## **Summary**

- The choice of a formula for the construction of index number is a two sided problem. It involves the choice of a method of averaging as well as the choice about the system of weighting.
- Several formulae have been suggested for constructing index numbers and the problem is that of selecting the most appropriate one in a given situation.
- The following tests are suggested for choosing an appropriate index: Unit Test, Time Reversal Test, Factor Reversal Test and Circular Test.
- Unit Test: It requires that the formula should be independent of the units in which or for which prices and quantities are quoted. This test is satisfied by all index number methods except the simple (unweighted) aggregative index method.
- Time Reversal Test: A test that may be used under the axiomatic approach which requires that if the prices and quantities in the two periods being compared are interchanged the resulting price index is the reciprocal of the original price index.
- The time reversal test requires that the index for the later period based on the earlier period should be the reciprocal of that for the earlier period based on the later period. In other words, the two should be reciprocals of each other i.e.,  $P_{01} \times P_{10} = 1$ .
- Fisher's ideal index, simple geometric mean of price relative, aggregates with fixed weights, the weighted geometric mean of price relatives, if we use fixed weights Marshall-Edgeworth methods satisfy the time reversal test.
- Thus a time reversal test, is satisfied when the new index is the reciprocal of the original index if the functions of the base period and given period are interchanged. The advantage of index numbers meeting the criteria of the test is that a symmetric comparison of the two periods is obtained and the results are consistent whether one or the other period is used as a base.
- Factor Reversal Test: The factor reversal test requires that multiplying a price index and a volume index of the same type should be equal to the proportionate change in the current values. Suppose the roles of the prices and quantities in a price index are reversed to yield a quantity index of exactly the same functional form as the price index.
- The factor reversal test used under the axiomatic approach requires that the product of this quantity index and the original price index should be identical with the proportionate change in the value of the aggregate in question. Also known as the "product test". Symbolically, P<sub>01</sub> × Q<sub>01</sub> = Value Index.

- Circular Test: It is concerned with the measurement of price changes over a period of years, when it is desirable to shift the base. If  $P_{01}$  represents the price change of the current year on the base year and  $P_{12}$ , the price change of the base year on some other base and  $P_{20}$ , the price change of the current year on this first base, then following equation should be satisfied:  $P_{01} \times P_{12} \times P_{20} = 1$ .
- The advantage of the circular test is that it reduces the computation every time a change in the base year has to be made. Index numbers can be adjusted from year to year without referring each time to the original base. The disadvantage is that weights in the index numbers depend on the periods between which comparisons are being made, if these periods change, the weights change.