

DR-1522

M. A./M. Sc. (Second Semester) Examination,

April-May 2019

MATHEMATICS

Paper : Fifth (ii) (Optional)

(Advanced Discrete Mathematics-II)

Time Allowed : Three hours

Maximum Marks : 40

Note : Attempt questions of all two sections as directed.

Section-'A'

(Short Answer Type Questions) 5×3=15

Note : Attempt all questions. Each question carries 3 marks.

DR-1522

PT

1. Define out degree and in degree of a vertex.

Explain tree traversals.

2. Define finite state machine

Or

Define equivalent machines.

3. Define finite automation.

Or

Describe Moore machine with example.

4. Define Turing machine. Give one example of it.

Or

Explain the concept of language. Give one example of it.

5. Define regular grammar.

Or

Explain context free grammar.

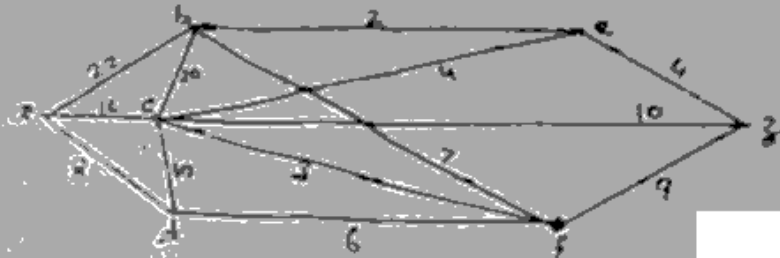
DR-1522

131
Section-'B'

(Long Answer Type Questions) 5x5=25

Note : Attempt all questions. Each question carries 5 marks

6. Write an algorithm for shortest path in weighted graph and use it to find shortest path from *a* to *z* in the graph shown in figure, where the number associated with edges are the weights



Or

Explain systematic order search.

7. Design a finite state machine that receives the set {0, 1, 2} as input and produced an output such that the output is equal to the modulo 3 sum of the digits in the input sequences.

214900

DR-1522

120

11/01

Or

Construct the state diagram for the finite state machine with the state table as given below :

State	f Input		g output	
	0	1	0	1
s_1	s_1	s_0	1	0
s_2	s_2	s_1	0	1
s_3	s_3	s_1	1	1
s_4	s_2	s_1	0	0

8. Explain non-deterministic finite automata

Or

Consider the Mealy machine described by the transition table. Construct a Moore machine which is equivalent to the Mealy machine :

Theory of Computer Science

Present State	Input <i>a</i> / <i>b</i>		Input <i>a</i> / <i>b</i>	
	State	Output	State	Output
s_1	s_1	0	s_1	00
s_2	s_1	1	s_2	0
s_3	s_2	1	s_3	11
s_4	s_1	1	s_4	0

DR-1522

9. Construct a grammar for the language:

$$L = \{a^j b^i : i, j \leq 1, i \neq j\}$$

Or

Explain phrase structure grammar.

10. State and prove Kleene's theorem.

Or

Write a short note on Polish notations.

<http://www.ujjainstudy.com>

Whatsapp @ 9300930012

Send your old paper & get 10/-

अपने पुराने पेपर्स भेजे और 10 रुपये पायें,

Paytm or Google Pay से

DR-1522