Total No. of Printed Pages:02

PRN No.	

PAPER CODE	U325-253 (ESE)

(AY:2024-25) May 2025 (ENDSEM) EXAM

TY (SEMESTER - II)

COURSE NAME: THEORY OF COMPUTATION **BRANCH: COMPUTER SCIENCE & ENGG (AIML)** **COURSE CODE: CMUA32203**

T.Y PATTERN 2020R1

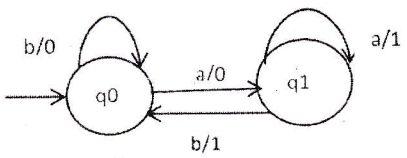
Time: [1Hr 30 Min] **[Max. Marks: 40]**

(*) Instructions to candidates:

1) **Figures to the right indicate full marks. Use of scientific calculator is allowed**
2) **Use suitable data wherever required**
3) **All questions are compulsory. Solve any two sub question each from Questions 1 , 2 ,3 and 4**

Q. No.	Question Description	Max. Marks	CO mapped	BT Level
Q.1	a) Convert the following Non deterministic Finite Automata into Deterministic Finite Automata	[5]	1	3
	b) Construct FA equivalent to following RE expressions: i) 10 + (0+11)0*1 ii) 01 [((10)* + 111)* + 0]* 1	[5]	1	3
	c) Convert the Mealy machine shown in following figure into Moore machine:	[5]	1	3
Q2	a) Simplify the following grammar: S → 0A0 | 1B1 | BB, A→C, B→S |A, C → S | Ɛ	[5]	2	3
	b) Convert the following CFG to CNF: S → Aba | aab, B → Ac	[5]	2	3
	c) Construct the Right Linear grammar for the language: (0+1)* 00 (0+1)*	[5]	2	3

States	0	1
→ p	{p,q}	{p}
q	{r}	{r}
r	{s}	Ø
s*	{s}	{s}



Q3	a) Construct PDA equivalent to the given CFG: $S \rightarrow 0A1 \mid 0BA, \quad A \rightarrow S01 \mid 0, \quad B \rightarrow 1B \mid 1$	[5]	3	3
	b) Construct a PDA for the language of strings of the form $0^n 10^n \mid n>=1$	[5]	3	3
	c) Design a DPDA for a binary number divisible by 3.	[5]	3	3
Q4	a) Design a Post Machine which accepts the strings with equal number of a's and b's.	[5]	4	3
	b) Design a Turing Machine to find the 1's complement of a given binary input	[5]	4	3
	c) Justify "Halting problem of Turing Machine is undecidable" using an example.	[5]	4	3

Note: BT Level : 1 - Remember, 2 - Understand, 3 - Apply, 4 - Analyze, 5 - Evaluate, 6 - Create