Q 8)

a.) We can utilize a backup coordinator to assume the role and finish the commit or abort process in distributed transactions when the transaction coordinator fails during the second phase of concurrency control (2PC). In case of failure, the backup coordinator, a selected site with a copy of the transaction log, can take over. When the backup coordinator takes over, it analyzes the transaction log to ascertain the status of the transaction and then moves forward with the required commit or abort actions.

b.) We can avoid bad transactions by employing a timeout mechanism if a non-coordinator site dies midway through 2PC (between phase 1 and phase 2). The coordinator site watches for responses from all non-coordinator sites within a predetermined window of time. The coordinator moves through with the required commit or abort actions for the remaining sites if a non-coordinator site doesn't answer within the timeout period, assuming the site has failed. In this approach, even if one or more non-coordinator sites fail, the transaction can still be properly completed.

c.) A recovery mechanism can be used to handle the scenario if a non-coordinator site fails at the beginning of 2PC (prior to phase 1). The recovery mechanism is in charge of undoing any modifications made by failed transactions and retrieving any lost data in order to return the failed site to a consistent state. The site can take part in the 2PC protocol as usual after it has been restored. The site is withdrawn from the protocol if it cannot be recovered, and the surviving sites carry out the necessary commit or abort operations.