**POORNIMA UNIVERSITY, JAIPUR**

**END SEMESTER EXAMINATION, APRIL 2023**

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|  | **2BT4171** | Roll No. | Total Printed Pages: 2 |
| **2BT4171** |  |
| B. Tech. II Year IV- Semester (Main/Back) End Semester Examination, April 2023  **(CE)** | |
| **BCEECE4111 : Theory of Computation** | | | |

# Time: **3** Hours. Total Marks: **60**

Min. Passing Marks: **21**

*Attempt* ***five*** *questions selecting one question from each Unit. There is internal choice from Unit I to Unit V. Marks of each question or its parts are indicated against each question / parts. Draw neat sketches wherever necessary to illustrate the answer. Assume missing data suitably (if any) and clearly indicate the same in the answer.*

Use of following supporting material is permitted during examination for this subject.

# **1.--------------------------Nil--------------------** **2.------------------Nil-----------------------**

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|  |  | **UNIT-I (CO1)** | **Marks** | **Bloom Level** |
| **Q.1** | **(a)** | Write Short Notes on Diffrent Types of Set? | **(6)** | **Remember** |
|  |  |  |  |  |
|  | **(b)** | Diffrentiate between Relation and function? Also demonstrate how will you determine if a relationship is a function? | **(6)** | **Understanding** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.2** | **(a)** | Show that ∼ (A ∨ B) ≡ ∼ A ∧ ∼ B is logicaly equivalent or not Also give explanation for your answer? | **(6)** | **Apply** |
|  |  |  |  |  |
|  | **(b)** | Prove using mathematical induction that for all n ≥ 1,  1 + 4 + 7 + · · · + (3n − 2) = n(3n − 1)/2 | **(6)** | **Apply** |
|  |  |  |  |  |
|  |  | **UNIT-II (CO2)** |  |  |
|  |  |  |  |  |
| **Q.3** | **(a)** | Finite Automata can construct machine for which kind of Language and Grammar. Give proper Explanation of Grammar and Language? | **(6)** | **Understanding** |
|  |  |  |  |  |
|  | **(b)** | Screenshot 2023-04-10 at 12.47.12 AM  Convert the given Melay machine to moore machine write the proper steps of conversion and also construct the transition table. | **(6)** | **Create** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.4** | **(a)** | Under what operations are regular language are closed explian them with example? | **(6)** | **Understanding** |
|  |  |  |  |  |
|  | **(b)** | Convert the given Non determonistic finite Automata to Deterministic Finite Automata also give the transition table for them and check it for some input.  Screenshot 2023-04-10 at 12.51.41 AM | **(6)** | **Apply** |
|  |  | **UNIT-III (CO3)** |  |  |
|  |  |  |  |  |
| **Q.5** |  | What do you mean by ambiguous Grammer. How ambigious grammer can be made unambiguous. for a given grammer check is it ambiguous or not if it ambiguous make it unambiguous with proper rule and rewrite the grammer again   1. -> n E--> E+E | E\*E | (E)   input string is (n+n)\*n | **(12)** | **Create** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.6** | **(a)** | Convert the given grammar to CNF  S → aAD  A → aB / bAB  B → b  D → d | **(6)** | **Apply** |
|  |  |  |  |  |
|  | **(b)** | Prove that Context free language closure property with example under union, concatination and kleen star. Under which operation it is not closed | **(6)** | **Understanding** |
|  |  |  |  |  |
|  |  | **UNIT-IV (CO4)** |  |  |
|  |  |  |  |  |
| **Q.7** | **(a)** | Give pushdown automata that recognize the following languages. Give both a drawing and 6-tuple specification for each PDA. (a) A = { w ∈ {0, 1}∗ | w contains at least three 1s } | **(6)** | **Create** |
|  |  |  |  |  |
|  | **(b)** | Language generated ny PDA is? Explain the components and working of PDA | **(6)** | **Remember** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.8** | **(a)** | Convert the following CFG to PDA  S → 0S1 | A  A → 1A0 | S | ε | **(6)** | **Evaluate** |
|  |  |  |  |  |
|  | **(b)** | Explain pumping leema for Context free grammar with proper example? | **(6)** | **Understanding** |
|  |  |  |  |  |
|  |  | **UNIT V (CO5)** |  |  |
|  |  |  |  |  |
| **Q.9** | **(a)** | With a neat diagram explain the working of a Turing Machine.  Write the Turing Machine model. | **(6)** | **Understanding** |
|  |  |  |  |  |
|  | **(b)** | Construct a Turing Machine to accept the following language.L = { 0n1n| n ≥1} | **(6)** | **Apply** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.10** | **(a)** | Write Short notes on different variants of turing machine? | **(6)** | **Understanding** |
|  |  |  |  |  |
|  | **(b)** | Explain with example how turing machine can be used to solve functions? | **(6)** | **Create** |