Q1. Given L1 = a*b and L2=ab*

The regular expression corresponding to (L1 U L2)* is _____

A. a*b
B. (a*b)*
C. a*b*
D. (a*b*)*

Q2. Consider the languages A = L(ab*) and B = L(a*b).

Which one of the following is Correct?

A. A is subset of B

B. B is subset of A

C. A and B are disjoint

D. None of these

Q3. The string 1101 does not belong to the set represented by ____

A. 110*1

B. (0+1)*

C. (00 + (11)* 0)*

D. $(0*1*)^{+}$

Q4. L = (0+1)*

Identify the regular expression which does not represents L.

A. (01)* . L

B. L . (01)*

C. L*

D. L.(0+1)

Q5. Consider the following regular expressions.

P = ((a+epsilon)b*)*

Q = ((b+epsilon)a*)*

1. P is subset of Q
2. Q is subset of P
3. P is equal to Q
4. P is not equal to Q

How many of the above relations are correct?

A. 1
B. 2
C. 3
D. 4

Q6. $L = \{a^n \mid n >= 0\}^*$
Identify equivalent expression for L.

A. aa*+epsilon

B. a^+

C. (aa+aaa)*

D. aaa*

Q7. The binary language described by the regular expression 110*(0+1)*1* is ___

A. The set of all binary strings containing 11

B. The set of all binary strings starts with 110 and ends with 1

C. The set of all binary strings starts with 11 and ends with 1

D. The set of all binary strings starts with 110

Q8. Find the length of shortest string generated by regular expression (a*b)*ab(ab*)*.

A. 0

B. 1

C. 2

D. None of these

Q9. Which of the following regular expression identities is true?

A. $(rs)^* = (sr)^*$

B. $r(r+s)^* = (rr+rs)^*$

C. $(r+s)^* = (r^*s^*r^*)^+$

D. $r(sr)^* = (rs)^*s$

Q10. Which of the following regular expressions represents the language: the set of all binary strings having both 0 and 1?

A. (0+1)*

B. (0 + 1)*0(0+1)*+ (0 + 1)*1(0+1)*

C. (0 + 1)* 0 (0+1)*1(0 + 1)* + (0+1)* 1 (0+1)*0 (0+1)*

D. (0 + 1)* 01 (0+1)* + (0+1)* 10 (0+1)*

Q11. $L = \{ w \in (a+b)^* : \text{No prefix of w contains b} \}$
Find equivalent expression for L.

A. a*

B. b*

C. (ab)*

D. None of these

Q12. $L = \{ w \in (a+b)^* : \text{No prefix of w starts with b} \}$
Find equivalent expression for L.

A. a^*

B. $(ab^*)^*$

C. $a(a+b)^*$

D. None of these

Q13. $L = \{ w \in (a+b)^* : \text{Every prefix of } w \text{ starts with a} \}$
Find equivalent expression for L.

A. a^*

B. $(ab^*)^*$

C. $a(a+b)^*$

D. None of these

Q14. Which one of the following regular expressions represents the set of all unary strings with an odd number of 1's?

A. 1(11)*

B. (0*10*10*)*0*10*

C. Both A and B

D. None of these

Q15. (aa+bb+ab+ba)* is same as

A. (b+a)*

B. (aa)*+(ab)*+(ba)*+(bb)*

C. (a+b)(a+b)*

D. None of these

Q16. Which of the following is TRUE for R is regular expression?

A. R + R = R

B. (RR)* = (R+R)*

C. R . R = R

D. All of these

Q17. Consider the languages R = a*b* and S = a*+b*.

Which one of the following represents L(S) . L(R)?

A. L(R)

B. L(S)

C. (a+b)*

D. None of these

Q18. Consider the language represented by R = (aa+aaa)*.

Which one of the following represents L(R*) ?

A. a*

B. (aa)*

C. aaa* + epsilon

D. None of these

Q19. Which one of the following is TRUE?

A. $(R^*)^* = R$

B. $(R^+)^+ = R$

C. $(R.R)^* = R^*$

D. None of these

Q20. Which of the following regular expression represent the set of all the strings containing either 0 or 1 as a substring but not both?

A. (0+1)*0(0+1)* + (0+1)*1(0+1)*

B. 0* + 1*

C. (0 + 1)*

D. None of these

Q21. Consider the following regular expression R.

$$R = (0+1)^* \; 1 \; (0+1)^*$$

Which of the following is not equivalent to R?

A. {w | w belongs to (0+1)*, w contains 1 as substring}

B. {w | w belongs to (0+1)*, |w| >0}

C. {w | w belongs to (0+1)*, Number of 1's in w >0}

D. None of these

Q22. Find equivalent regular expression for the following L.

L = { w | w belongs to (a+b)*, every b in w is followed by atleast two a's}

A. (baa)*

B. $(baa + a)^*$

C. (baaa)*

D. All of these

Q23. Find equivalent regular expression for the following L.

L = { w | w belongs to (a+b)*, every b in w is followed by atleast one a}

A. (ba)*

B. $(ba^{+})^{*}$

C. (ba*)*

D. ((b+epsilon)a)*

Q24. Which one of the following regular expressions represents the set of all binary strings with an odd number of 1's?

GATE 2020 PYQ

A. 10*(0*10*10*)*

B. ((0 + 1)*1(0 + 1)*1)*10*

C. (0*10*10*)*10*

D. (0*10*10*)*0*1

Q25. Which one of the following regular expressions represents the language: the set of all binary strings having two consecutive 0's and two consecutive 1's?

GATE 2016 PYQ

A. (0+1)*0011 (0+1)* + (0+1)*1100 (0+1)*

B. (0+1)*(00 (0+1)*11+11 (0+1)*00) (0+1)*

C. (0+1)*00 (0+1)* + (0+1)* 11 (0+1)*

D. 00 (0+1)*11 + 11 (0+1)*00

Q26. The length of the shortest string NOT in the language (over sigma ={a, b}) of the following regular expression is _____.

a* b* (ba)* a* GATE 2014 PYQ

A. 0

B. 1

C. 2

D. 3

Q27. Which one of the following languages over the alphabet {0, 1} is described by the regular expression (0+1)*0 (0+1)*0 (0+1)*

GATE PYQ

A. The set of all strings containing the substring 00

B. The set of all strings containing at most two 0's

C. The set of all strings containing at least two 0's

D. The set of all strings that begin and end with either 0 or 1

Q28. The regular expression 0* (10*) denotes the same set as ____

GATE PYQ

A. (1*0)1*

B. 0 + (0+10)*

C. (0+1)*10 (0+1)*

D. None of the above

Q29. Which two of the following four regular expressions are equivalent?

(i) (00)*(epsilon + 0)

(ii) (00)*

(iii) 0*

(iv) 0(00)*

GATE PYQ

A. (i) and (ii)

B. (ii) and (iii)

C. (i) and (iii)

D. (iii) and (iv)

Q30. Which one of the following regular expressions over {0, 1} denotes the set of all strings not containing 100 as substring? GATE PYQ

A. 0*(1+0)*

B. 0*1010*

C. 0*1*01*

D. 0*(10+1)*

Q31. Which of the following regular expression identities are true? GATE PYQ

A. $r(*) = r*$

B. $(r*s*)* = (r+s)*$

C. $(r+s)* = r* + s*$

D. $r*s* = r* + s*$

Q32. In some programming language, an identifier is permitted to be a letter followed by any number of letters or digits. If L and D denote the sets of letters and digits respectively, which of the following expressions defines an identifier? GATE PYQ

A. $(L+D)^+$

B. (L.D)*

C. L(L+D)*

D. L(L.D)*

Q33. Let L={w∈(0+1)∗|w has even number of 1 ’s }, i.e. L is the set of all bit strings with even number of 1’s.
Which one of the regular expression below represents L?

GATE/ISRO PYQ

A. (0*10*1)*

B. 0*(10*10*)*

C. 0*(10*1)*0*

D. 0*1(10*1)*10*

Q34. Which of the following regular expressions describes the language over{0,1} consisting of strings that contain exactly two 1's? GATE PYQ

A. (0+1)*11(0+1)*

B. 0* 1 1 0*

C. 0* 10*1 0*

D. (0+1)*1(0+1)*1(0+1)*

Q35. Consider the regular expression R=(a+b)*(aa+bb) (a+b)*.
Which one of the regular expressions given below defines the same language as defined by the regular expression R ? GATE PYQ

A. $(a(ba)^*+ b(ab)^*)(a+b)^+$

B. $(a(ba)^*+ b(ab)^*)(a+b)^*$

C. $(a(ba)^*(a + bb) + b(ab)^*(b + aa))(a+b)^*$

D. $(a(ba)^*(a + bb) + b(ab)^*(b + aa))(a+b)^+$

Q36. Which of the following statements is TRUE about the regular expression 01*0 ?

GATE PYQ

A. It represents a finite set of finite strings.

B. It represents an infinite set of finite strings.

C. It represents a finite set of infinite strings.

D. It represents an infinite set of infinite strings.

Q37. Which one of the following regular expressions is NOT equivalent to the regular expression (a+b+c)* ? GATE PYQ

A. (a*+b*+c*)*

B. (a*b*c*)*

C. ((ab)*+c*)*

D. (a*b*+c*)*

Q38. Let S and T be languages over $\Sigma=\{a.b\}$ represented by the regular expressions $(a+b^*)^*$ and $(a+b)^*$, respectively. Which of the following is true? GATE PYQ

A. $S \subset T$

B. $T \subset S$

C. $S=T$

D. $S \cap T=\phi$

Q39. Let S and T be languages over $\Sigma=\{a.b\}$ represented by the regular expressions $(a+b^*)^*$ and $(a+b)^*$, respectively.
Which of the following is NOT true?

A. $S \subseteq T$
B. $T \subseteq S$
C. $S = T$
D. $S \neq T$
E. A, B and D

Q40. The string 1101 does not belong to the set represented by ___

GATE PYQ

A. 110*(0+1)

B. 1(0+1)*101

C. (10)*(01)*(00+11)*

D. (00+(11)*0)*

E. Both C and D

Q41. If the regular set A is represented by A=(01+1)* and the regular set B is represented by B=((01)*1*)* , which of the following is true?

GATE PYQ

A. $A \subset B$

B. $B \subset A$

C. A and B are incomparable

D. $A = B$

Q42. Choose the correct alternatives (more than one may be correct) and write the corresponding letters only. Let r =1(1+0)*, s =11*0 and t =1*0 be three regular expressions.
Which one of the following is true?

GATE PYQ

A. $L(s) \subseteq L(r)$ and $L(s) \subseteq L(t)$

B. $L(r) \subseteq L(s)$ and $L(s) \subseteq L(t)$

C. $L(s) \subseteq L(t)$ and $L(s) \subseteq L(r)$

D. $L(t) \subseteq L(s)$ and $L(s) \subseteq L(r)$

E. Both A and C

Q43. Consider the following two regular expressions over the alphabet {0,1}:
The total number of strings of length less than or equal to 5.

A. 63

B. 32

C. 31

D. 64

Q44. Consider the following two regular expressions over the alphabet {0,1}:

$r = 0^* + 1^*$

$s = 0^*1 + 10^*$

The total number of strings of length less than or equal to 5. which are neither in r nor in s is ____

GATE 2024 PYQ

A. 63

B. 44

C. 55

D. 34

Q45. Let L_1 be the language represented by the regular expression b* ab* (ab* ab*)* and L_2 = {w belongs to (a+b)* : |w|<=3} where |w| denotes the length of string w. The number of strings in L_2 which are also in L_1 is __

A. 3

B. 6

C. 9

D. None of these

Q46. Let L_1 be the language represented by the regular expression b* ab* (ab* ab*)* and $L_2 = \{w \in (a|+b)^* w \ |\leq 4|\}$where |w| denotes the length of string w. The number of strings in L_2 which are also in L_1 is _

GATE PYQ

A. 10

B. 14

C. 15

D. None of these

Q47. If L= (a+b)*ab(a+b)* then Complement of L is ___

A. (a+b)*ba(a+b)*

B. (a+b)*aa(a+b)* + (a+b)*ba(a+b)* + (a+b)*bb(a+b)*

C. b*a*

D. None of these

Q48. If L= (a+b)*ba(a+b)* then Complement of L is ___

A. (a+b)*ab(a+b)*

B. (a+b)*aa(a+b)* + (a+b)*ab(a+b)* + (a+b)*bb(a+b)*

C. a*b*

D. None of these

Q49. If $L= (a+b)^+$ then which of the following is FALSE?

A. $L^* = (a+b)^*$

B. $L^+ = L$

C. $L^* . L = L$

D. $L^* . L = L^+$

Q50. Which of the following are equivalent.

I. 0*1 (1+00*1)*

II. 0*1*1+ 11*0*1

III. (0+1)*1

A. I and II

B. I and III

C. II and III

D. None of these