Registration No.:_____

Course Code:CSE322

Course Title:FORMAL LANGUAGES AND AUTOMATION THEORY

Allowed: 01:30hrs. ***Max Marks: 30***

1. Read the following instructions carefully before attempting the question paper.
Match the Paper Code shaded on the OMR Sheet with the Paper code mentioned on the question paper and ensure that both are the same.
2. This question paper contains 30 questions of 1 mark each. 0.25 marks will be deducted for each wrong answer.
3. All questions are compulsory.
4. Do not write or mark anything on the question paper and/or on rough sheet(s) which could be helpful to any student in copying, except your registration number on the designated space.
5. Submit the question paper and the rough sheet(s) along with the OMR sheet to the invigilator before leaving the examination hall.

Q1) Determine the number of states in DFA that accept the following language $L= \{a^n b^{2m} \mid n, m \geq 1\}$

(a) 2 (b) n (c) m (d) 5

CO1, L2

Q2) Determine the number of strings of length less than 4 contains the language described by regular expression $(x+y)^* y (a+ab)^*$

(a) 3 (b) 9 (c) 10 (d) 11

CO1, L2

Q3) Determine the number of states for a minimum DFA that accept the language $L=\{w|w$ has $\{0,1\}^*$, that are divisible by 3 and 5 respectively

(a) 15 (b) 11 (c) 10 (d) 9

CO1, L2

Q4) Representation of the output of mealy machine format is :

(a) $Op(t)= \delta(Op(t))$ (b) $Op(t)= \delta(Op(t)i(t))$ (c) $Op(t): \Sigma$ (d) None of the above mentioned

CO1, L2

Q5) Identify the transitions which takes without consuming any input symbol

(a) ε-transitions (b) λ-transitions (c) ε-transitions & λ-transitions (d) None of the above

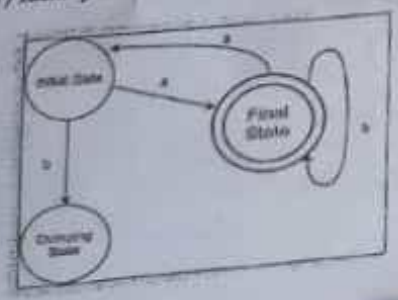
CO1, L2

Q6) Identify from the following that the behaviour of a NFA can be stimulated by DFA .

(a) Depends on NFA (b) Never (c) Always (d) Sometimes

CO1, L2

Q7) Identify from the following that will not be accepted by the given DFA?



(a) abbbaa (b) abbbaabb (c) ababaabaa (d) abbaabbaa

CO1, L2

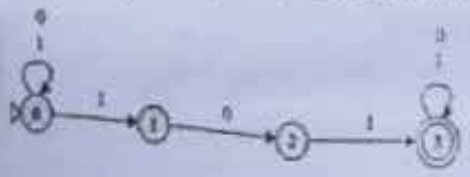
Q8) Find the reason that why the string WWR is not recognized by any FSM ? (WR is the reverse of W)

(a) A FSM cannot remember first and last inputs (b) A FSM cannot match W with WR (c) A FSM cannot fix the midpoint
(d) A FSM cannot remember arbitrarily large amount of information

CO1, L2

Q9)

Choose any one option for the language that is accepted by given NFA.



(a) all strings containing 101 (b) all strings start with 101 (c) all strings end with 101 (d) only for 101 string

CO1, L2

Q10) Determine the right option from below for statement 1 and 2.

Statement 1: All DFA are considered as NFA
Statement 2: All NFA are not considered as DFA

(a) Statement 1 is wrong and Statement 2 is correct (b) Statement 1 and 2 both Wrong
(c) Statement 1 is correct and Statement 2 is wrong (d) Statement 1 and 2 both Correct

CO1, L2

Q11) Represent the following set by regular expression

{w ∈ {a,b)* | w has atmost two a's}

(a) b*ab* + b*ab*ab* (b) b* + b*a*b* + b*a*b*a*b* (c) b*a*b* + b*a*b*ab* (d) b* + b*ab* + b*ab*ab*

CO2, L4

Q12) The set of all strings over {0,1} having 0011 as a substring is represented by

(a) 0*1*0101(0+1)* (b) 0*1*01010*1* (c) (0+1)*0101(0+1)* (d) (0+1)*01010*1*

CO2, L4

Q13) Which of the following expression is true?

(a) (a+b)*a(a+b)*b(a+b) = (a+b)*ab(a+b)* (b) (a+b)*ab(a+b)*+b*a* = (a+b)* (c) (ab)*a = a(ba)* (d) All of the above

CO2, L4

Q14) Which type of the following language is represented by regular expression?

(a) Type 3 language (b) Type 2 language (c) Type 1 language (d) Type 0 language

CO2, L4

Q15) Analyze which of the following statement is true for {w ∈ {a,b)* | w is ba*+a*}.

(a) Starting with one b and having no other b's or having no b's but only a's.
(b) Having no b's but only a's
(c) Starting with one b followed by a's.
(d) None of the above.

CO2, L4

Q16) Analyze the strings of length 6 or less in the regular set represented by the regular expression $(01 + 0)^*(00 + b)$
(a) 0100 (b) 0001 (c) 01000 (d) All of the above.

Q17) Analyze which of the following regular expression is equivalent to $0^*(0+1)^*$
a) 0^*1^* b) 0^*+1^* c) $(01)^*$ d) None of these CO2, L4

Q18) Choose the following statement with the options:
Statement: All suitably lengthy words in a regular language can have a middle piece of words repeated several times to form a new term that also belongs to the same language. CO2, L4
(a) Turing Machine (b) Arden's theorem (c) Pumping Lemma (d) None of these.

Q19) Analyze which of the following statements are true. CO2, L4
a) Under infinite union, the class of regular languages is closed.
b) If L1 U L2 are regular then both L1 and L2 must be regular.
(a) a only (b) b only (c) Both a and b (d) Neither a nor b

Q20) Analyze which one of the following can be a pumping length (the constant guaranteed by the pumping lemma) for L if the regular language $L = \{x \mid x = p^i+6n \text{ or } x = q^{11+13n}, n \geq 0\}$ is for $\Sigma = \{p, q\}$. CO5, L4
(a) 4 (b) 6 (c) 10 (d) 20

Q21) Identify the language generated by the following Grammar CO5, L4
S-> PQ
P->a
Q->b
(a) (ab) (b) (a^*b^*)
(c) $(ab)^*$ (d) none of these

Q22) There are _____ tuples in Grammar CO1, L2
(a) 3 (b) 4 (c) 5 (d) 6

Q23) A grammar G = (V, T, P, S) in which V is CO1, L2
(a) Set of variables (b) Set of terminals (c) Set of variables and non -terminals (d) Production rule

Q24) Regular Grammar is also called _____ CO1, L2
(a) Type 0 (b) Type 1 (c) Type 2 (d) Type 3

Q25) The set of all strings that can be derived from a grammar is said to be _____ CO1, L2
(a) Language (b) Variables (c) Production rule (d) None of these

Q26) Which of the following relates to Chomsky hierarchy? CO1, L2
(a) Type3<Type 2<Type 1<Type 0 (b) Regular<CFL<CSL<Unrestricted
(c) CSL<Unrestricted<CF<Regular (d) Both A and B

Q27) Which of the following string is generated by the grammar S -> 0XY X->0X/0 Y->1Y/1

a) 001 b) 01 c) 10 d) 1001

Q28) Which of the following strings do not belong the given regular expression p*+(p+qpx)? CO1, L2

(a) p (b) pqpx (c) ppqpx (d) xqpx

CO1, L2

Q29) Which type of grammar is it? $S \rightarrow Sp_{q,s} \rightarrow a$

(a) Left linear Grammar (b) Right Linear Grammar (c) Left and Right linear (d) All of the above

CO1, L2

Q30) The grammars in which all of the rules contain only one non-terminal on the right -hand side is called

(a) Left Linear Grammar (b) Right Linear Grammar (c) Left and Right Linear Grammar (d) Linear Grammar

CO1, L2

--End of Question paper--