



Chapter 2

Principles of Management

CBSE Syllabus

- Principles of Management—concept and significance
- Fayol's principles of management
- Taylor's Scientific management—principles and techniques

Content

- 2.1 Fayol's Principles of Management**
- 2.2 Taylor's Scientific Management**
- 2.3 Nature and Significance of Principles of Management**

Learning Outcomes

After going through this chapter, the students will be able to:

- Understand the concept of principles of management
- Explain the significance of management principles
- Discuss the principles of management developed by Fayol
- Explain the principles and techniques of 'Scientific Management'
- Compare the contributions of Fayol and Taylor

Principles of Management

GUIDING PRINCIPLES OF TOYOTA MOTOR CORPORATION

Toyota follows certain well-defined business principles guiding its functioning. These are:

1. Honour the language and spirit of law of every nation and undertake open and fair corporate activities to be a good corporate citizen around the world.
2. Respect the culture and customs of every nation and contribute to economic and social development through corporate activities in local communities.
3. To provide clean and safe products and to enhance the quality of life everywhere.
4. Create and develop advanced technologies and provide outstanding products and services that fulfil the needs of customers worldwide.
5. Foster a corporate culture that enhances individual creativity and teamwork value, while honouring mutual trust and respect between management and labour.
6. Pursue growth and harmony with global community through innovative management.
7. Work with business partners in research and creativity to achieve stable, long-term growth and mutual benefits and be open to new partnerships.

BUSINESS QUOTE

To Enhance Enterprising Skills

Good managers are not born; they are sculpted by learning and training process.

Introduction

It is clear from the foregoing case that managerial pursuits at Toyota Motor Corporation are driven by principles that serve as broad guidelines for stating the vision as well as the ways to achieve it. Similarly, many other business enterprises have followed various principles in their working over a period of time. A number of management thinkers, and writers have also studied principles of management from time-to-time.

In fact, there is a long history of management thought. Management principles have evolved and are in the continuous process of evolution.

Evolution of Management Principles

In tracing the history of management, one comes across various schools of thought that have outlined principles to guide management practices. These schools of thought may be divided into 6 distinctive phases:

1. **Early Perspectives:** The first known management ideas were recorded in 3000-4000 B.C. One Pyramid built by Egyptian ruler Cheops required work to be done by 100,000 men for over twenty years in 2900 B.C. It covered 13 acres of land and measured 481 meters in height. The stone slabs had to be moved thousands of kilometres of distance. As folklore goes, even the sound of a hammer was not heard in the villages in the vicinity of the site of these pyramids. Such monumental work could not be completed without adherence to principles of sound management.
2. **Classical Management Theory:** Rational economic view, scientific management, administrative principles, and bureaucratic organisation characterise this phase. While the rational economic view assumed that people are motivated by economic gains primarily; scientific management of F.W. Taylor and others emphasised one best way of production etc; administrative theorists personified by Henri Fayol etc. looked at the best way to combine jobs and people into an efficient organisation; bureaucratic organisation theorists led by Max Weber looked at ways to eliminate managerial inconsistencies due to abuse of power which contributed to ineffectiveness. This was the era of the industrial revolution and factory system of production. Large scale production would not have been possible without adherence to the principles governing organising production based on division of labour and specialisation, relationship between man and the machine, managing people and so on.
3. **Neo Classical Theory — Human Relations Approach:** This school of thought developed between 1920s to 1950s felt that employees simply do not respond rationally to rules, chains of authority and economic incentives alone but are also guided by social needs, drives and attitudes.

Hawthorne Studies at GEC etc., were conducted then. It was quite natural that in the early phases of the industrial revolution, the emphasis was on development of techniques and technology. The attention to the human factor was the salient aspect of this school of thought. This attention was to serve as a precursor to the development of behavioural sciences.

4. **Behavioural Science Approach — Organisational Humanism:** Organisational behaviourists like Chris Argyris; Douglas McGregor, Abraham Maslow and Fredrick Herzberg used the knowledge of psychology, sociology and anthropology to develop this approach. The underlying philosophy of organisational humanism is that individuals need to use all of their capacities and creative skills at work as well as at home.
5. **Management Science/Operational Research:** It emphasises research on operations and use of quantitative techniques to aid managers to take decisions.
6. **Modern Management:** It sees modern organisations as complex systems and underlies contingency approach and use of modern techniques to solve organisational and human problems.

You can see that the evolution of management thought has been very fascinating. In this chapter we will study the contributions of Henri Fayol and Fredrick Winslow Taylor who are associated with the classical management theory. Both of them contributed immensely towards the study of management as a discipline. But before we go into the details of their contributions let us study the meaning of the principles of management.

Principles of Management: Concept

Principles of management are broad and general guidelines for decision-making and behaviour. They can be used for conduct in workplaces under certain situations. They help managers to take and implement decisions.

For example, while deciding about promotion of an employee one manager may consider seniority, whereas the other may follow the principle of merit.

Principles of management are guidelines to action. They denote a cause and effect relationship. While functions of management viz., Planning, Organising, Staffing, Directing and Controlling are the actions to be taken while practising management, principles of management help managers to take decisions while performing these functions.

- Principles of management have been developed on the basis of observation and experimentation as well as personal experiences of the managers.
- Depending upon how they are derived and how effective they are in explaining and predicting managerial behaviour, they contribute towards the development of management both as a science and as an art. Derivation of these principles may be said to be a matter of science and their creative application may be regarded as an art.
- Management principles have gained importance with increasing professionalisation of management.

Distinction between Principles of Management and Principles of Pure Science

Management principles are not as rigid as principles of pure science. They deal with human behaviour and, thus, are to be applied creatively given the demands of the situation. Human behaviour is never static and so also technology, which affects business. Hence, all the principles have to keep pace with these changes.

Distinction between Principles of Management and Techniques of Management

Techniques are procedures or methods, which involve a series of steps to be taken to accomplish desired goals. Principles are guidelines to take decisions or actions while practicing techniques.

Distinction between Principles of Management and Values

- Values are something, which are acceptable or desirable. They have moral connotations. On the other hand, principles are basic truths or guidelines for behaviour.
 - Values are general rules for behaviour of individuals in society formed through common practice whereas principles of management are formed after research in work situations, which are technical in nature.
- However, while practicing principles of management values cannot be neglected, as businesses have to fulfill social and ethical responsibilities towards society.

2.1 Fayol's Principles of Management

HENRI FAYOL

1. **Life Time:** 1841 to 1925
2. **Profession:** Mining Engineer and Management Theorist (French national)
3. **Education:** Graduated from Mining Academy at St. Etienne in 1880.
4. **Positions Held:** Founded the mining company 'Compagnie de Commentry- Fourchambeau-Decazeville' and became its Managing Director in 1888 and remained till 1918.
5. **Writings:** *Administration industrielle et générale*. It was published in English as *General and Industrial Management* in 1949 and is widely considered a foundational work in classical management theory.
6. **Contributions:** Mainly 14 Management Principles, which are referred to as administrative in nature in that they have Top-Down approach concerning top management and other manager's conduct. In the development of classical school of management thought, Fayol's administrative theory provides an important link. Fayol's contribution must be interpreted in terms of the impact that his writings had and continue to have improvement in managerial efficiencies.

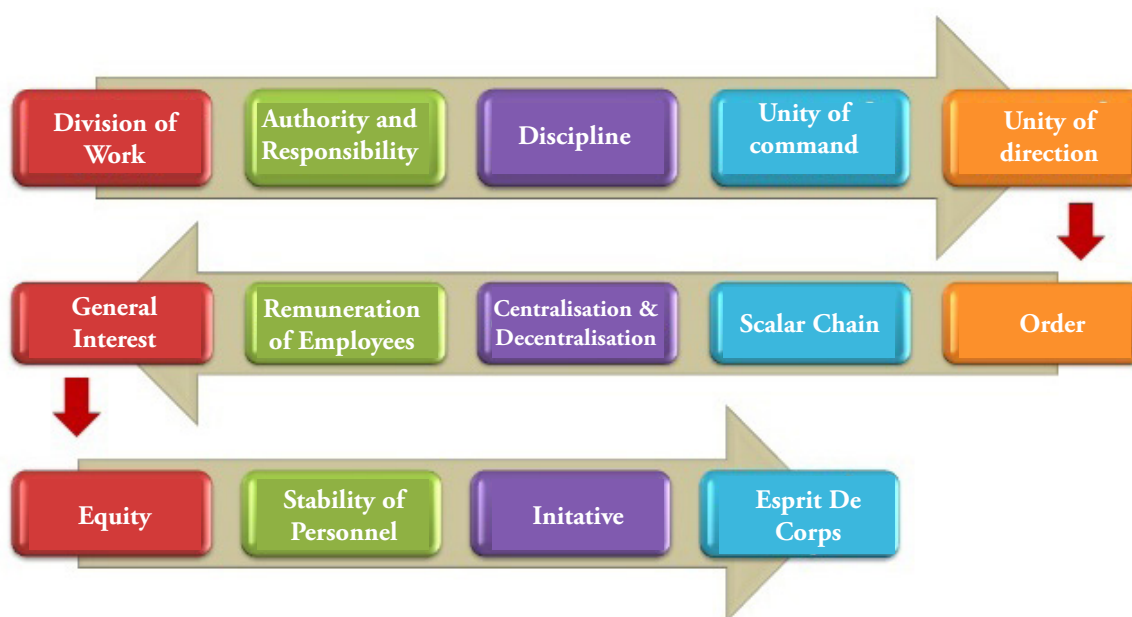


HENRI FAYOL

Father of General Management

Henri Fayol (1841-1925) was a French management theorist whose theories concerning organisation of labour were widely influential in the beginning of twentieth century. He graduated from the mining academy of St. Etienne in 1860 in mining engineering. The 19 year old engineer started at the mining company 'Compagnie de commentry-Fourchambeau- Decazeville, ultimately acting as its managing director from 1888 to 1918.

His theories deal with organisation of production in the context of a competitive enterprise that has to control its production costs. Fayol was the first to identify four functions of management – Planning, Organising, Directing and Controlling although his version was a bit different – Plan, Organise, Command, Coordinate and Control. According to Fayol, all activities of an industrial undertaking could be divided into: Technical; Commercial; Financial; Security; Accounting and Managerial. He also suggested that qualities a manager must possess should be — Physical, Moral, Education, Knowledge and Experience. He believed that the number of management principles that might help to improve an organisation's operation is potentially limitless. Based largely on his own experience, he developed his concept of administration. The 14 principles of management propounded by him were discussed in detail in his book published in 1917, '*Administration industrielle et generale*'. It was published in English as '*General and Industrial Management*' in 1949 and is widely considered a foundational work in classical management theory. For his contribution he is also known as the 'Father of General Management'



Henri Fayol's 14 General Principles of Management

1. Division of Work

Work should be divided into small tasks/jobs. A trained specialist who is competent is required to perform each job. Thus, division of work leads to specialisation.

According to Fayol, "The intent of division of work is to produce more and better work for the same effort. Specialisation is the most efficient way to use human effort."

All kinds of work– technical or managerial – can be performed more efficiently if it is divided into specialised tasks; each performed by a specialist or trained employee. This results in efficient and effective output.

Example

In a company there are separate departments for finance, marketing, production and human resource development etc. All of them have specialised persons. Collectively they achieve production and sales targets of the company. All of them have specialised persons. Collectively they achieve production and sales targets of the company.

2. Authority and Responsibility

According to Fayol, 'Authority' means the right to give orders and obtain obedience. There are two types of authority—(a) official authority, i.e., authority to command and (b) personal authority which is the authority of the individual manager. Authority is both formal and informal.

'Responsibility' means obligation of a subordinate to properly perform the assigned duty.

Managers require authority commensurate with their responsibility. There should be a balance between authority and responsibility.

- An organisation should build safeguards against abuse of managerial power.
- At the same time, a manager should have necessary authority to carry out his responsibility.

Example 1

Suppose the production manager of a company manufacturing scooters asks his foreman to achieve a target production of 500 scooters per day. But he does not give him the authority to requisition tools and materials from stores department. The foreman is not able to achieve the target. In this case, the production manager cannot blame the foreman because he does not give him the authority to requisition tools and materials from stores department. Here, the principle of 'Authority and Responsibility' is violated. When an employee is given responsibility for a job he must also be given the degree of authority necessary to carry it out.

Example 2

If a sales manager requires to offer a credit period of 60 days to negotiate a deal with a buyer to fetch the company net margin of ₹25 lakh, he should not be given power to offer a credit period of 100 days because it is not required. If authority granted is more than responsibility, it may lead to misuse of authority. An organisation should build safeguards against abuse of managerial power. This is the principle of 'Authority and Responsibility'.



Top Tip

According to the principle of 'Authority and Responsibility', a manager should have the right to punish a subordinate for willfully not obeying a legitimate order but only after sufficient opportunity has been given to a subordinate for presenting his/her case.

3. Discipline

Discipline is the obedience to organisational rules and employment agreement which are necessary for the working of the organisation.

According to Fayol, discipline requires good superiors at all levels, clear and fair agreements and judicious application of penalties.

Example

Suppose management and labour union have entered into an agreement whereby workers have agreed to work overtime without any additional payment to revive the company out of loss. In return, the management has promised to increase wages when this mission is accomplished.

Here, 'discipline' would mean that both workers and management honour their commitments without any prejudice towards one another.

4. Unity of command

According to Fayol, there should be one and only one boss for every individual employee. Dual subordination should be avoided.

The principle of unity of command states that each participant in a formal organisation should receive orders from and be responsible to only one superior.

Example

Suppose a sales person is asked to clinch a deal with a buyer and is allowed to give 10% discount by the marketing manager. But finance department tells her/him not to offer more than 5% discount. Now there is no unity of command. This can be avoided if there is coordination between various departments.

Positive effect

The principle of unity of command helps to prevent confusion regarding tasks to be done.

Consequences of violation

If an employee gets orders from two or more superiors at the same time, the principle of unity of command is violated. Fayol felt that if this principle is violated:

- authority is undermined,
- order is disturbed
- and
- discipline is in jeopardy,
- stability is threatened.



Top Tip

The principle of unity of command resembles military organisation.

5. Unity of direction

All the units/divisions of an organisation should be moving towards the same objectives through coordinated and focussed efforts.

Each group of activities having the same objective must have 'ONE HEAD AND ONE PLAN'.

Example

If a company is manufacturing motorcycles as well as cars then it should have two separate divisions for both of them. Each division should have its own in-charge, plans and execution resources. On no account should the working of two divisions overlap.

Positive effects

- Unity of direction ensures unity of action and coordination.
- It prevents overlapping of activities.

Difference between Unity of Command and Unity of Direction

Basis	Unity of Command	Unity of Direction
1. Meaning	One subordinate should receive orders from and should be responsible to only one superior.	Each group of activities having same objective must have one head and one plan.
2. Aim	It prevents dual subordination.	It prevents overlapping of activities.
3. Implications	It affects an individual employee.	It affects the entire organisation.

6. Subordination of Individual Interest to General Interest

The interests of an organisation should take priority over the interests of any one individual employee.

A manager can ensure this by his/her exemplary behaviour. *For example*, he/she should not fall into temptation of misusing his/her powers for individual/ family benefit at the cost of larger general interest of the workers/ company. This will raise his/her stature in the eyes of the workers and at the same time ensure same behaviour by them.

Explanation

Every worker has some individual interest for working in a company. The company has got its own objectives. For example, the company would want to get maximum output from its employees at a competitive cost (salary). On the other hand, an employee may want to get maximum salary while working the least. In another situation an individual employee may demand some concession, which is not admissible to any other employee like working for less time. In all the situations the interests of the group/company will supersede the interest of any one individual. This is so because larger interests of the workers and stakeholders are more important than the interest of any one person. For example, interests of various stakeholders i.e., owners, shareholders, creditors, debtors, financiers, tax authorities, customers and the society at large cannot be sacrificed for one individual or a small group of individuals who want to exert pressure on the company.

7. Remuneration of Employees

The overall pay and compensation should be fair to both employees and the organisation.

- The employees should be paid fair wages, which should give them at least a reasonable standard of living.
- At the same time it should be within the paying capacity of the company.

In other words, remuneration should be just and equitable.

Positive effects

- (i) This will ensure congenial atmosphere and good relations between workers and management.
- (ii) Consequently, the working of the company would be smooth.

8. Centralisation and Decentralisation

The concentration of decision-making authority is called centralisation whereas its dispersal among more than one person is known as decentralisation.

According to Fayol, “**There is a need to balance subordinate involvement through decentralisation with managers’ retention of final authority through centralisation.**”

The degree of centralisation or decentralisation will depend upon the circumstances in which the company is working. In general large organisations have more decentralisation than small organisations.

9. Scalar Chain

An organisation consists of superiors and subordinates. The formal lines of authority from highest to lowest ranks are known as 'scalar chain'.

According to Fayol, “**Organisations should have a chain of authority and communication that runs from top to bottom and should be followed by managers and the subordinates.**”

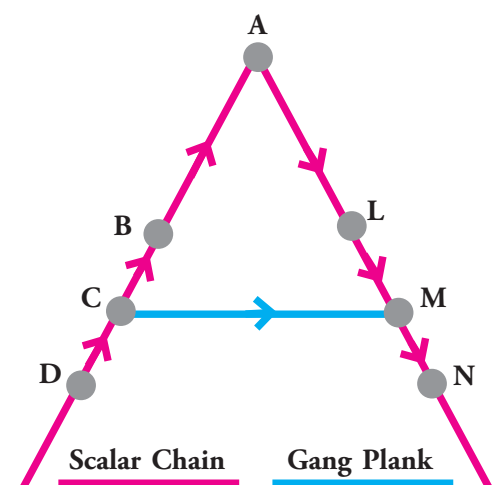
Example

Let us consider a situation where there is one head 'A' who has two lines of authority under her/ him. One line consists of B-C-D. Another line of authority under 'A' is L-M-N.

If 'C' has to communicate with 'M' who is at the same level of authority then she/he has to traverse the route C-B-A-L-M. This is due to the principle of scalar chain being followed in this situation.

According to Fayol, this chain should not be violated in the normal course of formal communication. However, if there is an emergency then 'C' can directly contact 'M' through 'Gang Plank' as shown in the diagram.

Gang Plank is a shorter route and has been provided so that communication is not delayed in an emergency.



✓ Top Tip

A worker cannot directly contact the CEO of the company. If at all he/she has to, then all the formal levels i.e., foreman, superintendent, manager, director etc. must know about the matter. However, in an emergency it can be possible that a worker can contact CEO directly.

10. Order

According to Fayol, “People and materials must be in suitable places at appropriate time for maximum efficiency.” The principle of order states that **‘a place for everything (everyone) and everything (everyone) in its (his/her) place’**. Essentially, it means orderliness.

Positive effects

- If there is a fixed place for everything (everyone) and it (he/she) is present there, then there will be no hindrance in the activities of business/ factory.
- This will lead to increased productivity and efficiency.

Example

In a school, books are kept in office, chalks in the library and office records in the staff room. In this case, the management principle of ‘Order’ is violated. In the absence of orderliness, school objectives will not be achieved efficiently and effectively.

11. Equity

This principle emphasises kindness and justice in the behaviour of managers towards workers.

There should be no discrimination against anyone on account of sex, religion, language, caste, belief or nationality etc.

According to Fayol, **“Good sense and experience are needed to ensure fairness to all employees, who should be treated as fairly as possible.”**

Example

In multinational corporations, people of various nationalities work together in a discrimination free environment. Equal opportunities are available for everyone in such companies to rise.

Positive effect

This will ensure loyalty and devotion.

✓ Top Tip

Fayol does not rule out use of force sometimes. Rather he says that lazy personnel should be dealt sternly to send the message that everyone is equal in the eyes of the management. There should be no discrimination against anyone on account of sex, religion, language, caste, belief or nationality etc.

12. Stability of Personnel

Personnel should be selected and appointed after due and rigorous procedure. But once selected they should be kept at their post/position for a minimum fixed tenure. They should have stability of tenure. They should be given reasonable time to show results.

According to Fayol, **“Employee turnover should be minimised to maintain organisational efficiency.”**

Consequences

- Any adhocism will create instability/insecurity among employees. They would tend to leave the organisation.
- Recruitment, selection and training cost will be high.

So stability in tenure of personnel is good for the business.

13. Initiative

Initiative means taking the first step with self-motivation. It is thinking out and executing the plan. It is one of the traits of an intelligent person.

According to Fayol, "Workers should be encouraged to develop and carry out their plans for improvements, within the prescribed limits of authority."

Example

A good company should have an employee suggestion system whereby initiative/ suggestions which result in substantial cost/time reduction should be rewarded.



Employee suggestion system: Encourage initiative



Top Tip

Initiative should be encouraged. But it does not mean going against the established practices of the company for the sake of being different.

14. Esprit De Corps

According to Fayol, "Management should promote a team spirit of unity and harmony among employees."

Management should promote teamwork especially in large organisations because otherwise objectives would be difficult to realise. It will also result in a loss of coordination. A manager should replace 'I' with 'We' in all his conversations with workers to foster team spirit.

Positive effects

- This will give rise to a spirit of mutual trust and belongingness among team members.
- It will also minimise the need for using penalties.



Esprit De Corps: Team spirit of unity and harmony

RECAP



Concept of Principles of Management

Principles of management are general guidelines for managerial decision making and behaviour.

- Management principles are not as rigid as principles of pure science. They deal with human behaviour and, thus, are to be applied creatively given the demands of the situation.
- Management principles are guidelines for managerial decisions or actions whereas management techniques are procedures or methods, which involve a series of steps to be performed to accomplish desired goals.

Fayol's Principles of Management

1. **Division of work:** The principle of Division of work suggests that work can be performed more efficiently if it is divided into specialised tasks. A trained specialist who is competent, is required to perform each job leading to specialization which results in efficient and effective output.
2. **Authority and Responsibility:** Authority is the right to give orders and obtain obedience, and responsibility is the corollary of authority. The principle of Authority and Responsibility suggests that managers require authority commensurate with their responsibility. An organisation should build safeguards against abuse of managerial power. At the same time, a manager should have necessary authority to carry out his responsibility. *For example*, a manager enhances the production target from 500 units

to 700 units per month but the authority to draw raw material was not given by him. The production manager should not be blamed if he could not achieve the revised production target. He should have the necessary authority to carry out his responsibility.

3. **Discipline:** Discipline refers to the obedience to organizational rules and employment agreement which are necessary for the working of the organization. It requires good superiors at all levels, clear and fair agreement and judicious application of penalties. Workers and management both should honour their commitments towards one another without prejudice. *Example:* Suppose management and labour union have entered into an agreement whereby workers have agreed to work overtime without any additional payment to revive the company out of loss. In return, the management has promised to increase wages when this mission is accomplished. Both workers and management must honour their commitments.
4. **Unity of command:** The principle of unity of command states that each employee in an organisation should receive orders from one superior only and he should be responsible to only one superior. It prevents confusion regarding tasks to be done. Fayol felt that if this principle is violated "authority is undermined, discipline is in jeopardy, order disturbed and stability threatened." (*This principle resembles military organisation.*) *Aim:* It prevents dual subordination. *Implications:* It affects an individual employee. *Example:* Suppose a salesperson is asked to make a deal with a buyer and is allowed to give 10% discount by the marketing manager. But the finance manager does not permit him to offer more than 5% discount. In this case, there is no unity of command.
5. **Unity of Direction:** Unity of direction states that all the divisions/units of an organisation should be moving towards the same objectives through coordinated and focused efforts. Each group of activities having the same objective must have one head and one plan. This ensures unity of action and coordination. *Aim:* It prevents overlapping of activities. *Implications:* It affects the entire organisation. *Example:* If a company is manufacturing motorcycles as well as cars, then it should have two separate divisions for both of them. Each division should have its own in-charge, plans and execution resources. The working of the two divisions should not overlap on any account.
6. **Subordination of individual interest to general interest:** The interests of an organisation should take priority over the interests of any individual employee. The larger interests of the workers and stakeholders are more important than the interest of any one person. A manager can ensure this by his exemplary behaviour. *For example,* he should not fall into temptation of misusing his powers for individual/ family benefit at the cost of larger general interest of the workers/ company. This will ensure same behaviour by them.
7. **Remuneration of employees:** It states that the remuneration of employees should be just and equitable. Employees should be paid fair wages, which should give them at least a reasonable standard of living. At the same time it should be within the paying capacity of the company. This will ensure good relations between workers and management.
8. **Centralisation and Decentralisation:** The concentration of decision-making authority by the top management is called centralisation whereas its dispersal among more than one person is known as decentralisation. In general, large organisations have more decentralisation than small organisations. According to Fayol, "There is a need to balance subordinate involvement through decentralisation with managers' retention of final authority through centralisation."
9. **Scalar chain:** It refers to chain of authority and communication that runs from top to bottom and should be followed by the managers and the subordinates. It facilitates smooth flow of communication and unity of command in the organisation. This chain should not be violated in the normal course of formal communication. However, in case of any emergency, a shorter route named 'gang plank' may be used to avoid delay in communication. *For example:* There is one head A who has two lines of authority under him, B-C-D and L-M-N. If C has to communicate with M who is at the same level of authority, then he has to transverse the route C-B-A-L-M due to the principle of scalar chain. However, if there is an emergency, then C can directly contact M through gang plank.
10. **Order:** It states that there should be a place for everything and everyone in an organization and that everything or person should be found in its allotted place. This will lead to increased productivity and efficiency.
11. **Equity:** Equity states that there should be no discrimination against anyone on account of sex, religion, language, caste, belief, nationality etc. It emphasises kindness and justice in the behaviour of managers towards the workers. This will ensure loyalty and devotion.
12. **Stability of personnel:** Employees, once selected, should be kept at their post for a minimum fixed tenure and be given reasonable time to show results. It will help to minimize employee turnover and maintain organizational efficiency. Any adhocism will create instability/insecurity among employees. They would tend to leave the organization. Recruitment, selection and training cost of new employees will be high.
13. **Initiative:** Initiative means thinking out and executing the plan within the prescribed limits of authority. It states that the workers should be encouraged to develop and carry out their plans for improvement in the organisation. A good company should have an employee suggestion system whereby initiative/suggestions which result in substantial cost/time reduction should be rewarded.
14. **Esprit De Corps:** It states that management should promote a team spirit of unity and harmony among employees to realise organisational objectives. Otherwise, it will result in a loss of coordination. A manager should replace 'I' with 'We' in all his conversations with workers to foster team spirit. This will give rise to a spirit of mutual trust and belongingness among team members. It will also minimise the need for using penalties.

Extra Shots

Fayol's Principles: THEN and NOW

Fayol's 14 principles of management are widely applicable to managerial problems and have cast a profound impact on management thinking today. But with the change of environment in which business is done, the interpretation of these principles has changed. For example, authority and responsibility meant empowering of managers but now it means empowerment of employees because of flat organisational structures that are gaining ground. We are now in a position to understand the current connotations of Fayol's principles.

	Name of Principle	THEN	NOW
1.	Division of Work	Specialisation in workers' Job design	Generalisation in workers' Job design
2.	Authority & Responsibility	Managers are empowered	Employees are empowered
3.	Discipline	Formalised Controls	Informal, Peer pressure controls
4.	Unity of Command	Subordinates report to only one boss	Subordinates report to multiple bosses
5.	Unity of Direction	Functions have only one plan and one boss	Functions have multiple plans and multiple bosses
6.	Subordination of individual interest to general interest	Employees are committed to the organisation	Organisation is committed to the employees and vice versa
7.	Remuneration of employees	Reasonable Pay reward system	Performance based reward system
8.	Centralisation and decentralisation	Trickle down decision making	Task relevant adhoc decision making
9.	Scalar Chain	Hierarchical, formalised communication channel	Less formalised, flatter communication structure
10.	Order	Internal information system for control purposes	Internal information system for coordination purposes
11.	Equity	Commitment obtained through kindness	Commitment obtained through a sense of ownership
12.	Stability of personnel	Train employees and encourage them to remain	On-going employee training and development
13.	Initiative	Managers conceive and implement new ideas	Workers conceive and implement new ideas
14.	Esprit de corps	Maintaining high morale among employees is imperative	Maintaining high morale among employees is desirable

Objective Type Questions 2.1

- In a company, there are four separate departments for finance, marketing, production and human resource development. Identify the principle of management. **(CBSE 2013)**
- Why did Fayol introduce the concept of 'Gang Plank' in the principle of Scalar chain?
- Name the principle of management which resembles military organisation.
- If the company does not provide the right place for physical and human resources, which principle of management is violated?
- Which principle of management envisages that each group of activities having same objectives must have one head and one plan?
- Which principle of management suggests that employees should be treated with justice and kindness?
- Identify the principle of Fayol which emphasises that wages and salaries paid to the employees should be just and equitable.
- Fayol points out the danger and costs of unnecessary labour turnover in one of his 'Principles'. Name the principle.
- "Workers should be encouraged to develop and carry out their plans for development." Identify the principle of management formulated by Fayol.
- According to Fayol, workers should be encouraged to develop and carry out their plans for improvements. A good company should have an employee suggestion system whereby initiative/ suggestions which result in substantial cost/time reduction should be rewarded. Identify the principle of management highlighted above.
- According to Fayol, a manager should not fall into temptation of misusing his powers for individual/ family benefit at the cost of larger interest of the workers/ company. This exemplary behaviour of the manager will raise his stature in the eyes of the workers and at the same time will ensure same behaviour by them. Identify the principle of management discussed.
- According to Fayol, "Good sense and experience are needed to ensure fairness to all employees, who should be treated as fairly as possible". However, Fayol does not rule out use of force sometimes. Rather he says that lazy personnel should be dealt sternly to send the message that everyone is equal in the eyes of the management. Identify the principle of management highlighted above

13. According to Fayol, personnel should be selected and appointed after due and rigorous procedure. But once selected they should be given reasonable time to show results.
Identify the principle of management highlighted above.
14. Name the principle of management which requires judicious application of penalties by the management.
15. A manager should have the right to punish a subordinate for wilfully not obeying a legitimate order but only after sufficient opportunity has been given to his/her case. Identify the principle of management highlighted here.
16. Following this principle of management will minimise the need for using penalties, but not following it may result in a loss of coordination. Identify the principle.
17. Match the principle of management as given by Henri Fayol being violated:

(a) When no division of the company has a separate plan of action.	(i) Scalar chain
(b) When a manager awards contract for supply of raw material to a particular party, which happens to be owned by his relative ignoring other parties, who can supply the same at a cheaper rate.	(ii) Subordination of individual interest to general interest
(c) When a subordinate habitually contacts higher authorities in the company by passing his/her immediate superior.	(iii) Unity of direction
(d) When the manager grants one month medical leave to a supervisor with pay and only one week medical leave to accountant.	(iv) Equity

18. Name the principle of management according to which a manager should replace 'I' with 'We' in all his conversations with the workers. **(CBSE 2013)**
19. A worker directly contacts the CEO of the company with a complaint regarding working conditions in the factory. Which of the following principles is being violated here?
 - (a) Unity of Command
 - (b) Unity of Direction
 - (c) Scalar Chain
 - (d) Discipline
20. What light does the idea of 'Gang Plank' show about the nature of principles of management?
21. Which principle of management aims at securing the loyalty and devotion of the employees by giving them kind, fair and just treatment?
22. If an organisation does not provide the right place for physical and human resources in an organisation, which principle is violated?

Case Studies

Analysing, Evaluating & Creating Type Questions

1. A manager enhances the production target from 500 units to 700 units per month but the authority to draw raw material was not given by him. The production manager could not achieve the revised production target. Who is responsible and which principle was violated? Explain. **(3 marks)**

Ans. The manager is responsible since the authority to draw raw material was not given by him.

The principle violated is 'Authority and Responsibility'.

(Explain)

2. In a company, a sales manager has to negotiate a deal with a buyer. She finds that if she can offer credit period of 60 days she is likely to clinch the deal which is supposed to fetch the company net margin of say Rs. 50 crores. But the company gives power to the manager to offer a credit period of only 40 days. As a result, she could not negotiate the deal with the buyer.

(a) Is the sales manager liable for this? Give reason in support of your answer.

(b) Should the sales manager be given a power to offer a credit period of 100 days? Justify your answer.

(3 marks)

Ans. (a) No, the sales manager is not responsible if she could not negotiate the deal with the buyer.

She should be granted authority of offering credit period of 60 days in the interest of the company.

Here, the principle of Authority and Responsibility is violated. A manager should have necessary authority to carry out his responsibility.

(b) No, the sales manager should not be given a power to offer a credit period of 100 days because it is not required. An organisation should build safeguards against abuse of managerial power.

3. **Loyd Co. Ltd. manufactures motorcycles and cars. It has two separate divisions for both of them. Each division has its own incharge, plans and execution resources. On no account the working of two divisions overlap. Which principle of management is followed by Loyd Co. Ltd.?** (1 mark)

Ans. Unity of Direction

4. **In a formal organisation, a worker cannot directly contact the CEO of the company. If at all he has to, then all the formal levels, i.e. foreman, superintendent, manager, director, etc have to know about the matter. However, in an emergency it can be possible that a worker can contact CEO directly.**

(a) **Identify and state the principle of management highlighted above.**

(b) **State the device that can be used when in an emergency a worker can contact CEO directly.** (3 marks)

Ans. (a) Scalar Chain: The formal lines of authority from highest to lowest ranks are known as scalar chain. According to Fayol, "Organisations should have a chain of authority and communication that runs from top to bottom and should be followed by managers and the subordinates."

(b) Gang Plank: If there is an emergency then a worker can contact CEO directly through 'Gang Plank', which is a shorter route provided so that communication is not delayed.

5. **Zoya International Ltd. is a multinational company in which people of various nationalities work together with a team spirit of unity and harmony in a discrimination free environment. Equal opportunities are available for everyone in the company. The pay and compensation of all the employees is just and equitable.**

(a) **State the principles of management being followed by Zoya International Ltd.**

(b) **What benefits will Zoya International Ltd. derive by following the principles identified in part (a).**

(6 marks)

Ans. (a) The principles of management being followed by Zoya International Ltd. are:

(i) Esprit de corps (ii) Equity (iii) Remuneration of employees (Give the meaning)

(b) Benefits that Zoya International Ltd. will derive by following the above principles are:

(i) Esprit de corps – This will give rise to a spirit of mutual trust and belongingness among team members. It will also minimise the need for using penalties.

(ii) Equity – Kindliness and justice in the behaviour of managers towards workers will ensure loyalty and devotion.

(iii) Remuneration of employees – This will ensure congenial atmosphere and good relations between workers and management. Consequently, the working of the company would be smooth.

6. **Zaika Ltd. is a company manufacturing garments under the brand name 'Amol'. The management of the company does not give the workers reasonable time to show results. Even the management does not promote a team spirit of unity and harmony among the workers. The workers often have to work under two superiors at the same time.**

(a) **Identify and state the principles of management overlooked in the above case.**

(b) **State the consequences which Zaika Ltd. will have to face by not following the principles identified in part (a).** (6 marks)

Ans. (a) The principles of management overlooked by the management of Zaika Ltd. are:

(i) Stability of Personnel (ii) Esprit De Corps (iii) Unity of Command (Give the meaning)

(b) The consequences which Zaika Ltd. will have to face by not following the above principles are:

(i) Stability of Personnel – Any adhocism in this regard will create instability/insecurity among employees. They would tend to leave the organisation. Recruitment, selection and training cost will be high.

(ii) Esprit De Corps – Objectives would be difficult to realise. It will also result in a loss of coordination

(iii) Unity of Command – If an employee gets orders from two superiors at the same time, "authority is undermined, discipline is in jeopardy, order disturbed and stability threatened".

7. **'F' limited was engaged in the business of food processing and selling its products under a popular brand. Lately the business was expanding due to good quality and reasonable prices. Also with more people working the market for processed food was increasing. New players were also coming to cash in on the**

new trend. In order to keep its market share in the short run the company directed its existing workforce to work overtime.

But this resulted in many problems. Due to increased pressure of work the efficiency of the workers declined. Sometimes the subordinates had to work for more than one superior resulting in declining efficiency. The divisions that were previously working on one product were also made to work on two or more products.

This resulted in a lot of overlapping and wastage. The spirit of teamwork, which had characterised the company, previously was beginning to wane. The quality of the products was beginning to decline and market share was on the verge of decrease. Actually the company had implemented changes without creating the required infrastructure.

Identify and explain briefly any three principles of management given by Henri Fayol that were violated by the company. **(6 marks)**

Ans. Principles of Fayol violated are: (i) Unity of command (ii) Unity of direction (iii) Esprit de corps *(Explain)*

8. The production manager of an automobile company asked the foreman to achieve a target production of 200 scooters per day. But he did not give him the authority to requisition tools and materials from the stores department. Can the production manager blame the foreman if he is not able to achieve the desired target? Explain briefly the principle relating to the situation. **(3 marks)**

Ans. No, the production manager cannot blame the foreman because he did not give him the authority to requisition tools and materials from the stores department.

In this case the principle of 'Authority and Responsibility' is violated. Managers require authority commensurate with their responsibility. There should be a balance between authority and responsibility. An organisation should build safeguards against abuse of managerial power. At the same time a manager should have necessary authority to carry out his responsibility.

9. Nutan Tiffin Box service was started in Mumbai by Mumbai Dabbawalas. The Dabbawalas who are the soul of entire Mumbai aim to provide prompt and efficient services by providing tasty homemade tiffin to all office goers at right time and place. The service is uninterrupted even on the days of bad weather, political unrest and social disturbances. Recently they have started online booking system through their website 'mydabbawala.com'. Owing to their tremendous popularity amongst the happy and satisfied customers and members, the dabbawalas were invited as guest lecturers by top business schools. The Dabbawalas operate in a group of 25-30 people along with a group leader. Each group teams up with other groups in order to deliver the tiffin on time. They are not transferred on frequent basis as they have to remember the addresses of their customers. They follow certain rules while doing trade- No alcohol during working hours; No leave without permission; Wearing of white cap & carrying ID cards during business hours.

State the three principles of management given by Fayol. **(CBSE SQP 2016) (3 marks)**

Ans. Principles of management: (i) Stability of Personnel (ii) Discipline (iii) Esprit de corps *(Explain)*

10. 'Aapka Vidyalaya' believes in holistic development of students and encourages team building through a mix of curricular, co-curricular and sports activities. On its founders day a stage performance had to be put up. A committee of ten prefects was constituted to plan different aspects of the function. They all decided to use recycled paper for decoration. There was a spirit of unity and harmony and all members supported each other. With mutual trust and belongingness the programme was systematically planned and executed. Kartik, one of the prefects realised that unknowingly the group had applied one of the principles of management while planning and executing the programme. He was so inspired by the success of the function that he asked his father to apply the same principle in his business. His father replied that he was already using this principle.

Identify and explain the principle of management applied for the success of the programme. **(3 marks)**

Ans. Esprit de corps *(Explain)*

11. Nikita and Salman completed their MBA and started working in a multinational company at the same level. Both are working hard and are happy with their employer. Salman had the habit of backbiting and wrong

reporting about his colleagues to impress his boss. All the employees in the organisation knew about it. At the time of performance appraisal the performance of Nikita was judged better than Salman. Even then their boss, Mohammed Sharif decided to promote Salman stating that being a female Nikita will not be able to handle the complications of a higher post.

Identify and explain the principle of management which was not followed by this multinational company. (CBSE 2013) (3 marks)

Ans. The principle violated is 'Equity'. (Explain)

12. Rajat joined as a CEO of Bharat Ltd, a firm manufacturing Computer hardware. On the first day he addressed the employees. He said that he believed that a good company should have an employee suggestion system and he wished to minimise employee turnover to maintain organisational efficiency. He informed all employees that he would ensure that all agreements were clear, fair and there was judicious application of penalties. However, he said that he believed that lazy personnel should be dealt sternly to send the message that everyone was equal in the eyes of management. Also, that he would want to promote a team spirit of unity and harmony among employees, which would give rise to a spirit of mutual trust and belongingness among team members and eventually minimise need for using penalties. He told all present that the interests of the organisation should take priority over the interests of any one individual employee.

Identify and briefly explain the principles of management given by Fayol, which Rajat highlighted in his address to the employees. (CBSE SQP 2018) (6 marks)

Ans. Following are the principles of management highlighted by Rajat in his address to the employees: (Explain)

- | | |
|---------------------|---|
| (i) Initiative | (ii) Stability of personnel |
| (iii) Discipline | (iv) Equity |
| (v) Esprit de corps | (vi) Subordination of individual interest to general interest |

13. Appar Foundation is a Non Government Organisation (NGO) working to improve the lives of children with medical needs, the homeless and victims of natural disasters. Apart from donations in cash, they collect dry ration, old clothes, shoes, toys, books and medicines from donors. At Appar Foundation's office in Bhopal the material collected is segregated, classified and put in shelves and boxes that are labelled systematically. There is a specific place for each these items and volunteers put everything at their respective places.

The volunteer work is divided into specific jobs like fund raising, field visit, social media updates and so on. Each volunteer is part of a particular team, depending on their competency and training. Each volunteer becomes specialised in their respective field, leading to efficient utilisation of human effort.

Identify and explain two principles of management adopted by Appar Foundation. (4 marks)

Ans. Principles of management adopted by Appar Foundation are: (i) Order (ii) Division of work (Explain)

14. Sigma Ltd. is a large company manufacturing electric motors. The company has several departments—Production, Marketing, Finance and HR. Mr. Shashank, CEO of the company set the target sale of ₹ 10 crore in a month. To increase the sales, the marketing manager, Mr. Ishaan insists on offering 10% discount to customers. But the finance manager, Mr. Mohak does not approve such discount as it would mean loss of revenue. Because of dual subordination, the sales manager, Mr. Anshik could not achieve the sales target.

Which principle of management has been overlooked by this company? (1 mark)

Ans. Unity of command

15. Deewan Ltd. is a multinational consulting company with its headquarters at Washington D.C. It hires young people from different countries of the world. It is a company in which people dream to work because of its work-environment, pay and growth prospectus. The company has a culture of open communication and people of various nationalities work together in a discrimination free environment. The behaviour of managers of Deewan Ltd. emphasizes kindness and justice which ensures loyalty and devotion of workers. It also promotes mutual trust and belongingness among team members. In this way management of Deewan Ltd. is able to achieve its objectives by promoting team work. By doing so managers of Deewan Ltd. are following some principles of management.

Identify and explain two such principles. (CBSE 2018) (5 marks)

Ans. Two principles of management followed by managers of Deewan Ltd are: (i) Equity (ii) Esprit de Corps (Explain)

16. Mohan Ltd. is producing different lines of products viz. cosmetics, medicines, confectionary items, etc. All activities of the company like purchase, production, sales, accounting, etc. share common Purchase, Production, Sales and Accounts Departments. As a result, there is chaos and ineffective working of the organisation. No department is able to set specific targets related to each type of product and is unable to give justice and full concentration to each product line. Moreover, employees remain confused regarding provision of their focus and attention to a particular product line.

Identify the principle of management violated here.

(1 mark)

Ans. Unity of Direction

17. In an organisation, a sales person is asked to clinch a deal with a buyer and is allowed to give 10% discount by the marketing manager. But finance department tells him not to offer more than 5% discount.

Which principle of management is missing in the above case and how this can be avoided? (1 mark)

Ans. There is no 'unity of command'. This can be avoided if there is coordination between the marketing and finance departments.

18. In a company, management and labour union have entered into an agreement whereby workers have agreed to put in extra hours without any additional payment to revive the company out of loss. In return the management has promised to increase wages of the workers when this mission is accomplished. As per the agreement, the workers worked overtime and within two months, the company's losses were wiped out. Soon the company started earning high profits. All this was due to the hard work and commitment of the workers. But the company denied to increase wages of the workers as per the agreement.

Explain the principle of management violated in the above case.

(3 marks)

Ans. The principle of 'discipline' is violated by the company.

(Explain)

19. Kushal Ltd. is a leading automobile company in which the various departments are setting up their own objectives without paying any interest to the organisational objectives.

Identify the principle of management which has been overlooked by this organisation.

(1 mark)

Ans. Subordination of individual interest to general interest.

20. The manager of an organisation knows that one of the newly appointed workers belongs to the reserved category and he always undermines that employee's performance.

Identify the principle of management violated by the manager.

(1 mark)

Ans. Principle of Equity

21. Anand was continuously shifted from one job to another in the organisation without giving him adequate time to settle down in any department.

Identify the principle of management overlooked here.

(1 mark)

Ans. Principle of Stability of Personnel

22. The production manager of Harsh Ltd. instructs a salesman to go slow in selling the product, whereas the marketing manager is insisting on fast selling to achieve the target.

Which principle of management is being violated in this case?

(1 mark)

Ans. Unity of command

23. Kanika and Priyanka are typists in a company having the same educational qualifications. Kanika is getting ₹20,000 per month and Priyanka ₹15,000 per month as salary for the same working hours. Which principle of management is violated in this case?

(1 mark)

Ans. Principle of equity

24. Rishabh, a manager, very often speaks to people at all levels, passing on instructions regarding his department and also the other departments.

Which principle of management is being overlooked?

(1 mark)

Ans. Principle of Scalar Chain

25. For the last two years, Tulip Industries is not functioning smoothly and systematically. The relations between management and employees are becoming bitter day-by-day. After a complete analysis, it was observed that

employees are not working effectively and efficiently and management is not fulfilling its commitment of increments and promotions.

Which management principle is being ignored in the given case? (1 mark)

Ans. The principle of Discipline

26. Arun is a salesman in Sunrise Ltd. He did an aggressive research on a new cost saving advertisement technique and suggested the same to his sales manager. However, the sales manager did not pay any attention to his suggestion.

Which principle of management is being violated by the sales manager? (1 mark)

Ans. The principle of Initiative

27. Fast Cool Industries (AC manufacturing company) asked its employees to work overtime in order to meet growing demand of AC in the summer season. However, the employees were not paid overtime wages for extra time worked by them. As a result, the employees always felt dissatisfied and it led to unhealthy relationships between the employees and management.

Identify the principle of management not observed by Fast Cool Industries. (1 mark)

Ans. Remuneration of Employees

28. Mr. Prakash Chopra, General Manager of M/s Kwaliti Enterprises (Leather bags manufacturing company) retains complete authority over all the activities of the business. No decision-making power is given to the subordinates. As a result, Mr. Prakash is always engaged in day-to-day operational activities and is unable to concentrate on core issues of the company.

Identify the management principle violated by Mr. Prakash Chopra. (1 mark)

Ans. The principle of Centralisation and Decentralisation

29. Wizard Digitek Enterprises imports various computer parts from China and assembles them to make a complete computer. The total work involves three different tasks: assembling, labelling and packaging of computer. Each employee of the company independently performs these three tasks. As a result, no employee is able to gain specialisation in a particular field and the company is unable to fulfill the orders on time. Identify the principle of management which can be followed by Wizard Digitek Enterprises to overcome this problem. (1 mark)

Ans. The principle of Division of Work

30. Mr. Kapoor, Finance manager of ABC Ltd. applied for leave to attend a family function in Amritsar. The director of the company requested him to cancel his leave as there is an important meeting schedule on that date. Mr. Kapoor immediately agreed and cancelled his trip as he thought that attending the meeting was more important for company's benefit.

Which principle of management is highlighted in this case? (1 mark)

Ans. The principle of subordination of individual interest to general interest

31. Raghav, a manager, expects his subordinates to adapt to the new environs and working conditions without giving them time to settle down.

Identify the principle of management overlooked by the manager. (1 mark)

Ans. Stability of Personnel

32. Pranav, a manager, expects his subordinates to work for the happiness and pleasure of being in the organisation.

Identify the principle of management violated by the manager. (1 mark)

Ans. Remuneration of Employees

33. The sales manager assigned a target of selling 40 RO Water Purifiers in a month to a group of 10 sales executives. They mutually decided to sell 4 purifiers each. However, after selling 1 purifier, Kshitij (one of the sales executive) met with an accident. The other sales executives did not pay any attention to the remaining target of Kshitij and concentrated on their individual sales target. At the end of the month, only 37 purifiers could be sold. Identify the principle of management violated in the given case? (1 mark)

Ans. Esprit De Corps

2.2 Taylor's Scientific Management

FREDRICK WINSLOW TAYLOR

Life Time: March 20, 1856 to March 21, 1915

Profession: American mechanical engineer

Education: Degree in Mechanical Engineering from Stevens Institute of Technology in 1883.

Positions held:

1. Apprentice Machinist in 1874.
2. Executive at Midville Steel Company in 1884.
3. At Bethlehem Iron Company in 1898, which later became Bethlehem Steel Company.
4. Professor at 'Tuck School of Business' founded in 1900.
5. President of 'American Society of Mechanical Engineers' from 1906 to 1907.

Writings:

'The Principles of Scientific Management' series of articles published in 'The American Magazine' during March-May 1911, later published in book form.

1. 'Concrete, Plain and Reinforced' in 1906.
2. 'Notes on Belting' in 1893
3. 'On the Art of Cutting Metals' December 1906.
4. 'A Piece Rate System' in June 1895.
5. 'The making of a putting green' a series of articles published in 1915.
6. 'Not for the genius but for the average man' published in 'The American Magazine' in March 1918.



Fredrick Winslow Taylor:
Founder of Scientific
Management Movement

TAYLOR'S CONTRIBUTION TO SCIENTIFIC MANAGEMENT

Scientific management refers to an important stream of one of the earlier schools of thought of management referred to as the 'Classical' school. Fredrick Winslow Taylor (March 20, 1856 – March 21, 1915) was an American mechanical engineer who sought to improve industrial efficiency. In 1874, he became an apprentice mechanist, learning factory conditions at the grass roots level. He earned a degree in mechanical engineering. He was one of the intellectual leaders of the efficiency movement and was highly influential in reshaping the factory system of production. He belonged to the era of the industrial revolution characterised by mass production.

Taylor's contribution must be seen in the light of the efforts made to perfect the factory system of production. Taylor thought that by scientifically analysing work, it would be possible to find 'one best way' to do it. He is most remembered for his time and motion studies. Taylor believed that workers should cooperate with the management and thus there would be no need of trade unions. The best results would come from the partnership between a trained and qualified management and a cooperative and innovative workforce. Each side needed the other. He is known for coinage of the term 'Scientific Management' in his article 'The Principles of Scientific Management' published in 1911. After being fired from Bethlehem Steel Company he wrote a book 'Shop floor' which sold well. He was selected to be the president of the American Society of Mechanical Engineers (ASME) from 1906 to 1907. He was a professor at Tuck School of Business at Dartmouth College founded in 1900. In 1884 he became an executive at Midvale Steel Company by demonstrating his leadership abilities. He instructed his fellow workers to work in phases. He joined the Bethlehem Iron Company in 1898, which later became Bethlehem Steel Company. He was originally employed to introduce piece rate wage system. After setting up the wage system, he was given authority and more responsibilities in the company. Using his newfound resources he increased the staff and made Bethlehem a show place for inventive work. Unfortunately, the company was sold to another group and he was discharged. In 1910 his health started to fall. He died in 1915 due to pneumonia.

Principles of Scientific Management

In the earlier days of the Industrial Revolution, in the absence of an established theory of factory organisation, factory owners or managers relied on personal judgment in attending to the problems they confronted in the course of managing their work. This is what is referred to as 'rule of thumb'. Managing factories by rule of thumb enabled them to handle the situations as they arose but suffered from the limitation of a trial and error approach. For their experiences to be emulated, it was important to know what works and why does it work. For this, there was a need to follow an approach that was based on the method of science defining a problem, developing alternative solutions, anticipating consequences, measuring progress and drawing conclusions. In this scenario, Taylor emerged as the 'Father of Scientific Management'. He proposed scientific management as opposed to rule of thumb. He broke up human activity into small parts and found out how it could be done effectively, in less time and with increased productivity.

According to Taylor, "Scientific management means knowing exactly what you want men to do and seeing that they do it in the best and cheapest way."

The Bethlehem Steel company where Taylor himself worked achieved three-fold increase in productivity by application of the following scientific management principles.

1. Science, not Rule of Thumb

Taylor believed that there was only one best method to maximise efficiency.

- This method can be developed through study and analysis.
- The method so developed should substitute 'Rule of Thumb' throughout the organisation.
- Scientific method involved investigation of traditional methods through work-study, unifying the best practices and developing a standard method, which would be followed throughout the organisation.

According to Taylor, even a small production activity like loading pigs of iron into boxcars can be scientifically planned and managed. This can result in tremendous saving of human energy as well as wastage of time and materials.

The more sophisticated the processes, greater would be the savings.

2. Harmony, Not Discord

Factory system of production implied that managers served as a link between the owners and the workers. Since as managers they had the mandate to 'get work done' from the workers, it should not be difficult for you to appreciate that there always existed the possibility of a kind of class-conflict, the managers versus workers. Taylor recognised that this conflict helped none, the workers, the managers or the factory owners.

Taylor emphasised that there should be complete harmony between the management and workers. Both should realise that each one is important.

To achieve this state, Taylor called for complete '**mental revolution**' on the part of both management and workers. It means that management and workers should transform their thinking.

Both should be part of the family. In such a situation even trade unions will not think of going on strike etc.

- Management should share the gains of the company, if any, with the workers.
- At the same time workers should work hard and be willing to embrace change for the good of the company.

According to Taylor, "**Prosperity for the employer cannot exist for a long time unless it is accompanied by prosperity for the employees and vice versa**".



Scientific Management: Conducting business activities according to standardised tools, methods and trained personnel in order to increase the output, improve its quality and reduce costs and wastes.



In the present context, the use of Internet has brought about dramatic improvements in internal efficiencies and customer satisfaction.



Harmony, not Discord: Sharing of gains between management and workers leading to complete harmony



Japanese work culture is a classic example of a situation of Harmony, not Discord. In Japanese companies, 'paternalistic style of management' is in practice. There is complete openness between the management and workers. If at all workers go to strike they wear a black badge but work more than normal working hours to gain the sympathy of the management.

Concept of Mental Revolution

Mental revolution involves a change in the attitude of workers and management towards one another from competition to cooperation. Both should realise that they require one another. Both should aim to increase the size of surplus. This would eliminate the need for any agitation. Management should share a part of surplus with workers. Workers should also contribute their might so that the company makes profits. This attitude will be good for both of them and also for the company. In the long run only worker's well-being will ensure prosperity of the business.

3. Cooperation, Not Individualism

There should be complete cooperation between the labour and the management instead of individualism.

Competition should be replaced by cooperation. Both should realise that they need each other.

- For this, management should not close its ears to any constructive suggestions made by the employees. They should be rewarded for their suggestions which results in substantial reduction in costs. They should be part of management and, if any important decisions are taken, workers should be taken into confidence.
- At the same time workers should desist from going on strike and making unreasonable demands on the management. In fact when there will be open communication system and goodwill there will be no need for even a trade union. Paternalistic style of management, whereby the employer takes care of the needs of employees, would prevail as in the case of Japanese companies.

This principle is an extension of principle of 'Harmony not discord'. According to Taylor, **"there should be an almost equal division of work and responsibility between workers and management. All the day long the management should work almost side by side with the workers helping, encouraging and smoothing the way for them."**

4. Development of Each and Every Person to His or Her Greatest Efficiency and Prosperity

Industrial efficiency depends to a large extent on personnel competencies. As such, scientific management also stood for worker development. Worker training was essential also to learn the 'best method' developed as a consequence of the scientific approach.

- Taylor was of the view that the concern for efficiency could be built in right from the process of employee selection. Each person should be scientifically selected. Then, work assigned should suit her/his physical, mental and intellectual capabilities.
- To increase efficiency, employees should be given the required training. Efficient employees would produce more and earn more. This will ensure their greatest efficiency and prosperity for both company and workers.

Techniques of Scientific Management

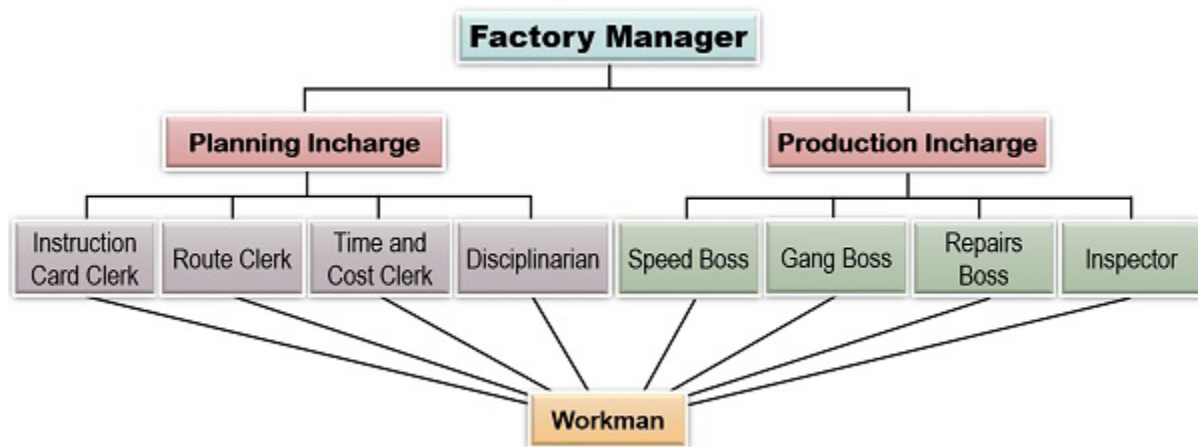
1. Functional Foremanship

In the factory system, the foreman represents the managerial figure with whom the workers are in face-to-face contact on a daily basis. *The foreman is the lowest ranking manager and the highest ranking worker.* He is the pivot around whom revolves the entire production planning, implementation and control. Thus, Taylor concentrated on improving the performance of this role in the factory set-up. In fact, he identified a list of qualities of a good foreman/supervisor. Foremen should have intelligence, education, tact, grit, judgment, special knowledge, manual dexterity, and energy, honesty and good health. Since all these qualities could not be found in a single person so Taylor proposed eight specialists. Each specialist is to be assigned work according to her/his qualities. For example, those with technical mastery, intelligence and grit may be given planning work. Those with energy and good health may be assigned execution work.

Functional foremanship is an extension of the principle of division of work and specialisation to the shop floor.

Functional foremanship is a technique which aims to improve the quality of supervision at shop floor by putting a worker under eight specialist foremen. In this technique, planning is separated from execution.

Under the factory manager there was a planning incharge and a production incharge.



Functional Formanship: Separation of planning and execution functions

Under planning incharge four personnel namely instruction card clerk, route clerk, time and cost clerk and a disciplinarian worked. Their role are as follows:

- (i) **Instruction card clerk:** To draft instructions for the workers.
- (ii) **Route clerk:** To specify the route of production.
- (iii) **Time and cost clerk:** To prepare time and cost sheet.
- (iv) **Disciplinarian:** To ensure discipline.

Under Production incharge, personnel who would work were speed boss, gang boss, repair boss, and inspector. Their role are as follows:

- (v) **Speed boss:** To be responsible for timely and accurate completion of the job.
- (vi) **Gang boss:** To keep machines and tools ready for operation by the workers.
- (vii) **Repair boss:** To ensure proper working conditions of machines and tools.
- (viii) **Inspector:** To check the quality of work.

Each worker will have to take orders from these eight foremen in the related process or function of production.

2. Method Study

The objective of method study is to find out one best way/method of doing the job.

It helps to minimise the cost of production and maximise the quality and satisfaction of the customer. For this purpose many techniques like process charts and operations research etc. are used.

Right from procurement of raw materials till the final product is delivered to the customer every activity is part of method study.

For example, for designing a car, the assembly line production would require deciding the sequence of operations, place for men, machines and raw materials etc. All this is part of method study.

3. Motion Study

Motion study refers to the study of movements like lifting, putting objects, sitting and changing positions etc., which are undertaken while doing a typical job.



Taylor devised the concept of assembly line by using method study. Ford Motor Company used this concept very successfully. Even now auto companies are using it.



- Taylor and his associate Frank Gailberth were able to reduce motions in brick layering from 18 to just 5. Taylor demonstrated that productivity increased to about four times by this process.
- Through motion studies, Taylor was able to design suitable equipment and tools to educate workers on their use. The results achieved by him were truly remarkable.

For example, on close examination of body motions, it is possible to find out:

- (i) Motions which are productive
- (ii) Motions which are incidental (e.g., going to stores)
- (iii) Motions which are unproductive.

Taylor used stopwatches and various symbols and colours to identify different motions.

The objective of motion study is to eliminate unnecessary and wasteful movements so that it takes less time to complete the job efficiently. It helps to increase productivity.

4. Time Study

It is a technique to determine the standard time, i.e. the time taken by a worker of reasonable skill and efficiency to perform a well-defined job.

Time measuring devices are used for each element of task. The standard time is fixed for the whole of the task by taking several readings.

The method of time study will depend upon:

- (i) volume and frequency of the task,
- (ii) the cycle time of the operation and
- (iii) time measurement costs.

The objective of time study is to determine the number of workers to be employed; frame suitable incentive schemes and determine labour costs.

For example, on the basis of several observations it is determined that standard time taken by the worker to make one cardboard box is 30 minutes. So in one hour he/she will make 2 boxes. Assuming that a worker has to put in 8 hours of work in a shift and deducting one hour for rest and lunch, it is determined that in 7 hours a worker makes 14 boxes @ 2 boxes per hour. Now this is the standard task a worker has to do. Wages can be decided accordingly.

5. Fatigue Study

A person is bound to feel tired physically and mentally if he/she does not rest while working. The rest intervals will help one to regain stamina and work again with the same capacity. This will result in increased productivity.

Fatigue study seeks to determine the amount and frequency of rest intervals in completing a task.

For example, normally in a plant, work takes place in three shifts of eight hours each. Even in a single shift a worker has to be given some rest interval to take his/her lunch etc. If the work involves heavy manual labour, then small pauses have to be frequently given to the worker so that he/she can recharge his/her energy level for optimum contribution.



Top Tip

There can be many causes for fatigue like long working hours, doing unsuitable work, having uncordial relations with the boss or bad working conditions etc. Such hindrances in good performance should be removed.

6. Differential Piece Wage System

According to Taylor, the standard time and other parameters should be determined on the basis of the work study techniques (time study, method study, etc.). The workers can then be classified as efficient or inefficient on the basis of these standards.

Taylor wanted to differentiate between efficient and inefficient workers. He wanted to reward efficient workers. So he introduced different rate of wage payment for those who performed above standard and for those who performed below standard.

For example, it is determined that standard output per worker per day is 10 units and those who made standard or more than standard will get ₹50 per unit and those below will get ₹40 per unit.

An efficient worker making 11 units will get $11 \times 50 = ₹550$ per day.

On the other hand, an inefficient worker who makes 9 units will get $9 \times 40 = ₹360$ per day.

According to Taylor, the difference of ₹190 should be enough for the inefficient worker to be motivated to perform better.

7. Standardisation and Simplification of Work

Simplification aims at eliminating superfluous varieties, sizes and dimensions while standardisation implies devising new varieties instead of the existing ones.

Standardisation refers to the process of setting standards for every business activity. It can be standardisation of process, raw material, time, product, machinery, methods or working conditions.

These standards are the benchmarks, which must be adhered to during production.

The objectives of standardisation are:

- (i) To reduce a given line or product to fixed types, sizes and characteristics.
- (ii) To establish interchange ability of manufactured parts and products. *For example*, same battery can be used in different mobile phones of a particular brand.
- (iii) To establish standards of excellence and quality in materials.
- (iv) To establish standards of performance of men and machines.

Simplification aims at eliminating unnecessary diversity of products. It results in savings of cost of labour, machines and tools. It implies reduced inventories, fuller utilisation of equipment and increasing turnover.



- Most large companies like Nokia, Toyota and Microsoft etc. have successfully implemented standardisation and simplification. This is evident from their large share in their respective markets.
- Even the contemporary techniques of business process including reengineering, kaizen (continuous improvement) and benchmarking are aimed at standardising the work.



Top Tip

Taylor was an ardent supporter of standardisation. According to him, scientific method should be used to analyse methods of production prevalent under the rule of thumb. The best practices can be kept and further refined to develop a standard which should be followed throughout the organisation. This can be done through work-study techniques which include time study, motion study, fatigue study and method study.

Extra Shots

Applications of Scientific Management by Taylor and his Contemporaries

1. Taylor found out the optimum-shovelling load of 21 pounds per shovel per worker through a series of experiments in work-study at Bethlehem Steel Company. The implementation saved the company \$ 75000 to \$80000 per year.
2. Pig iron handling per person per day was increased from 12.5 tons to 47 tons. This also resulted in the wages increase to labourers by 60% but also savings to the company on account of less number of labourers from 500 to 140.
3. He had published a paper "The Art of cutting metals" which turned it into a science.
4. He designed a Piece Rate Wage System including incentives for Bethlehem Steel Company.
5. Taylor's associate Frank Gilbreth applied scientific management to the art of 'brick layering' and through motion study, he was able to eliminate certain motions which were considered by the brick layers to be necessary (reduced motions from 18 to 5), designed simple apparatus like adjustable scaffold and its packets to hold the bricks and finally also taught brick layers to use both the hands at the same time. This is a classic example of application of Scientific Management to the simple art of brick layering.

Fayol Versus Taylor — A Comparison

Henri Fayol was a French mining engineer whereas F.W. Taylor was an American mechanical engineer. Both of them have contributed immensely to the knowledge of management, which has formed a basis for further practice by managers.

Taylor gave the concept of 'Scientific Management' whereas Fayol emphasised 'Administrative Principles'.

While Taylor succeeded in revolutionising the working of factory shop-floor in terms of devising the best method, fair day's work, differential piece-rate system and functional foremanship; Henri Fayol explained what amounts to a managers work and what principles should be followed in doing this work. If workers' efficiency mattered in the factory system, so does the managerial efficiency. Thus, their contributions are complementary to each other.

We can make out the following points of difference between their contributions:

S. No.	Basis of difference	Henri Fayol	F. W. Taylor
1.	Perspective	Fayol's perspective was on the top level of management.	Taylor's perspective was on the shop floor level of a factory.
2.	Unity of command	Fayol was a staunch proponent of unity of command.	Taylor did not feel that it is important as under functional foremanship a worker received orders from eight specialists.
3.	Focus	Fayol focused on improving overall administration.	Taylor focused on increasing productivity of workers.
4.	Expression	Fayol used the expression 'General Theory of Administration'.	Taylor used the expression 'Scientific Management'.
5.	Applicability	Fayol's principles are applicable universally.	Taylor's principles are applicable to specialised situations.
6.	Basis of formation	Principles were based on his personal experience.	Principles were based on observations and experimentation.
7.	Personality	Practitioner	Scientist



Today, many new techniques have been developed as a sequel to scientific management. Operations research was developed in the second World War to optimise the deployment of war material. Similarly assembly line was also discovered by F.W. Taylor, which was used very successfully by Ford motor company for manufacturing 'Model T' car for the masses. This concept is much used now. The latest development in scientific management is 'LEAN MANUFACTURING'. Now-a-days, robotics and computers are being used in production and other business activities. This is part of scientific management of these activities. It has increased productivity levels.



Think over it

Taylor's techniques of management are universally applicable. Do you agree? Give reasons in support of your answer.

RECAP



Taylor's Scientific Management – Principles

Scientific management means knowing exactly what you want men to do and seeing that they do it in the best and cheapest way.

- Science not rule of thumb:** Taylor believed that there was only one best method to maximise efficiency. This method can be developed through scientific study and analysis of each element of a job and should substitute 'Rule of Thumb'. This standard method then should be followed throughout the organisation.
- Harmony Not Discord:** The principle emphasises that there should be complete harmony between the management and the workers. Management should share gains of the company with the workers and workers should work hard and be willing to embrace change for the good of the company. This requires 'Mental revolution' on the part of both management and workers. Both management and the workers should transform their thinking. Both should realise that they require one another.

3. **Cooperation, not individualism:** This principle is an extension of principle of 'Harmony, Not Discord'. There should be complete cooperation between the management and the workers instead of individualism. According to Taylor, there should be an almost equal division of work and responsibility between workers and management. The management should work almost side by side with the workers helping, encouraging and smoothing the way for them. For all important decisions taken by the management, workers should be taken into confidence. The management should be open to any constructive suggestions made by the employees and suitably reward them.
4. **Development of each and every person to his/her greatest efficiency and prosperity:** This principle is concerned with efficiency of employees which could be built in right from the process of employee selection. The work assigned to employees should suit their capabilities. They should be given the required training to increase their efficiency. Efficient employees would produce more and earn more. This will ensure greatest efficiency and prosperity for both the company and the workers.

Techniques of Scientific Management

1. **Functional Foremanship:** Functional foremanship is an extension of the principle of division of work and specialisation. It is a technique which aims to improve the quality of supervision at shop floor by putting a worker under eight specialist foremen. In this technique, planning is separated from execution. Taylor suggested four foremen for planning and four foremen for execution. The four foremen for planning and their role: (i) Instruction card clerk: To draft instructions for the workers. (ii) Route clerk: To specify the route of production. (iii) Time and cost clerk: To prepare time and cost sheet. (iv) Disciplinarian: To ensure discipline. The four foremen for execution and their role: (i) Speed boss: To be responsible for timely and accurate completion of the job. (ii) Gang boss: To keep machines and tools ready for operation by the workers. (iii) Repair boss: To ensure proper working conditions of machines and tools. (iv) Inspector: To check the quality of work.
2. **Method Study:** The objective of method study is to find out one best way of doing the job and includes all activities from procurement of raw materials till the final product is delivered to the customer. It helps to minimize the cost of production, improve the quality and maximize satisfaction of the customer. For example, for designing a car, the assembly line production would entail deciding the sequence of operations, place for men, machines and raw materials etc. All this is part of method study.
3. **Motion Study:** It is a technique to study the movements which are undertaken while doing a well defined job. The movement could be productive, incidental and unproductive. Motion study seeks to eliminate unnecessary and wasteful movements so that it takes less time to complete a job efficiently.
4. **Time Study:** It is a technique to determine the standard time i.e. the time taken by a worker of reasonable skill and efficiency to perform a well-defined job. The standard time is fixed for the whole of the task by taking several readings. The objective of time study is to determine the number of workers to be employed, frame suitable incentive schemes and determine labour costs. For example, on the basis of several observations, it is determined that standard time taken by the worker to make one lunch box is 30 minutes. So, in one hour he/she will make 2 boxes. Assuming that a worker works for 8 hours per day and deducting one hour for rest and lunch, it is determined that in 7 hours a worker makes 14 boxes @ 2 boxes per hour. Now this is the standard task a worker has to do. Wages can be decided accordingly.
5. **Fatigue study:** Fatigue Study determines the amount and frequency of rest intervals in completing task. The rest intervals help the workers to regain stamina and work again with the same capacity resulting in increased productivity. There can be many causes for fatigue like long working hours, doing unsuitable work, bad working conditions etc.
6. **Differential piece wage system:** It is a technique which differentiates between efficient and less efficient workers. Taylor wanted to reward the efficient workers. So he introduced different rate of wage payment for those who performed above standard and for those who performed below standard. *Example:* Standard output (per worker per day) = 10 units. Wage rate I = ₹50 per unit (for output $\geq$ 10 units) Wage rate II = ₹40 per unit (for output < 10 units). Worker A produced 11 units and Worker B 9 units. Total wages of Worker A = $11 \times 50 = ₹550$ and of Worker B = $9 \times 40 = ₹360$. According to Taylor, this loss of ₹190 should be enough for the inefficient worker (worker B) to be motivated to perform better.
7. **Standardisation and simplification of work:** Standardisation is the process of setting standards for every business activity – standardisation of process, raw material, time, etc. The objectives of standardisation of work are: (i) To reduce a given line or product to fixed types, sizes and characteristics. (ii) To establish standards of excellence and quality in materials. (iii) To establish standards of performance of men and machines. (iv) To establish interchange ability of manufactured parts and products. Simplification of Work is a technique to eliminate superfluous varieties, sizes and dimensions of products. It leads to reduced inventories, fuller utilization of equipment and increased turnover to reduce costs.

Fayol versus Taylor– A Comparison

1. **Perspective:** Fayol – Top level of management Taylor – Shop floor level of a factory
2. **Basis of formation:** Fayol – Personal experience Taylor – Observations and experimentation
3. **Focus:** Fayol – Improving overall administration Taylor – Increasing productivity
4. **Unity of Command:** Fayol – Staunch proponent Taylor – Did not feel that it is important as under functional foremanship a worker received orders from eight specialists.
5. **Applicability:** Fayol – Applicable universally Taylor – Applicable to specialised situations
6. **Expression:** Fayol – General Theory of Administration Taylor – Scientific Management



Key Terms

Principles of management – Principles of management are broad and general guidelines for decision-making and behaviour.

Techniques of Management – Techniques are procedures or methods, which involve a series of steps to be taken to accomplish desired goals.

Authority – Authority means the right to give orders and obtain obedience.

Responsibility – Responsibility means obligation to perform the of a subordinate to properly perform the assigned duty.

Discipline – Discipline is the obedience to organisational rules and employment agreement which are necessary for the working of the organisation.

Unity of command – It means that there should be one and only one boss for every individual employee. Dual subordination should be avoided.

Unity of direction – It means that all the units of an organisation should be moving towards the same objectives through coordinated and focussed efforts.

Centralisation – The concentration of decision-making authority is called centralisation.

Decentralisation – The dispersal of decision-making authority among more than one person is known as decentralisation.

Scalar Chain – The formal lines of authority from highest to lowest ranks are known as 'scalar chain'.

Gang Plank – Gang plank is a shorter route and has been provided so that communication is not delayed in an emergency.

Order – It means that 'a place for everything (everyone) and everything (everyone) in its (his/her) place'.

Employee turnover/Labour turnover – It measures the rate at which employees are leaving an organisation. Employee turnover should be minimised to maintain organisational efficiency.

Initiative – Initiative means taking the first step with self-motivation. It is thinking out and executing the plan.

Esprit De Corps – Management should promote a team spirit of unity and harmony among employees.

Scientific Management – It means conducting business activities according to standardised tools, methods and trained personnel in order to increase the output, improve its quality and reduce costs and wastes.

Harmony, Not Discord – It means that there should be complete harmony between the management and workers. Both should realise that each one is important.

Mental revolution – It involves a change in the attitude of workers and management towards one another from competition to cooperation. Both should realise that they require one another. Both should aim to increase the size of surplus.

Cooperation, Not Individualism – There should be complete cooperation between the labour and the management instead of individualism. Competition should be replaced by cooperation. Both should realise that they need each other.

Functional foremanship – It is a technique which aims to improve the quality of supervision at shop floor by putting a worker under eight specialist foremen. In this technique, planning is separated from execution.

Gang boss – Gang boss is a foreman under Production incharge, who keeps machines and tools ready for operation by the workers.

Method Study – It is a technique of scientific management to find out one best way/method of doing the job. It helps to minimise the cost of production and maximise the quality and satisfaction of the customer.

Motion study – Motion study refers to the study of movements like lifting, putting objects, sitting and changing positions etc., which are undertaken while doing a typical job. It seeks to eliminate unnecessary and wasteful movements so that it takes less time to complete the job efficiently.

Time Study – It is a technique to determine the standard time i.e. the time taken by a worker of reasonable skill and efficiency to perform a well-defined job.

Fatigue study – It is a technique to determine the amount and frequency of rest intervals in completing a task.

Differential Piece Wage System – It is technique of scientific management to differentiate between efficient and inefficient workers. It has two different rates of wage payment for those who performed above standard and for those who performed below standard.

Standardisation of work – Standardisation refers to the process of setting standards for every business activity. It can be standardisation of process, raw material, time, product, machinery, methods or working conditions.

Simplification of work – Simplification aims at eliminating unnecessary diversity of products. It results in savings of cost of labour, machines and tools.

Universal applicability of principles of management – It means that the principles of management apply to all types of organisations, at all levels and at all times.

Flexibility of principles of management – It means that the principles of management are not rigid prescriptions, which have to be followed absolutely. They are flexible and can be modified by the manager when the situation so demands.

Contingent – The application of principles of management is dependent upon the prevailing situation at a particular point of time. The application has to be changed as per requirements.

Cause and effect relationships – The principles of management are intended to establish relationship between cause and effect. They tell us if a particular principle was applied in a particular situation, what would be its likely effect.

Self Assessment Test 1

Principles of Management

Time allowed : 1 hour

Maximum Marks : 25

- Q.1** Sanak and Gagan started their career in Wales Limited (a printing press) after going through a rigorous recruitment process. Since they had no prior work experience, the firm decided to give them one year to prove themselves. The principle of management followed by Wales Limited is _____.

(Fill up the blank with correct answer) (1 mark)

- Q.2** Match the following techniques of scientific management:

(1 mark)

(i) Separation of planning and execution functions	(a) Standardisation of work
(ii) Setting benchmarks for every business activity which must be adhered to during production	(b) Simplification of work
(iii) Eliminating superfluous varieties, sizes and dimensions.	(c) Method study
(iv) Minimising the cost of production and maximise the quality and satisfaction of the customer	(d) Functional foremanship

- Q.3** Principles of management equip the managers to foresee the cause and effect relationships of their decisions and actions so that the wastages associated with a trial and error approach can be overcome. The point of significance of principles of management highlighted here is _____.

(Fill up the blank with correct answer) (1 mark)

- Q.4** To motivate the workers 'Differential Piece Wage System' should be implemented. True/False? Give reason. (1 mark)

- Q.5** Damini D'souza took over the reins of 'Kinsa Retail' as its Managing Director in India. Kinsa Retail with its headquarters at Japan has been in retail business for the last 40 years. It has regional offices in many countries with each regional office taking care of the shops in that particular region. As it is a large organisation, the regional officers have been given the powers to decide and spend funds sanctioned to them by the headquarter for the welfare of the customers of their region. Kinsa Retail wants the highest possible standards of ethical conduct being followed for which a code of conduct is in place for putting values into practice. All employees as well as Board members are required to act in accordance with the highest standards of personal and professional integrity when acting on behalf of the company. Non-compliance involves a heavy penalty including termination of employment.

Identify and state two principles of general management being followed by Kinsa Retail.

(3 marks)

- Q.6** Name and explain with a suitable example the technique of Scientific Management given by Taylor, with the objective of determining the number of workers to be employed for a task.

(3 marks)

- Q.7** Define principles of management. Explain any three points highlighting the significance of principles of management.

(4 marks)

- Q.8** Explain briefly any five characteristics of principles of management.

(5 marks)

- Q.9** Fayol and Taylor both have contributed immensely to the knowledge of management, which has become a basis for further practice by managers. Taylor thought that by scientifically analysing work it would be possible to find 'one best way' to do it. He is most remembered for his time and motion studies and functional foremanship. He said that the best result would come from the partnership between a trained and qualified management and a cooperative and innovative workforce. Fayol explained what amounts to a manager's work and what principles should be followed in doing this work. In the light of the above discussion, differentiate between the contribution of Taylor and Fayol on the following basis:

- | | |
|-------------------|------------------------|
| (a) Perspective | (b) Unity of command |
| (c) Focus | (d) Expression |
| (e) Applicability | (f) Basis of formation |

(6 marks)

Self Assessment Test 2

Principles of Management

Time allowed : 1 hour

Maximum Marks : 25

Q.1 Appliances India Ltd is engaged in manufacturing and distribution of home appliances since 1987. It has a good name in the market as the company is producing good quality appliances. It has separate departments for manufacturing, finance, sales, maintenance services and technical services to achieve specialisation. Since the areas of operation of the company have increased and customers have become more demanding, the company decided to modify the existing principle of management to meet the changing requirements of the environment. The general principle of management which the company wants to modify to meet the changing requirements is _____ .
(Fill up the blank with correct answer) (1 mark)

Q.2 Match the following techniques of scientific management: (1 mark)

(i) To reduce a given line or product to fixed types, sizes and characteristic	(a) Method Study
(ii) Devising new varieties instead of the existing ones	(b) Time Study
(iii) To find out one best way of doing the job.	(c) Standardisation of work
(iv) To determine the number of workers to be employed ; frame suitable incentive schemes and determine labour costs.	(d) Simplification of work

Q.3 Management principles are rigid as principles of pure science. (True/False) (1 mark)

Q.4 "The application of principles of management has to be changed as per requirements." Which characteristic of management principles is highlighted above? (Choose the correct alternative) (1 mark)

- (a) Flexible (b) Contingent
(c) Behavioral (d) General guidelines

Q.5 Management principles enable managers to learn from past mistakes and conserve time by solving recurring problems quickly. As such management principles increase managerial efficiency. For example, a manager can leave routine decision-making to his subordinates and deal with exceptional situations which require his/her expertise.

- (a) State the point of significance of principles of management highlighted above.
(b) Identify and state the principles of management highlighted above. (3 marks)

Q.6 Kirtika Kapoor, the CEO of Mobilo Ltd. firmly believes in providing fair wages to the employees , superior value to the customer, care for the environment and honest dealings with business associates.

- (a) Identify and explain the general principle of management followed by Kirtika Kapoor.
(b) State the point of importance of management principles highlighted above. (3 marks)

Q.7 Define principles of management. Distinguish between the principles of 'unity of command' and 'unity of direction' on the basis of: (i) Meaning (ii) Aim (iii) Implications (4 marks)

Q.8 Tanvi is a manager in Beta Ltd, a company manufacturing plastic glasses and bowls. The government banned plastic items. As a result, Beta Ltd. incurred a huge loss as it had to stop production of plastic glasses and bowls, and had to purchase new machinery for producing paper glasses and bowls.

The management of the company entered into an agreement with labour union whereby workers agreed to put in extra hours without additional payment to revive the company out of loss. In return the management promised to increase wages of the workers when this mission was accomplished.

Tanvi found that workers' efficiency declined due to long working hours. She conducted an experiment to see the effect of improvement of physical conditions of work to reduce stress. It worked and workers efficiency and productivity increased manifold.

Within two months, the company revived out of loss. The management in returned increased their wages by 30 per cent.

- (a) Identify and explain the principles/technique of management highlighted above.
(b) State the characteristic of principles of management highlighted above. (5 marks)

Q.9 Vishesh completed his MBA at a reputed business school in Lucknow. He was impressed by the Principles and Techniques of Scientific Management developed by F.W. Taylor. On completing his MBA, he wanted to apply scientific Management in his family's business of fast food chain of restaurants named 'Burger Mania'.

His main goal was to reduce costs with increased output. To begin with, he wanted to develop a standard method which would be followed throughout the organisation. So, he investigated traditional methods through work study and unified the best practices. The standard method, i.e. the best way of doing the job was then developed taking into account all parameters right from the procurement of raw materials till the delivery of the final product to the customer. Vishesh also believed that each person should not only be scientifically selected but should also be given the required training to increase efficiency. For this, he set up a Special Training Unit called 'Hamburger' in Bengaluru where the workers were given the required training to increase efficiency. For this, he set up a workers were given the required training to learn the best method. At the factory, the ingredients making up a burger were strategically placed to reduce the time taken for excess movements. The standard time and other parameters were determined on the basis of work study and Vishesh rewarded the workers for meeting the standard output.

Now, 'Burger Mania' has standardised processes, raw material, time, machinery, product and working conditions that ensure the food they send out to their customers has the same high standards of excellence and level of quality in every chain or franchise.

The application of Scientific Management to every aspect of restaurant operations led to Burger Mania's widespread success.

Quoting the lines from the above, explain the Principles and Techniques of Scientific Management used by 'Burger Mania'. (6 marks)

Self Assessment Test 3

Principles of Management

Time allowed : 1 hour

Maximum Marks : 25

- Q.1** In an organisation, each person should be scientifically selected. Then work assigned should suit his physical, mental and intellectual capabilities. To increase efficiency, they should be given the required training. Efficient employees would produce more and earn more.

Which of the following principles of management is highlighted above? *(Choose the correct alternative)* (1 mark)

- (a) Science, not rule of thumb
- (b) Division of work.
- (c) Development of each and every person to his/her greatest efficiency and prosperity.
- (d) Remuneration of employees.

- Q.2** Match the following: (1 mark)

(i) To establish interchange ability of the manufactured parts and products.	(a) Standardisation of work
(ii) Classification of workers as efficient and inefficient on the basis of certain standards	(b) Mental revolution
(iii) Change in the attitude of workers and management towards one another from competition to cooperation.	(c) Cooperation, not individualism
(iv) Equal division of work and responsibility between workers and management	(d) Differential piece rate system.

- Q.3** Principles of management have been developed on the basis of _____. *(Complete the sentence)* (1 mark)

- Q.4** "Individual principles of management are like different tools serving different purposes. The manager has to decide which tool to use under what circumstances."

State the characteristic of nature of management principles highlighted above. (1 mark)

- Q.5** For greater productivity, work should be divided into small tasks and each employee should be trained to perform his/her specialised job. This principle is applicable to a government office where there is a diary/dispatch clerk whose job is to receive and send mail or documents, a data entry operator whose task is to input data on the computer, a peon and an officer etc. This principle is also applicable to a limited company where there are separate departments like Production, Finance, Marketing and Research and Development (R&D) etc.

- (a) Identify and explain the principle of management highlighted in the above para
- (b) Identify and state the characteristic of principles of management highlighted in the above para. (3 marks)

- Q.6** A production manager at top level in a reputed corporate, Mr. Rathore holds the responsibility for ordering raw material for the firm. While deciding on the supplier for the financial year 2018-19, he gave the order to his cousin at a higher price per unit instead of the firm's usual supplier who was willing to lower the rates for the order.

- (a) Which principle of management was violated by Mr. Rathore?
- (b) What are the positive impacts of following the above identified principle? (3 marks)

- Q.7** Name and explain with a suitable example the technique of Scientific Management given by Taylor to differentiate between the efficient and the inefficient workers. (4 marks)

- Q.8** Define principles of management. Explain the principle of 'Scalar Chain' and 'Gang Plank' with the help of a diagram. (5 marks)

- Q.9** Explain any four points regarding significance of principles of management. (6 marks)

Self Assessment Test 4

Principles of Management and Nature and Significance of Management

Time allowed : 1 hour 30 minutes

Maximum Marks : 40

- Q.1** Employees in an organisation deserve fair and just remuneration. But what is just and fair is determined by multiple factors, such as contributions of the employee, paying capacity of the employer and also prevailing wage rate for the occupation under consideration.
Identify the characteristic of principles of management highlighted above. (1 mark)
- Q.2** Principles of management are NOT: (Choose the correct alternative) (1 mark)
- | | |
|------------------------------------|---|
| (a) Applicable only in large firms | (b) Formed by practice and experience of managers |
| (c) Flexible | (d) Contingent |
- Q.3** Complete the sentence: (1 mark)
Management principles have gained importance with _____.
- Q.4** _____ is also known as the 'Father of General Management'. (Choose the correct alternative) (1 mark)
- | | |
|-----------------|--------------------|
| (a) Henri Fayol | (b) F.W. Taylor |
| (c) Max Weber | (d) Abraham Maslow |
- Q.5** Which of the following statement best explains the "Management is an Art"? (Choose the correct alternative) (1 mark)
- | |
|--|
| (a) Two managers deal with the same problem differently. |
| (b) Management has drawn its knowledge from other disciplines also. |
| (c) No formal qualification is required for the appointment as a manager in a company. |
| (d) Outcomes of managerial actions cannot be predicted accurately. |
- Q.6** Match the following activities with their respective levels of management: (1 mark)
- | | |
|--|---|
| (i) Introducing a new product line and deciding the capital structure of the company. | (a) Top management |
| (ii) Recruitment of casual labourers. | (b) Middle management |
| (iii) Devise a suitable advertising campaign to sell a new product/service a company is launching. | (c) Supervisory or Operational management |
- Q.7** Ashita and Lakshita are employees working in Dazzling enterprises dealing in costume jewellery. The firm secured an urgent order for 1,000 bracelets that were to be delivered within 4 days. They were assigned the responsibility of producing 500 bracelets each at a cost of ₹100 per bracelet. Ashita was able to produce the required number within the stipulated time at the cost of ₹ 55,000 whereas, Lakshita was able to produce only 450 units at a cost of ₹ 90 per unit.
State whether Ashita and Lakshita are efficient and effective. Give reasons to justify your answer. (3 marks)
- Q.8** State any three features of principles of management. (3 marks)
- Q.9** If an organisation does not provide the right place for physical and human resources in an organisation, which principle is violated? What are the consequences of it? (3 marks)
- Q.10** Fashion India Limited is a chain of ladies garments boutiques where most of the work is done manually. Due to coming of international brands in India, the company is finding it difficult to compete on two fronts—finishing and embroidery work.
The production manager realised that without modern machines it would not be possible for them to survive for long. The company purchased new hi-tech modern machines from Germany.
During the production process, the manager observed that the quality of production is not as per standard and very often production is disrupted due to break-down of machinery.
The workers get frustrated by continuous rejection of output and started showing resistance towards new technology.

To increase the efficiency of the workers, the company decided to train their workers on-the-job under the able guidance of specialists.

The workers who are able to pick the skills are promoted and made incharge of the not so trained groups. This created positive impact and everybody became keen to learn. Suggestions from the workers are valued and workers are encouraged to communicate freely.

Identify and explain any two points of importance of management highlighted in the above case by quoting the lines. (4 marks)

Q.11 Define scientific management. State any three of its principles. (4 marks)

Q.12 'Scientific Management means knowing exactly what you want men to do and seeing that they do it in the best and the cheapest way.' Taylor developed various techniques for application of Scientific Management principles and was able to achieve a three-fold increase in productivity in Bethlehem Steel Company, where he worked. One of the techniques helps to determine the number of workers to be employed; frame suitable incentive schemes and labour costs. Another technique recognises those workers who are able to accomplish/exceed the fair day's work and is based on the premise that efficiency is the result of the joint efforts of the managers and the workers.

Quoting the lines from the above paragraph, identify and explain the two techniques of Scientific Management. (5 marks)

Q.13 Explain briefly the following Principles of management given by Fayol: (6 marks)

- (i) Unity of direction
- (ii) Equity
- (iii) Esprit de corps
- (iv) Order
- (v) Centralisation and Decentralisation
- (vi) Initiative

Q.14 Define coordination. State any five points highlighting the importance of coordination in an organisation. (6 marks)

Self Assessment Test 5

Principles of Management and Nature and Significance of Management

Time allowed : 1 hour 30 minutes

Maximum Marks : 40

- Q.1** Entrance to management institutes is preceded by management aptitude tests, which are developed with an understanding of management principles. These principles provide basic groundwork for the development of management as a discipline. Professional courses, such as MBA, BBA also teach these principles as part of their curriculum at the beginner's level. These principles enable refinement of management practices as well by facilitating the development of new management techniques like Operations Research (OR), 'Just in Time' and 'Kaizen'.
State the point significance of management principles highlighted above. (1 mark)
- Q.2** The principle of _____ maintains coordination between various departments.
(Fill up the blank with correct answer) (1 mark)
- Q.3** While functions of management viz; planning, organising, staffing, directing and controlling are the actions to be taken while practising management, _____ help managers to take decisions while performing these functions.
(Fill up the blank with correct answer) (1 mark)
- Q.4** There can be many causes for fatigue like _____; such hindrances in good performance should be removed.
(Fill up the blank with correct answer) (1 mark)
- Q.5** A business needs to add to its prospects in the long run. Identify the organisational objective highlighted by this. (1 mark)
- Q.6** Tina a manager of Shikhar Automobiles Ltd.; establishes an atmosphere that encourages employees to do their best. She also creates an environment that makes them want to work. She directs through praise and criticism in such a way that it brings out the best in the employee.
Identify the concept of management highlighted in the above para. (1 mark)
- Q.7** H. Tech Ltd. is a company producing IT services. The company's profits are enough for the survival and growth. The management of the company believes that a satisfied employee creates a satisfied customer, who in turn creates profits that lead to satisfied shareholders. So, it pays competitive salaries and perks to all its employees. All the employees are happy working in the organisation because of personal growth and development.
The company has a strong sense of social responsibility. It has set up an engineering college in which one-third of the students are girls to whom the company gives 50% scholarship.
Is the management of H. Tech Ltd. fulfilling its objectives? Justify your answer by quoting the lines from the above. (3 marks)
- Q.8** Mr. Sanjeev, a manager believes that through principles of management do not provide strait jacket solutions to all managerial problems, yet they cannot be underestimated because even a small guideline helps to solve a given problem. Mr. Sanjeev, in dealing with a situation of conflict between two departments, always emphasizes the primacy of the overall goals of the organisation.
(a) Identify and explain the principles of management followed by Mr. Sanjeev.
(b) Identify and state the characteristic of principles of management highlighted above. (3 marks)
- Q.9** State any points highlighting the nature of principles of management. (3 marks)
- Q.10** Ashish Singh was working in 'Axe Ltd.', a company manufacturing air purifiers. He found that the profits had started declining from the last six months. Profit has an implication for the survival of the firm, so he analysed the business environment to find out the reasons for this decline.
(a) Identify the level of management at which Ashish Singh was working.
(b) State three other functions being performed by Ashish Singh. (4 marks)
- Q.11** Discuss the following techniques of Scientific Work Study: (4 marks)
(i) Time Study (ii) Motion Study
(iii) Fatigue Study (iv) Method Study

- Q.12** Explain the technique of 'Functional Foremanship' and the concept of 'Mental Revolution' as enunciated by Taylor. (5 marks)
- Q.13** Bhasin limited was engaged in the business of food processing and selling its products under a popular brand. Lately the business was expanding due to good quality and reasonable prices. Also with more people working the market for processed food was increasing. New players were also coming to cash in on the new trend. In order to keep its market share in the short run the company directed its existing workforce to work overtime. But this resulted in many problems.
- Due to increased pressure of work the efficiency of the workers declined.
- Sometimes the subordinates had to work for more than one superior resulting in declining efficiency.
- The divisions that were previously working on one product were also made to work on two or more products. This resulted in a lot of overlapping and wastage.
- The workers were becoming indisciplined.
- The spirit of teamwork, which had characterized the company, previously was beginning to wane.
- Workers were feeling cheated and initiative was declining. The quality of the products was beginning to decline and market share was on the verge of decrease. Actually the company had implemented changes without creating the required infrastructure.
- Identify by quoting lines from the above the Principles/Technique of Management that were being violated by the company. (6 marks)
- Q.14** Define management. State any five points highlighting the importance of management. (6 marks)

Check List to Objective Type Questions

Objective Type Questions 2.1

1. Division of work
2. To avoid delay in communication.
3. Unity of command
4. Order
5. Unity of direction
6. Equity
7. Remuneration of employees
8. Stability of personnel
9. Initiative
10. Initiative
11. Subordination of individual interest to general interest
12. Equity
13. Stability of personnel
14. Principle of discipline
15. The principle of authority and responsibility
16. Esprit de corps
17. (a) – (iii), (b) – (ii), (c) – (i), (d) – (iv)
18. Esprit de corps
19. (c) Scalar Chain
20. Flexible: The principles of management are not rigid prescriptions, which have to be followed absolutely. They are flexible and can be modified by the manager when the situation so demands.
21. Equity
22. Order

Think over it: No, Taylor's techniques of scientific management are not universally applicable. They are applicable to specialised situations.

For example:

- (i) Functional foremanship: Functional foremanship insists on orders and instructions from eight specialists. This technique is not applicable in the organisations following the principle of unity of command which states that an employee should receive orders/instructions from one and only one boss or superior.
- (ii) Differential piece wage system: This technique is also not applicable in the organisation following the principle of equity as it differentiates the workers and divides them

into two categories—efficient and inefficient; and makes provision for payment of different wages for the same job.

Objective Type Questions 2.2

1. (a) Standardisation of work
2. (b) Fayol's principles are applicable in specialised situations whereas Taylor's principles have universal application
3. (a) – (iii), (b) – (iv), (c) – (i), (d) – (ii)
4. (c) Gang Boss
5. (c) Both management and workers require each other.
6. Differential piece wage system
7. (i) To differentiate between efficient and inefficient workers.
(ii) To reward efficient workers.
8. Simplification of work
9. Science, not rule of thumb
10. Cooperation, not individualism
11. Harmony, not discord
12. Science, not rule of thumb
13. Functional Foremanship
14. Method study
15. Standardisation of work
16. Simplification of work
17. Division of work and specialisation
18. Differential piece wage system
19. Functional Foremanship
20. Standardisation and Simplification of Work
21. Cooperation, Not Individualism
22. Functional Foremanship
23. Science not Rule of Thumb
24. Mental revolution

Objective Type Questions 2.3

1. (c) Optimum utilisation of resources
2. (b) By experiences of managers
3. (c) Absolute
4. Principles of management help in meeting changing environment requirements as they can be as they can be modified according to the needs of the environment. This shows that principles of management are flexible in nature.

Answers to Self Assessment Tests Questions

Self Assessment Test 2.1

1. Stability of Personnel
2. (i) – (d), (ii) – (a), (iii) – (b), (iv) – (c)
3. Optimum utilization of resources and effective administration.
4. True: The difference in wages of an efficient worker and an inefficient worker should be enough for the inefficient worker to be motivated to perform better.
5. Principles of General management being followed by Kinsa Retail are:
 - (i) Discipline
 - (ii) Centralisation and Decentralisation (Explain)
6. Time Study (Explain with example)

Self Assessment Test 2.2

1. Principle of Division of work
2. (i) – (c), (ii) – (d), (iii) – (a), (iv) – (b)
3. False: Since they deal with human behaviour, they are to be applied creatively given the demand of the situation.
4. (b) Contingent
5. (a) The principles of management provide the managers with useful insights into real world situations.
(b) Centralisation and decentralisation.
6. (a) Equity
(b) Principles of management help in fulfilling social responsibility.
8. (a) Discipline ; Fatigue study (Explain)
(b) The principles of management are formed in the basis of observation/experimentation and experiences of the managers.
9. Principles of scientific management used by 'Burger Mania' are:
 - (i) Science, not rule of thumb (Explain)
"To begin with, he wanted to develop a standard method which would be followed throughout the organisation. So, he investigated traditional methods through work study and unified the best practices."
 - (ii) Development of each and every person to his/her greatest efficiency and prosperity (Explain)
"Vishesh also believed that each person should not only be scientifically selected but should also be given the required training to increase efficiency."

Techniques of scientific management used by 'Burger Mania' are: (Explain any four)

- (i) Method study
"The standard method, i.e. the best way of doing the job was then developed taking into account all parameters right from the procurement of raw materials till the delivery of the final product to the customer."
- (ii) Motion study
"At the factory, the ingredients making up a burger were strategically placed to reduce the time taken for excess movements."

- (iii) Time study
"The standard time and other parameters were determined on the basis of work study"
- (iv) Standardization and Simplification of Work
"Now, 'Burger Mania' has standardised processes, raw material, time, machinery, product and working conditions that ensure the food they send out to their customers has the same high standards of excellence and level of quality in every chain or franchise."
- (v) Differential piece wage system
"Vishesh rewarded the workers for meeting the standard output."

Self Assessment Test 2.3

1. (c) Development of each and every person to his/her greatest efficiency and prosperity.
2. (i)-(a), (ii)-(d), (iii)-(b), (iv)-(c)
3. Observation and experimentation as well as personal experiences of the managers.
4. Principles of management are flexible and can be modified by the manager when the situation so demands.
5. (a) Division of work (Explain)
(b) Universal applicability (Explain)
6. (a) Subordination of individual interest to general interest.
(b) Positive impacts:
 - (i) Interests of the organisation will supersede the interests of anyone individual.
 - (ii) The exemplary behaviour of the manager will raise his/her stature in the eyes of the workers and at the same time ensure same behaviour by them.
7. Differential Piece Wage System (Explain with example)

Self Assessment Test 2.4

1. Contingent: The application of principles of management is dependent upon the prevailing situation at a particular point of time.
2. (a) Applicable only in large firms.
3. Increasing professionalisation of management.
4. (a) Henri Fayol
5. (a) Two managers deal with the same problem differently.
6. (i) – (a), (ii) – (c), (iii) – (b)
7. • Ashita is effective but not efficient. Reason: She was able to produce 500 bracelets within the stipulated time but at a higher cost of ₹110 per bracelet.
• Lakshita is efficient but not effective. Reason: Though she was able to achieve a lower cost of ₹90 per bracelet but could not produce the target production of 500 bracelets. She was able to produce only 450 bracelets.
9. Order (Explain the consequences of violation)
10. The points of importance of management highlighted in the given case are: (Explain any two)
 - (i) Management increases efficiency
"To increase the efficiency of the workers, the company under the able guidance of specialists."

- (ii) Management helps in achieving personal objectives.
"The workers who are able to pick the skills are promoted and made incharge of the not so trained groups. This created positive impact and everybody became keen to learn."
- (iii) Management creates a dynamic organisation.
"The production manager realised that without modern machines it would not be possible for them to survive for long. The company purchased new hi-tech modern machines from Germany."

12. Time Study

'One of the techniques helps to determine labour costs'

- It is a technique to determine the standard time taken by a worker of reasonable skill and efficiency to perform a well-defined job.
- It helps in deciding the number of workers to be employed, frame suitable incentive schemes and determine labour costs.

Differential Piece Wage System

'Another technique recognises those workers who are able to accomplish/exceed the fair day's work and is based on the premise that efficiency is the result of the joint efforts of the managers and the workers'

- Differential Piece Wage System is a technique which differentiates between efficient and less efficient workers. It rewards the efficient workers and motivates the less efficient ones to improve their efficiency.
- In this plan, there are two piece rates – a higher piece rate for those workers who produce the standard output or more, and a lower one for those who produce less than the standard output.

Self Assessment Test 2.5

1. Principles of management are used as a basis for management training, education and research.
2. Unity of command/Espirit de Corps
3. principles of management
4. long working hours, bad working conditions, doing unsuitable work, uncordial relations with the loss, etc.
5. Growth
6. 'Directing' function of management
7. Yes, the management of H. Tech Ltd. is fulfilling all the objectives—organisational objectives, social objectives and personal objectives.
 - (i) Organisational objectives are the economic objectives of a business. These are survival, profit and growth.
'Profits of H. Tech Ltd. are enough for the survival and growth.'

- (ii) Social objectives involve creation of benefits or economic value for the society.

'H. Tech Ltd. has set up an engineering college in which one-third of the students are girls to whom the company gives 50% scholarship.'

- (iii) Personal objectives are related to satisfying diverse needs of the individuals such as financial needs, social needs and higher level needs.

"...it pays competitive salaries and perks to all its employees. All the employees are happy working in the organisation because of personal growth and development."

8. (a) Subordination of individual interest to general interest
(Explain)
- (b) General guidelines
(Explain)

10. Top Level Management

Functions of the top level of management: *(any three)*

- (i) To co-ordinate the activities of different departments.
- (ii) To be responsible for welfare and survival of the organisation.
- (iii) To formulate overall organisational goals and strategies for their achievement.
- (iv) To be responsible for all the activities of the business and for its impact on the society.

13. Principles/Technique of Management that were being violated by the company are: *(any six)*

- (i) Fatigue Study
"...existing workforce to work overtime... Due to increased pressure of work the efficiency of the workers declined."
- (ii) Unity of Command
"Sometimes the subordinates had to work for more than one superior..."
- (iii) Unity of Direction
"The divisions that were previously working on one product were also made to work on two or more products. This resulted in a lot of overlapping and wastage."
- (iv) Discipline
"The workers were becoming indisciplined."
- (v) Espirit De Corps
"The spirit of teamwork, which had characterized the company, previously was beginning to wane."
- (vi) Initiative
"Workers were feeling cheated and initiative was declining."
- (vii) Science, not rule of thumb
"...the company had implemented changes without creating the required infrastructure."