Pre-Tutorial (To be completed by student before attending tutorial session

1. Let $r=a(a+b)^*$, $s=aa^*b$ and $t=a^*b$ be three regular expressions. Provide the relationship among the languages L(r), L(s), and L(t). Explain.

Solution:

$$y = a(0+b)^{*}$$

 $5 = aa^{*}b$
 $t = a^{*}b$

exait with on a followed by any Combination of do and bis

L(s): consists of all strings that stort with one (or) more No. of ois followed by o Single b

1(t): consists of all the strings start with zero (or) any No. of ais followed by a single b.

Relationship!

1) L(S) is a subset of L(t) and L(t)

2) L(t) is not a subset of L(v)

: L(s) is a Common set of both ((r) and L(t)

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2. Write the regular expression corresponding to the language L where L = $\{x \in \{0, 1\}^* | x \text{ ends with 1 and does not contain substring 00} \}$. Explain.

Solution:

$$\Rightarrow$$
 End with 1
 \Rightarrow Does not contain oo
 $1 = (1+01)^{+1}$
 $1 = (1,11,101,1101,---)$

3. Prove that $a(ba)^*b = ab(ab)^*$

The string accepted by or can be written as a (box) b

15 abtabab + abababab + -- -

ab (ab) = ab+ abab + ababab + ---

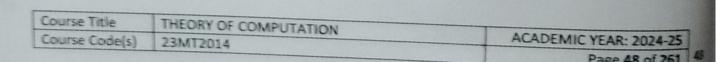
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IN-TUTORIAL (To be carried out in presence of faculty in classroom)

1. Prove that $(1 + 00^{\circ}1) + (1 + 00^{\circ}1)(0 + 10^{\circ}1)^{\circ}(0 + 10^{\circ}1) = 0^{\circ}1(0 + 10^{\circ}1)^{\circ}$ Solution:



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2. Give TWO R.E.s for representing the set L of strings in which every 0 is immediately followed by at least two 1s.

solution: (i)
$$R_1 = (1*)(011)* (1*)$$

3. Prove $(a + b)^* = a^*(ba^*)^*$ using identity rules of regular set.

Solution:

$$(a+b)^{*} = (+(a+b) + (a+b)(a+b) + ---$$

$$= (+a+b+aa+b+ba+bb+---)$$

$$= a^{*} + (b+ab+---)$$

$$= a^{*} + b((+a+b+---))$$

$$= a^{*} + ba^{*}$$

$$= a^{*} ((+ba^{*}))$$

$$= a^{*} ((+ba^{*}))$$

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Post-Tutorial (To be carried out by student after attending the tutorial session)

1. Find the regular expression representing the set of all strings of the form $a^mb^nc^p$ where $m,n,p\geq 1$

Solution:

Find the sets represented by the regular Expression (aa)* + (aaa)*
 Solution:

3. Prove that $P + PQ^*Q = a^*bQ^*$ where $P = b + aa^*b$ and Q is any regular expression. Solution:

4	04	7	Q*	
/	a	U	Q	

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Viva Questions

1. What is the relationship between regular sets and regular expressions? How do they help us describe and analyze patterns in strings?

Answer: Regular sets are the longuages described by regular expression and they represent patterns in string that Con be matched

2. How do we determine whether two regular expressions are equivalent, and what are the implications of equivalence in terms of language recognition and automata theory?

Two regular expression are equivalent if they describe the same regular longuage which means the generate (or) match the same set of Strings.

(For Evaluator's use only)

Comment of the Evaluator (if Any)	Evaluator's Observation
	Marks Secured:out of 50
	Full Name of the Evaluator:
	Signature of the Evaluator
	Date of Evaluation:

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