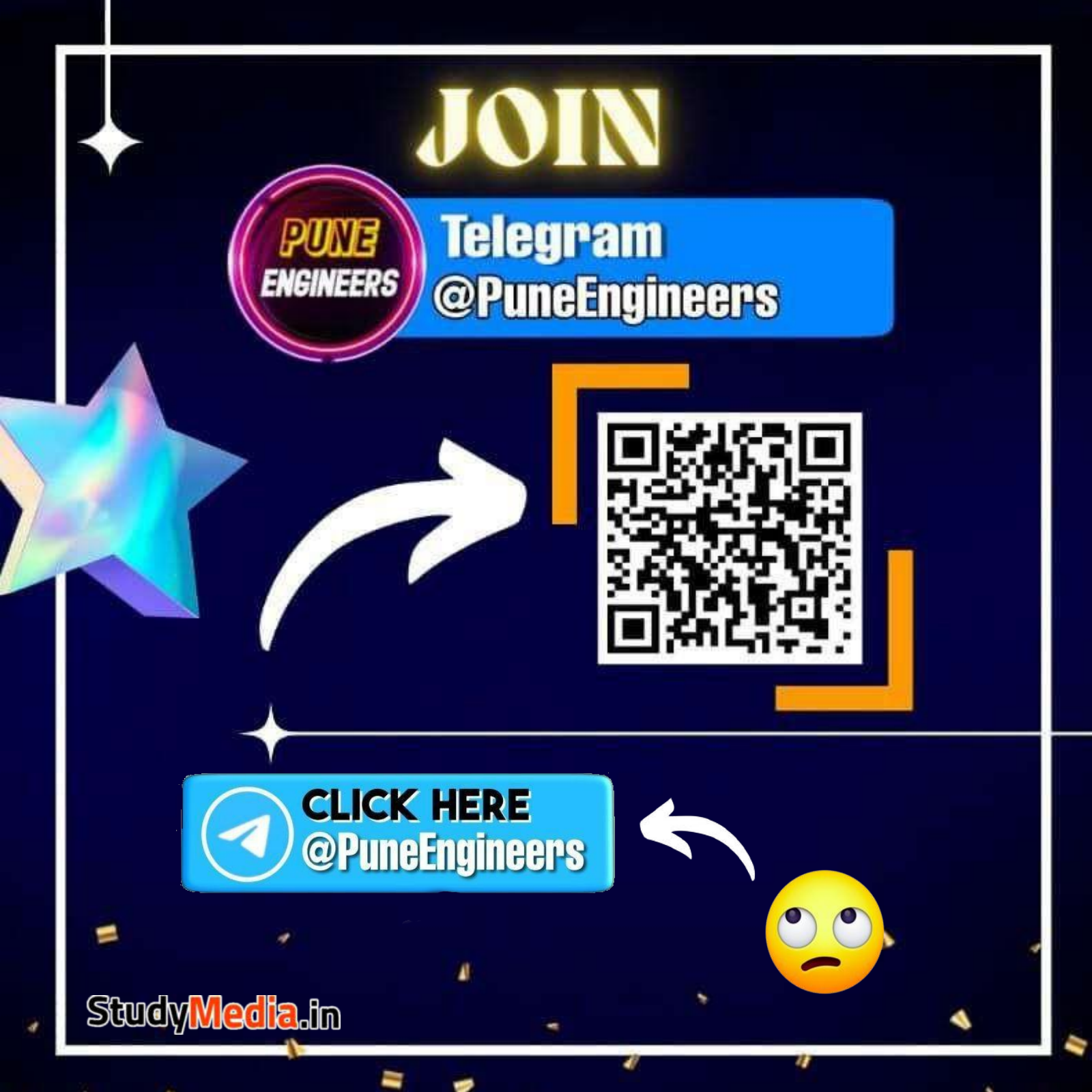

JOIN
PUNE ENGINEERS
Telegram
@PuneEngineers
CLICK HERE
@PuneEngineers
StudyMedia.in

Total No. of Questions : 6]

SEAT No. :

**P5696**

[Total No. of Pages : 3

# TE/INSEM./OCT. - 142

## T.E. (Information Technology)

## THEORY OF COMPUTATION

## (2015 Pattern) (Semester - I) (314441)

*Time : 1 Hour]* *[Max. Marks : 30*

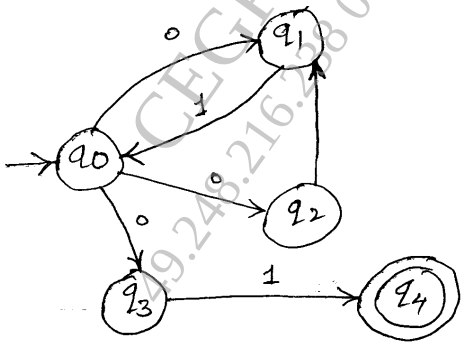
***Instructions to the candidates:***

1) ***Figures in the right indicate full marks.***
2) ***Attempt Q1 or Q2, Q3 or Q4, Q5 or Q6.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable data if necessary.***

CEGP013091 49.248.216.238 07/08/2018 10:58:31

***Q1)*** a) Design FSM for divisibility by 3 tester for binary number. **[6]**

b) Convert the following NFA to DFA. **[4]**




OR

***Q2)*** a) Design FA for accepting strings over $\Sigma = \{a, b\}$ **[6]**

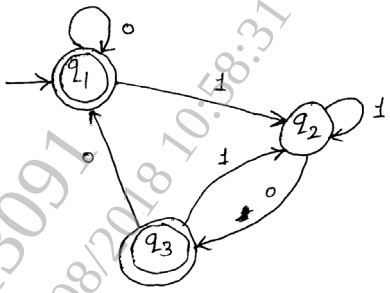
i) Strings containing at least one ‘a’ & at least one ‘b’

ii) Set of all strings that do not contain three or more consecutive a’s

b) Design Mealy machine to find 2’s compliment of a binary number. **[4]**

***P.T.O.***

***Q3)*** a) Obtain RE corresponding to following Transition Diagram using Arden's Theorem. **[6]**




b) Write Regular Language for the following regular expressions. **[4]**

i) $r_1 = (0+1)^* \cdot 11\ (0+1)^*$

ii) $r_2 = (1+10)^*$

OR

***Q4)*** a) Prove that

$L = \{a^p / p \text{ is a prime}\}$ is not regular using pumping Lemma. **[5]**

b) Construct DFA using Direct Method for the following regular expression

$r = 0^* \cdot 1^* \cdot 2^*$ **[5]**

***Q5)*** a) Check whether the following grammar is ambiguous & if yes then remove ambiguity **[6]**

$S \rightarrow i\ C\ t\ S / i\ C\ t\ S\ e\ S / a$

$C \rightarrow b$

b) Write the CFG for (letter) (letter + digit)* **[2]**

c) Find CFL for **[2]**

$S \rightarrow aB / bA$

$A \rightarrow a / aS / bAA$

$B \rightarrow b / bS / aBB$

OR



CEGP013091 49.248.216.238 07/08/2018 10:58:31

***Q6)*** a) Write equivalent Left Linear Grammar for the Right Linear Grammar. **[6]**

$S \rightarrow 0A / 1B$

$A \rightarrow 0C / 1A / 0$

$B \rightarrow 1B / 1A / 1$

$C \rightarrow 0 / 0A$

b) Simplify the following grammar G, **[4]**

$S \rightarrow A / bb$

$A \rightarrow B / b$

$B \rightarrow S / a$

x x x

CEGP013091 49.248.216.238 07/08/2018 10:58:31