* can be expressed in which of the forms:

Response:

OPTIONS	RESPONSE	ANSWER
a) R+	✓	✓
b) R-		
c) R+ U R-		
d) R		

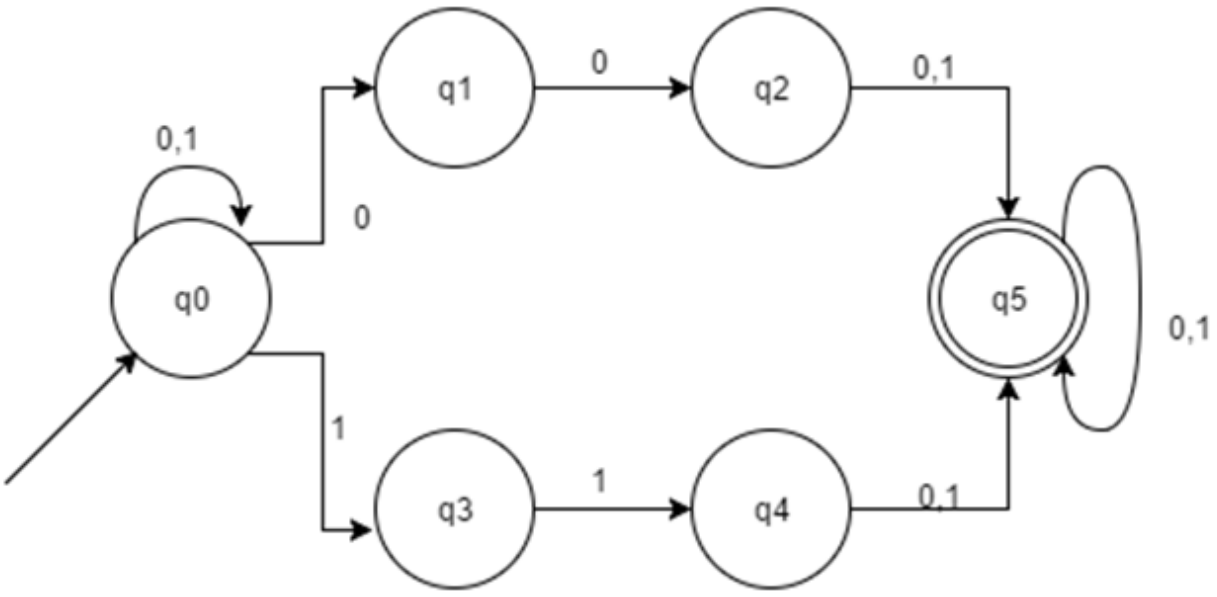
Q. 44

Question 44

Time taken: 1m 3s

Marks Scored: 0.7/0.7

The given NFA corresponds to which of the following Regular expressions?



Response:

OPTIONS	RESPONSE	ANSWER
a) (0+1) *(00+11) (0+1) *	✓	✓
b) (0+1) *(00+11) *(0+1) *		
c) (0+1) *(00+11) (0+1)		
d) (0+1) (00+11) (0+1) *		

Q. 45

Question 45

Time taken: 53s

Marks Scored: 0.7/0.7

The minimum number of states required to recognize an octal number divisible by 3 are/is

Response:

OPTIONS	RESPONSE	ANSWER
a) 1		
b) 3	✓	✓
c) 5		
d) 7		

Q. 46

Question 46

Time taken: 1m 27s

Marks Scored: 0.7/0.7

A regular language over an alphabet ∑ is one that cannot be obtained from the basic languages using the operation

Response:

OPTIONS	RESPONSE	ANSWER
a) Union		
b) Concatenation		
c) Kleene*		
d) All of the mentioned	✓	✓

Q. 47

Question 47

Time taken: 3m 18s

Marks Scored: 0/0.7

Concatenation Operation refers to which of the following set operations:

Response:

OPTIONS	RESPONSE	ANSWER
a) Union		
b) Dot		✓
c) Kleene	✓	
d) Two of the options are correct		

Q. 48

Question 48

Time taken: 1m 4s

Marks Scored: 0.7/0.7

Which of the following is a not a part of 5-tuple finite automata?

Response:

OPTIONS	RESPONSE	ANSWER
a) Input alphabet		
b) Transition function		
c) Initial State		
d) Output Alphabet	✓	✓

Q. 49

Question 49

Time taken: 1m 28s

Marks Scored: 0.7/0.7

According to the given language, which among the following expressions does it corresponds to? Language L={x□{0,1}|x is of length 4 or less}

Response:

OPTIONS	RESPONSE	ANSWER
a) (0+1+0+1+0+1+0+1)4		
b) (0+1)4		
c) (01)4		
d) (0+1+ε)4	✓	✓

Q. 50

Question 50

Time taken: 16s

Marks Scored: 0.7/0.7

Which of the following does not represents the given language? Language: {0,01}

Response:

OPTIONS	RESPONSE	ANSWER
a) 0+01		
b) {0} U {01}		
c) {0} U {0}{1}		
d) {0} ^ {01}	✓	✓