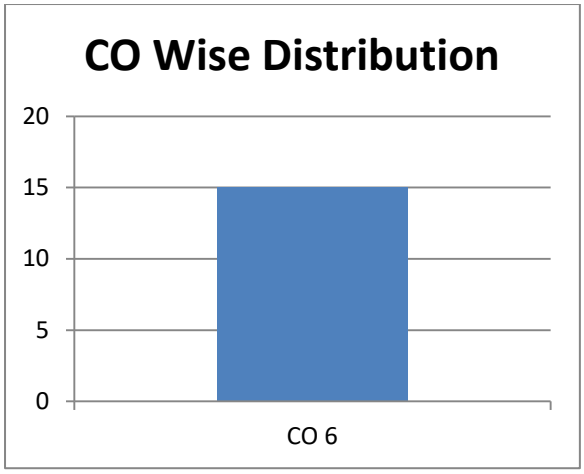
# United College of Engineering & Research, Prayagraj

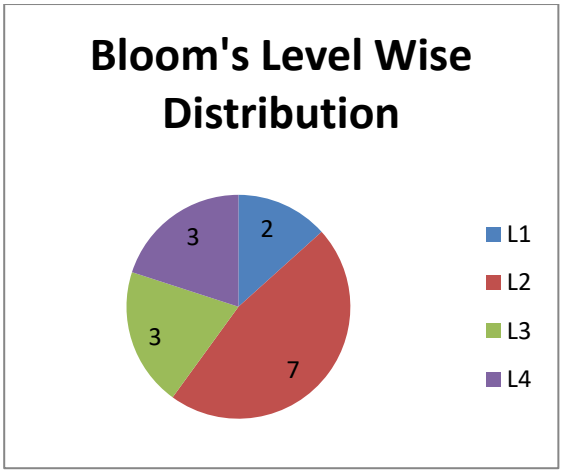
## Department of Computer Science & Engineering

# Automata Theory(KCS-402)

## Assignment-5

| Q. No. | Question | CO | Bloom's level |
|---|---|---|---|
| | **Section-A** | | |
| 1 | What do you understand by the Halting Problem? | CO6 | L2 |
| 2 | What are the features of Universal Turing Machine? | CO6 | L2 |
| 3 | Define the Turing Machine. | CO6 | L1 |
| 4 | What do you mean by Turing decidable language? | CO6 | L2 |
| 5 | Define PCP problem. | CO6 | L1 |
| | **Section-B** | | |
| 6 | Design the Turing Machine for the following language L={$a^n b^n c^n$ ! n≥1}. | CO6 | L4 |
| 7 | Design a TM for the following language: L = { $a^{n+2} b^n$ \| n > 0 } | CO6 | L3 |
| 8 | Design a TM to recognize all strings consisting of an odd number of α's. | CO6 | L2 |
| 9 | Find any three solutions of the lists X= (b, $bab^3$, ba) and Y = ($b^3$, ba, a). | CO6 | L3 |
| 10 | Prove that single tape machines can simulate multi tape machines. | CO6 | L2 |
| 11 | Write short notes on the following:<br>(a) Halting Problem<br>(b) Turing Church's Thesis<br>(c) Recursively Enumerable languages. | CO6 | L2 |
| 12 | Construct Turing Machine for the language,<br>L = ={wcw \| w ∈{a,b}* } | CO6 | L3 |
| 13 | Design a TM that can compute proper subtraction function, it is defined as<br>f(m,n) = m-n , if m > n<br>= 0 , otherwise | CO6 | L4 |
| 14 | State True or False with reason:-<br>(a) Every language described by Regular Expression can be recognized by DFA.<br>(b) Every Recursive Enumerable Language can be generated by CFL.<br>(c) The Halting Problem of TM is decidable.<br>(d) Complement of recursive enumerable language is also recursive enumerable language.<br>(e) Every CFL can be recognized by TM. | CO6 | L2 |
| 15 | Design a Turing machine to calculate function f(m,n)=m*n , where m and n are integers. | CO6 | L4 |




**CO** - Course Outcome

**Bloom's Levels**

| | | |
|---|---|---|
| 1- Remembering | 2-Understanding | 3-Applying |
| 4-Analyzing | 5-Evaluating | 6-Creating |