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# University of Delhi - Open Book Examination (Semester Examination)

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SEMESTER: I

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QUESTION : 3

a) 
$$X = \frac{(B * C + A)}{B}$$

Using one address instructions

LOAD	B	$AC \leftarrow M[B]$
MUL	C	$AC \leftarrow M[C] * AC$
ADD	A	$AC \leftarrow AC + M[A]$
DIV	B	$AC \leftarrow AC / M[B]$
STORE	X	$M[X] \leftarrow AC$

b) (i) 01001110010010

010	011	100	10010
<u>SELA</u>	<u>SELB</u>	<u>R4</u>	<u>OPR</u>
R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	ADD

$$R_4 \leftarrow R_2 + R_3 \quad [\text{Micro-instruction}]$$

(ii) 0110001101011

011	100	011	01011
<u>SELA</u>	<u>SELB</u>	<u>SELD</u>	<u>OPR</u>
R <sub>3</sub>	R <sub>4</sub>	R <sub>3</sub>	OR

$$R_3 \leftarrow R_3 (OR) R_4 \quad [\text{Micro-instruction}]$$



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(iii) 10100001110100

101 000 011 10100

SELA SELB SELD OPR $R_5$  Input  $R_3$  Complement

$$R_3 \leftarrow \overline{R_5} \quad [\text{Micro-instruction}]$$

c) Characteristic Table :-

X	Y	$Q(t+1)$
0	0	$Q(t)$
0	1	0
1	0	1
1	1	$Q'(t)$

Excitation Table :-

$Q(t)$	$Q(t+1)$	X	Y
0	0	0	X
0	1	1	X
1	0	X	1
1	1	X	0

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d) Space-Time diagram for six segment for five tasks

Segment	1	2	3	4	5	6	7	8	9	10	→ Clock cycles
1	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>						
2		T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>					
3			T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>				
4				T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>			
5					T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>		
6						T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	