Advantages of FMS

1. There is a greater potential to make changes in terms of product, technology.
2. It reduces both direct and indirect labour cost because of automatic handling, gauging and inspection facilities.
3. It provides reduced manufacturing lead time, reduced inventory of parts (both stock and work in progress).
4. It improves the utilization of equipments. In this case, utilization is 85% compared to 50% in conventional method.
5. It provides a better management control by integration of computers.
6. It provides better and more consistent products.

Computer Integrated Manufacturing (CIM)

- CIM is defined as a process of integration of CAD, CAM and business aspects of a factory and it attempts to describe complete automation with all processes functioning under computer control.
- CIM includes Management Information System (MIS), sales marketing, finance, database management system, design, manufacturing, monitor and control and bar code software etc., which helps to manage and control the overall factory environment. CAD, CAM and CIM basically involve fundamental principles of these underlying branches with hardware and software to operate and utilize them effectively.

Just In Time (JIT)

The Just-in-time production concept was first implemented in Japan around 1970's to eliminate waste of

- Materials
- M/C
- Capital
- Manpower
- Inventory

through out the manufacturing system. The JIT concept has the following objectives:

- Receive supplies just in time to be used.
- Produce parts just in time to be made into subassembly.
- Produce subassemblies just in time to be assembled into finished products.
- Produce and deliver finished products just in time to be sold.

In order to achieve these objectives, every point in the organization where buffer stocks normally occur is identified. Then, critical examinations of reasons for such stocks are made. A set of possible reasons for maintaining high stock is listed below:

- Unreliable/unpredictable deliveries
- Poor qualities from supplier
- Increased variety of materials
- Machine break down
- Labourabsentism
- Frequent machine setting
- Variations in operators capabilities
- Schedule charges
- Changing product priorities
- Product modification

In traditional manufacturing, the parts are made in batches, placed in inventory and used whenever necessary. This approach is known as 'Push system' which means that parts is produced in accordance with the order. That means the rate at which the products come out at the end of final assembly matches with the order quantity for that product. There are no stockpiles within the production process. It is also called zero inventory, stockless production, demand scheduling. Moreover, parts are inspected by the workers as they are manufactured. This process of inspection takes a very short period. As a result of which workers can maintain continuous production control immediately identifying defective parts and reducing process variation. This JIT system ensures quality products. Extra work involved in stockpiling parts is eliminated.

Advantages of JIT

1. Exact delivery schedule is possible with JIT practices.
2. Quality of product is improved.
3. Lower defect rates i.e. lower inspection cost.
4. Lower raw material inventory, in process inventory and finished product inventory resulting lower product cost.
5. Satisfying market demand without delay in delivery.
6. Flexibility in utilizing manpower as workers is trained to do many jobs.
7. JIT helps in effective communication and reduce waste.
8. Less shop floor space is required.
9. Employee morale is high in an efficient working environment.
10. JIT reduces scrap and need for rework.

ISO 9000

ISO stands for International organization for standardization. It is an international body consists of representatives from more than 90 countries. The national standard bodies of these countries are the member of this organization. These are non-governmental

organizations and can provide common standards of goods and services on international trades.
ISO9000 series has 5 numbers of international standards on quality management which are listed below with different objectives.
ISO 9000: Provides guide lines on selection and use of quality management and quality assurance standards.
ISO 9001: This is applicable for industries doing their own design and development, production, installation and servicing. It has 20 elements.
ISO 9002: It has 18 elements. It is same as ISO 9001 without the 1sttwo tasks i.e. design and development.
ISO 9003: It has 12 elements covering final inspection and testing for laboratories and warehouses.
ISO 9004: This provides guidelines to interpret the quality management and quality assurance. It also has suggestions which are not mandatory.

Benefits of ISO 9000 Series

1. This gives competitive advantage in the global market.
2. Consistency in quality, as ISO helps in detecting non-conforming early which makes it possible to rectify.
3. Documentation of quality procedure adds clarity to quality system.
4. It ensures adequate and regular quality training for all members of the organization.
5. It helps in customers to have cost effective purchase procedure.
6. The customers during purchase from firm holding ISO certificate need not spend much on inspection and testing. This will reduce quality cost and lead time.
7. This will aid to improved morale and involvement of workers.
8. The level of job satisfaction will be more.
9. This will help in increasing productivity.

Steps in ISO 9000 Registration

1. Selection of appropriate standard from ISO 9001/9002/9003 using guidelines given in ISO 9000.
2. Preparation of quality manual to cover all the elements in the selected model.
3. Preparation of procedure and shop floor instruction which are used at the time of implementing the system. Also document these items.
4. Self-auditing to check compliance of the selected module.
5. Selection of a registrar (an independent body with knowledge and experience to evaluate any one of the three quality systems i.e. ISO 9001/ 9002/ 9003) and the application is to be submitted to obtain certificate for the selected quality system/ model.

Sl.No.	System requirement	ISO 9001	ISO 9002
1	Management responsibility	✓	✓
2	Quality system	✓	✓
3	Product identification & traceability	✓	✓
4	Inspection status	✓	✓
5	Inspection & Testing	✓	✓
6	Inspection, measuring & test equipment	✓	✓
7	Control of non-conforming products	✓	✓
8	Handling, storage, packaging & delivery	✓ ✓	✓ ✓
9	Document control	✓	✓
10	Quality record	✓	✓
11	Training	✓	✓
12	Statistical technique	✓	✓
13	Internal auditing	✓	✓
14	Contract review	✓	✓
15	Purchasing	✓	✓
16	Process control	✓	✓
17	Purchaser's supplied product	✓	✓
18	Corrective action		✗
19	Design control	✓	✗
20	Servicing	✓	

✓ Present

✗ Not Present

Quality circle (QC)

Quality circle may be defined as a small group of workers (5 to 10) who do the same work voluntarily meeting together regularly during their normal working time usually under the leadership of their own supervisor to identify, analyze and solve work related problems.
This group presents the solution to the management and wherever possible implement the solution themselves. The QC concept was first originated in Japan in 1960. The basic cycle of a quality circle starts from identification of problem.

Philosophical basis of QC

1. A belief that people will take pride and interest in their work if they get autonomy and take part in decision making.
2. It develops a sense of belongingness in the employees towards a particular organization.
3. A belief that each employee desires to participate in making the organization a better place.
4. It is a mean/method for the development of human resources through the process of training, work experience and participation in problem solving.