Total No. of Questions – [3]　　　　　Total No. of Printed Pages: [02]

PRN | | PAPER CODE | U222-235(ESE)

MAY 2022 - ENDSEM EXAM
S.Y. B. TECH (COMPUTER ENGINEERING) (SEMESTER - II)
COURSE NAME: THEORY OF COMPUTATION
COURSE CODE: CSUA22205
(PATTERN 2020)

Time: [1 Hr]　　　　　　　　　　　　　　　　[Max. Marks: 30]

Instructions to candidates:
1) Figures to the right indicate full marks.
2) 'a' part of every question is compulsory
3) Use of scientific calculator is allowed
4) Use suitable data where ever required

Q.1　a)Define and Compare i) Deterministic Pushdown　　[4]
Automata(PDA) ii) Non-deterministic PDA

b) Construct a Pushdown Automata(PDA) for accepting　　[6]
language $L = \{ a^{2n}b^n \mid n>=0\}$ by final state and also
perform validity testing.

OR

b). Construct a Context free grammar generating the　　[6]
following language and hence PDA accepting by empty
store.
$L=\{\{ a^n b^n \mid n>=1 \} \cup \{ a^n b^{2m} \mid m>=1 \}$.

Q.2　a) Describe the concept of Universal Turing Machine　　[4]

b) Construct a Turing Machine for language over {1}　　[6]
which can compute concatenation function and also
perform validity testing.

OR

b) Construct a Turing Machine for subtraction operation　　[6]
M - N where M > N and also perform validity testing.

Q.3 a) Differentiate between tractable and non-tractable problems with suitable examples. [4]

b) Prove any two properties of recursively enumerable (RE) languages. [6]

OR

b) Prove the following statements [6]
1. If a language L is decidable then its complement L' is also decidable.
2. Union of two recursive languages is also recursive.