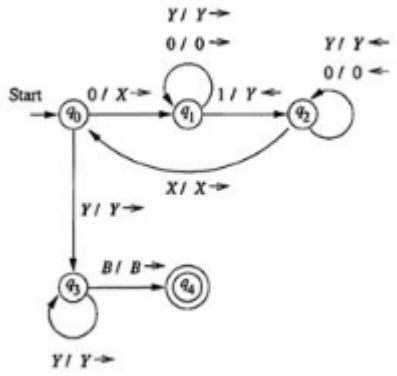
Considering the tape symbol as a tuple - Multiple tracks Turing Machine

1. Can a multi-track Turing machine can be converted to single track Turing machine (**TRUE** /FALSE)?
2. Are Multi-tape and multi-track Turing machine same? (**TRUE** /FALSE)
3. The value of m if Turing machine is defined using m-tuple
   A. 6
   B. 7
   C. 8
   D. 5
4. In multi tape Turing machine, the head of the first tape is at the end of the input
   A. Left
   B. Right
   C. Middle
   D. Corner
5. S1: There exists a deterministic Turing machine corresponding to each non-deterministic Turing Machine
   S2: There exists a single tape Turing machine corresponding to each multi-tape Turing machine.
   Which of the following is correct?
   A. Both S1 and S2 are true
   B. Neither S1 and S2 are true
   C. Only S1 is true
   D. Only S2 is true
6. The below transition diagram accept the _____string



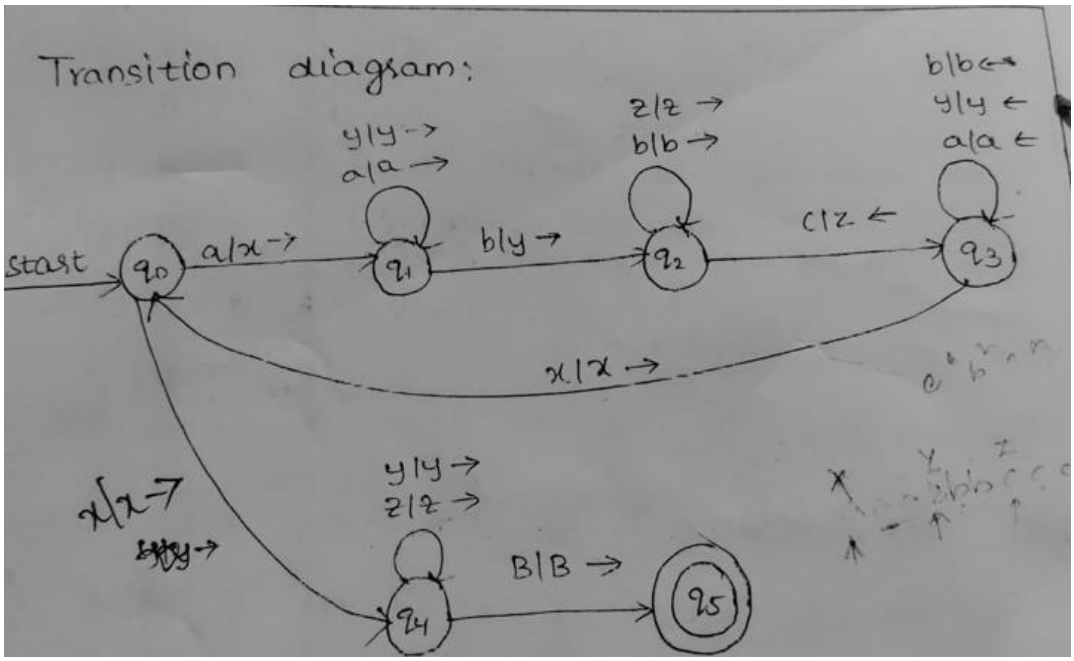
A. 0^n1^n
B. $0^n0^n1^n$
C. 0^n0^n
D. 1^n1^n

Scenario based- Considering the state as a tuple

1. An equity trader invested in two stocks with same quantities where the quantity is represented as n. He then realized that during market crash, whenever he invested in a third stock with the same quantity as that of his first stock, he could make a reasonable profit and so he invested in a third stock of quantity n. Help the investor with a diagrammatic

representation of suitable turing machine that would accept only if the investments would yield a reasonable profit by satisfying the above mentioned criteria.

Sol: Turing Machine for L ={ $a^n b^n c^n$}



Descriptive Question

2. Describe the following Turing machine and their working. Are they more powerful than the Basic Turing Machine?
   - Multi-tape (Multiple Track) Turing Machine
   - Multi-Dimensional Turing Machine
   - Two-Way infinite tape TM

Considering the tape symbol as a tuple is equivalent to multi track TM

3. Construct a TM to accept {0^n1^n / n>=1} using Multi track TM concept
   Sol: We explicitly think of the tape as if it was composed of tracks.

TM M is

$$M = (\{q_0, q_1, q_2, q_3, q_4\}, \{0,1\}, \{0,1,X,Y,B\}, \delta, q_0, B, \{q_4\})$$

where δ is given by the table in Fig. 8.9.

State	Symbol 0	1	X	Y	B
q_0	(q_1, X, R)	–	–	(q_3, Y, R)	–
q_1	$(q_1, 0, R)$	(q_2, Y, L)	–	(q_1, Y, R)	–
q_2	$(q_2, 0, L)$	–	(q_0, X, R)	(q_2, Y, L)	–
q_3	–	–	–	(q_3, Y, R)	(q_4, B, R)
q_4	–	–	–	–	–