(Q3) Write short notes on the following.
(i) Halting problem of TM.
(ii) Recursive language
(iii) varients of Turning Machine

Sol) Halting problem of TM:

- The discription of a Turing machine M and an input w, does M, when started in the initial configuration $q_0 w$, perform a computation that eventually halts.

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- Now we ask whether M applied to w, or simply (M, w), halts or does not halt.
- The domain of this problem is to be taken as the set of all Turing machines and all w; that is we are looking for a single Turing machine that given to description of an arbitrary M & w, will predict whether or not the computation of M applied to w will halt.

Recursive language :

- TM defines two classes of language such as recursively enumerable language and recursively language.
- The language L is called recursively languag if there is a turing machine T that accepts every valid string in L & either rejects or loops for every strings in the complem ent of L(L).
- Every recursive language is recursively enumerable language

Variants of Turning machine:

- Multiple track Turing machine.
- Two way infinite Tape Turing machine.
- multi-tape Turing machine.
- multi-tape multi-head Turing machine.
- multi-dimensional tape Turing machine.
- multi-head Turing machine.
- Non-deterministic Turing machine.