

Q49. Which of the following is an appropriate description concerning countermeasures to online system failures?

- a) Backup files for journal files and master files should be stored at the same location as the original files so that they can be used quickly for system recovery.
- b) If a transaction could not be completed properly, roll-forward should be performed to return to the state immediately before the transaction began.
- c) Most up-to-date data immediately before the system failure occurred should be recovered using the master file as well as the transaction files prepared on a regular basis to update the master file.
- d) The master file should be backed up not only at the completion of online service but at times corresponding to the characteristics of the system.