

Q.No.	Question	Max. Marks	CO
Q.1	Solve the following		
(A)	<p>It is decided to nominate the General Secretary for Computer Engineering Student Association at S.P.I.T. Nominations are invited for this purpose. The eligibility conditions are as follows.</p> <p>Mumbaikar, Male student should have CGPA, 8 and above</p> <p>Mumbaikar, Female student should have CGPA, 7 and above</p> <p>Non Mumbaikar, Male student should have CGPA, 7 and above</p> <p>Non Mumbaikar, Female student should have CGPA, 6 and above</p> <p>OR</p> <p>Any student from socially challenged category without the backlogs.</p> <p>Design the circuit which indicates whether the applicant is eligible or not.</p>	03	CO1
(B)	<p>Find out the output of the following circuit.</p>	03	CO1
(C)	Design a minimum circuit which detects whether a 4-bit binary number is divisible by 3 or not ?	03	CO2
(D)	<p>$(555)_X = (D7)_H = (\dots)_7$</p> <p>Find out "X" and "....."</p>	03	CO1
(F)	What is race around problem? How it can be mitigated.	03	CO1



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Q.2 A)	<p>Obtain a "BNC" flip flop using J-K flip flop. The "BNC" flip flop has following truth table.</p> <table border="1"> <thead> <tr> <th>B</th><th>N</th><th>C</th><th>Output</th></tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>Q_n (Previous State)</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>Q_n (Previous State)</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>$\overline{Q_n}$</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>$\overline{Q_n}$</td></tr> </tbody> </table>	B	N	C	Output	0	0	0	0	0	0	1	0	0	1	0	Q _n (Previous State)	0	1	1	Q _n (Previous State)	1	0	0	1	1	0	1	1	1	1	0	$\overline{Q_n}$	1	1	1	$\overline{Q_n}$	05	CO3
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Q.2 B)	<p>Realize the following function, $f = m(0,3,6,8,9,10,12,13,14) + d(1,2,5,9,11)$ using...</p> <ol style="list-style-type: none"> AND-OR network NAND-NAND OR-AND NOR-NOR 16:1 Multiplexer 	05	CO2																																				
Q.2 C)	<p>Reduce the given State diagram and obtain reduced table using Normal Method and Implication Chart Method</p>	05	CO3																																				
Q.3	Solve any 3																																						
(A)	<p>Using Quine Mc'Clusky Method minimize the given expression.</p> $f(A,B,C,D) = \sum m(0,1,3,4,5,7,10,13,14,15)$	05	CO1																																				
(B)	Analyze the following Sequential machine and obtain the state diagram.	05	CO3																																				



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(C)	S.P.I.T has decided to install a person counting machine at the entrance of the institute to know the exact number of the persons in the building at any time "t", to avoid crowd in the building to maintain covid guidelines. Design the circuit to perform this task and provide an alarm when the maximum allowable limit (999) is reached. Use 7490 (decade counter). Note that people can move in and out any number of times. Assume that there is only one gate which is used for entry and exit.	05	CO3
(D)	Design a counter which progresses through 0-1-4-6-3-7-0..., using J-K flipflops. While designing take care that the counter comes out from the illegal states automatically.	05	CO3
Q.4	Solve Any 3.		
(A)	What are essential requirements of a central processing unit of a microcomputer? List out and explain any 4 requirements in brief.	05	CO5
(B)	Draw the timing diagram for the ORA M instruction. [No explanation required]	05	CO5
(C)	There are 50 numbers stored in the memory from 5000H. Write a program to sort out the odd numbers. How many such numbers exit in the array? Store this at 6000 H.	05	CO5
(D)	Explain following instructions of 8085. 1. LDA Address 2. PUSH, PSW 3. CALL, Address	1.5 1.5 2	CO5