

# ESE 2027

UPSC ENGINEERING SERVICES EXAMINATION

**PRELIMINARY EXAMINATION**

## **General Studies & Engineering Aptitude**

### **Basics of Project Management**

**Comprehensive Theory with Practice Questions  
and ESE Prelims Solved Questions**



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# ESE 2027 Preliminary Examination Basics of Project Management

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# Preface

The book **Basics of Project Management** has been compiled with the objective of providing a concise yet comprehensive resource for aspirants of the Engineering Services Examination (ESE). It is specifically designed to help students develop a clear understanding of the concepts covered under the General Studies and Engineering Aptitude section of ESE.



This textbook offers detailed and descriptive, step-by-step theoretical explanations presented in lucid and easy-to-understand language. It ensures thorough coverage of fundamental concepts along with well-structured objective-type questions. The concise and systematic presentation enables readers to grasp the subject with clarity and apply their knowledge effectively to solve objective questions with speed and accuracy.

The book covers the complete ESE syllabus in a holistic manner and is equally useful for other competitive examinations. Each topic has been given due emphasis so that a careful reading of the text itself is sufficient to build strong conceptual clarity.

Special effort has been made to include solved practice questions and previous years' solved questions from the General Studies and Engineering Aptitude (ESE Prelims) section. These solutions are explained in a clear, step-by-step manner to strengthen problem-solving skills. At the end of every chapter, practice question sets with answer keys and detailed explanations are provided to help readers assess their understanding and enhance their exam readiness.

We have made sincere efforts to ensure accuracy and eliminate errors. However, we would greatly appreciate it if readers bring to our notice any printing or conceptual errors.

Though it is not possible to acknowledge everyone individually, we extend our heartfelt gratitude to all the authors, editors, and reviewers whose valuable contributions made this publication possible.

With Best Wishes  
B. Singh (Ex. IES)  
CMD, MADE EASY Group

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# 1

# Basic Concepts and Project Life Cycle

## 1.1 WHAT IS PROJECT?

A project is accomplished by performing a set of interrelated activities over a fixed period within certain cost and specifications. Projects are temporary and unique.

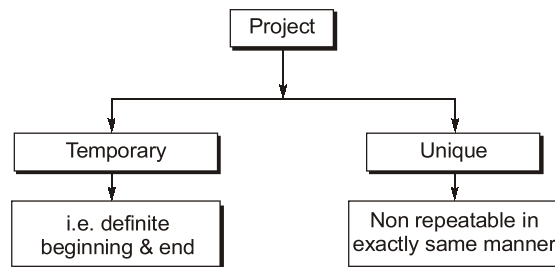


Fig. Feature of a project

- Temporariness of projects indicates that they are time bound and have a definite beginning and definite end. It has fixed time span.
- Uniqueness of projects means that they have be created for the first time and are not repeatative or routine.

Project has been defined in various ways. Some of popular definitions are:

- According to **Little and Mirrlees**, "A project is any scheme or a part of scheme for investing resources which can be reasonably analysed and evaluated as an independent unit."
- According to **Harison**, "A project can be defined as a non-routine, non-repetitive, one-off undertaking, normally with discrete time, financial and technical performance goal."

According to Project Management Institutes PMBOK guide.

**"A project is a temporary endeavours undertaken to create a unique product, service or result".**

**Example of projects:**

- Development of a software for a business.
- Construction of a building.
- Setting up a power plant.
- Expansion of sales in a new geographic market, etc.

## 1.2 CLASSIFICATION OF PROJECTS (TAXONOMY OF PROJECTS)

Projects can be classified under different heads as follows:

### 1. Classification based on type of work

- (a) Industrial projects
- (b) Non-industrial projects
  - Infrastructure projects
  - Irrigation projects
  - Building projects
  - Educational projects

- Health care projects
- Advertising and marketing projects
- IT and computer projects
- military and aerospace projects
- Event management projects
- Bank projects

## 2. Classification on the basis of Project Completion Time

- |                              |                                     |
|------------------------------|-------------------------------------|
| (a) Long duration projects   | (Completion time more than 5 years) |
| (b) Medium duration projects | (3 to 5 years)                      |
| (c) Short duration projects  | (1 to 3 years)                      |
| (d) Special short duration   | (Less than 1 year)                  |

## 3. Classification on the basis of project value

- |                           |                                 |
|---------------------------|---------------------------------|
| (a) Mega value projects   | (> Rs. 1000 crores)             |
| (b) Large value projects  | (Rs. 100 crores to 1000 crores) |
| (c) Medium value projects | (Rs. 1 crores to 100 crores)    |
| (d) Small value projects  | (Cost less than 1 crore)        |

## 4. Classification on the basis of ownership

- |                                |                                |
|--------------------------------|--------------------------------|
| (a) Private sector projects    | (b) Public sector projects     |
| (c) Joint sector project (PPP) | (d) Government sector projects |

## 5. Based on the basis of pace of work

- |                           |                         |
|---------------------------|-------------------------|
| (a) Normal track projects | (b) Fast track projects |
|---------------------------|-------------------------|

Which of the following are project?

1.	Reading a New Book	Yes
2.	Maintaining of New constructed Road	No
3.	Mass Production in a Car Plant	No
4.	Designing a New Product	Yes

### 1.2.1 Project Vs Operations

Operations is an ongoing work effort following repetitive process & producing same output or service.

**Similarities of Project and operation are:**

1. Both consume time and resources
2. Both are executed by individuals
3. Both has some similar phases i.e. planning execution & control
4. Both are executed to meet strategic & organisational objective

**Differences of project and operation are:**

Project	Operations
Temporary, Unique	Ongoing, repetitive
In Project more skills, are required	It requires limited skills as the process is repetitive
Risk are high at start as no. of unknown and unpredictable elements are present	Risk are not high as it is repetition of activities
A project has definite start and end.	Operations don't have a definite end
Risk are evaluated continually	Here processes are designed to minimise risk.

**NOTE:** Point of view also plays important role to distinguish project and operation. For customer work effort is project whereas for organisation it is operation as they do it all time.

### 1.3 WHAT IS MANAGEMENT?

Management is an act of getting people together to accomplish a work or goal using available resources efficiently and effectively.

**Management process involves:** In the project management context, a project management process consists of a linear sequence of processes:

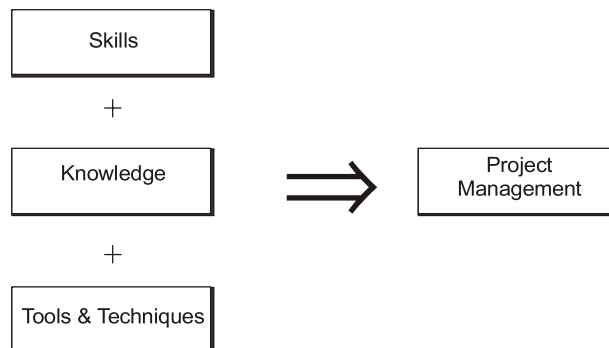
- Initiation process
- Execution process
- Closing process
- Planning process
- Monitoring and control process

There are various type of resources within management:

- |                          |                             |
|--------------------------|-----------------------------|
| (a) Human resources      | (b) Financial resources     |
| (c) Time resources       | (d) Technological resources |
| (e) Mechanical resources | (f) Natural resources       |

### 1.4 WHAT IS PROJECT MANAGEMENT?

Project management is an application of knowledge, skills, tools and techniques to meet the project requirements. The objective is to use the optimum resources to accomplish a goal in minimum time.



#### The 7-S of Project Management

The 7-S framework provides a comprehensive set of issues that need to be considered. It also allows classification of tasks within the remit of the project manager, which reduces the complexity of the role. In addition, classifying issues in this manner ensures that the project manager will know where to look to find sources of help if novel situation arises. Knowing that interpersonal problem in a team are aggravated by the style /culture that a project manager promotes provides a means for finding solutions to the problem

**Strategy:** The high-level requirements of the projects and the means to achieve them

**Structure:** The organizational arrangement that will be used to carry out the project

**Systems:** The methods for work to be designed monitored and controlled

**Staff:** The selection, recruitment, management and leadership of those working on the projects

**Style / culture:** The underlying way of working and inter-relating within the work team or organization

**Stakeholders:** Individuals and groups who have an interest in the project process or outcome

## 1.5 CHARACTERISTICS OF PROJECT MANAGEMENT

1. **Project Charter:** The project charter is one of the special project management documents that translates the project sponsor's business case into project objectives.
2. **Tools and Techniques:** The management of projects uses a number of special tools and techniques, combined with subject related knowledge and skills that have been developed over the years to manage different aspects of the project and facilitate the processing of large amounts of data. These include the CPM analysis, the Gantt chart, the resource histogram, the earned value graph and tables, activity crashing and matrix organization structures.
3. **Project Plan:** The project plan is a special project management document integrating the knowledge areas with individual plans to form one combined baseline plan.
4. **Project Management Processes:** The project management process is a special management technique for managing a linear sequence of steps or interrelated actions performed to achieve a specified set of projects, results or services. The project management process is subdivided into the following sub processes (initiation, planning, execution and closing).
5. **Project Organization Structure:** The project organization structure is a special management technique that enables the project manager to form temporary organization structures and project teams that can be designed to suit the needs of the project and the project participants. The enables the project leader to build and motivate the team and coordinate their work.
6. **Project Methodology:** The project lifecycle format is a special management technique subdividing the project into a number of identifiable phases that each produce a distinct deliverable. This sequence of phases forms the backbone of the project methodology, interlinking all the topics within a phase and between phases.

**Do you know?:** A product life cycle has five stages among which project management is done in development stage

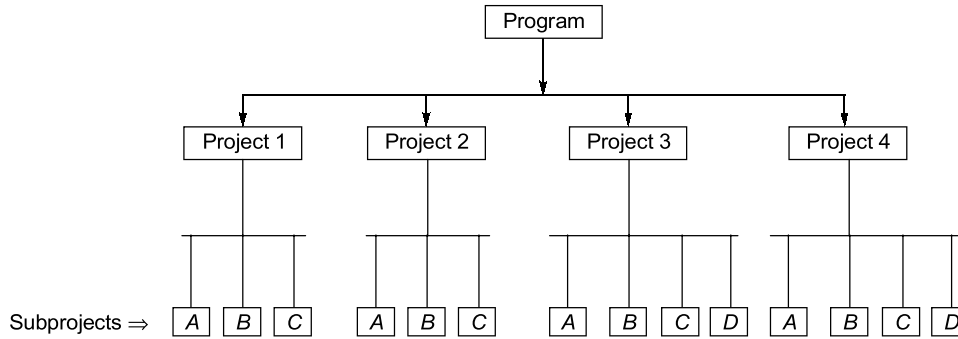
**Note :** 1. A portfolio can contain programs or projects specifically to meet strategic objectives.  
2. Program → Group of related Projects.

## 1.6 DIFFERENT TYPES OF MANAGEMENT

1. **General Management:** The successful project manager must also be competent in a wide range of general management skills. These include:
  - Recruiting and team selection
  - Sales and marketing
  - Project economics
  - Legal contracts
  - Personnel and human resources
  - Accounts and salaries
  - Computer systems
2. **Production Management:** Although projects are deemed to be unique, in reality they usually consist of a number of similar and repetitive tasks that could be grouped and made using a production line approach.
3. **Process Management:** Process management is used by companies that manage a product that typically flows from one process to another.
4. **Programme Management:** A programme is a set of related projects and organizational changes put in place to achieve a strategic goal and to deliver the benefits that the organization expects.
5. **Portfolio Management:** Portfolio management could be used by a project office that is running a number of unrelated projects such as managing the repairs and maintenance of a large telecom type company, a power station or a water utility.

A portfolio is a set of projects and/or programmes that are not necessarily related but are brought together for the sake of control, co-ordination and optimization.

Portfolio management is mainly applied to groups of projects and programmes that might not be related in the business sense but draw on a common pool of scarce resources. The portfolio manager co-ordinates all the projects and possible programmes within an organization during the process of evaluation, selection, monitoring and controlling, reprioritization and closure.

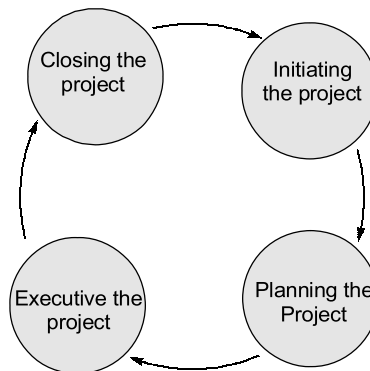
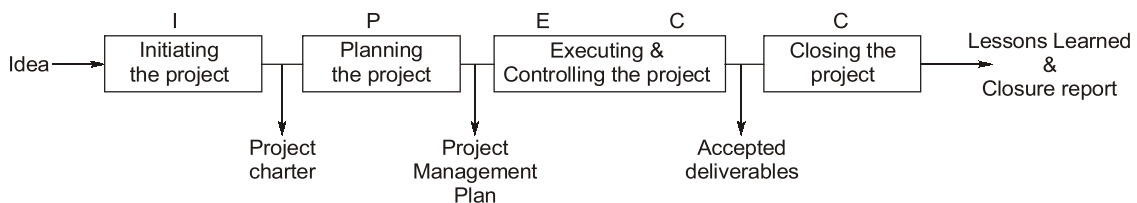


## 1.7 PROJECT LIFE CYCLE

- The project life cycle shows how a project can be subdivided into a number of phases presented sequentially along a project timeline.
- Every project has certain phases of development. A clear understanding of these phases allows managers and executives to control the project more efficiently.
- All the phases of a project from start to end are known as life cycle phases. The project life cycle i.e. number of phases may differ from project to project.

The main phases of life cycle are:

### 1.7.1 Project Life Cycle (4 Phases)

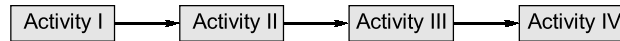


Project Life Cycle

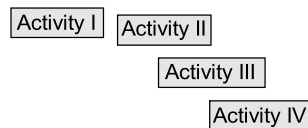
Monitoring and control processes is an integral part of all the process groups, and interact with each process in numerous ways:

#### Type of Relation between Activities of a Project:

1. **Sequential** : Finish to start Relationship i.e. one phase starts when the preceeding has finished.

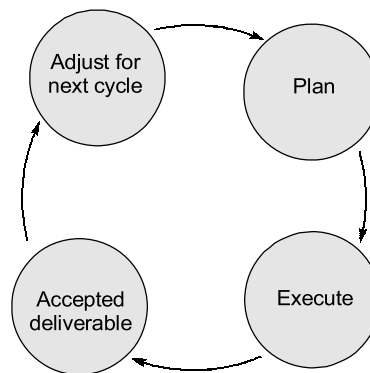


2. **Overlapping** : Here the subsequent phase can begin before the previous has finished.



It saves time and generally done for IT Projects.

3. **Iterative** : This phase type is particularly useful with Projects in which there are uncertainties rapidly changing market conditions or complete unknowns.



**Concurrent Engineering:** Concurrent engineering, or simultaneous engineering or Integrated Product Development or Agile, is a work methodology where the various areas required to bring a product from conceptualization to sales is done in parallel as opposed to step-by-step. The result is decreased time in product/service realisation/completion leading to increased time to market resulting in more sales and early market capture. Said areas could include research and development, design, manufacturing, testing, etc. for the product or project.

#### Phase-1. Feasibility Stage or Conception Stage/ Initiation stage

- The feasibility phase assesses the business case to confirm it is feasible to manufacture and implement.
- If there are number of possible business case solutions the feasibility study will rank the business cases in order of how well they are addressing the client's requirements.
- This is the phase when a problem is identified and potential solutions are suggested i.e. ideas are conceived.
- After feasibility study once the objectives have been clearly defined then the appraisal of the solutions is conducted in terms of risk, financial commitment and benefits.
- In case project ideas are found feasible from all considerations it is then given '*go ahead*' signal.

#### Phase-I of the project can be summarized as under:

- (a) Identification of the need
- (b) Establishment of the primary feasibility of project idea

**Previous ESE Prelims Questions**

**Q.1** Consider the following statements regarding project management:

1. It is the process of attaining project objectives in a stipulated time to produce quantified and qualified deliverables
2. It is the art of bringing together the responsibilities, resources and people necessary to accomplish the business goals and objectives within the specified time limitations and within the financial grant

Which of the above statements is/are correct?

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2 [ESE Prelims : 2017]

**Ans. (c)**

**Q.2** Consider the following phases of project management:

1. Identification      2. Formulation      3. Appraisal      4. Implementation

Which of the above phases are relevant, sequentially?

- (a) 1, 2 and 3 only (b) 1, 2 and 4 only  
(c) 3 and 4 only (d) 1, 2, 3 and 4 [ESE Prelims : 2017]

**Ans. (d)**

**Q.3 Statement (I):** Project management is essentially the process to plan its implementation and to pre-determine the period-wise need of resources including funds and personnel, given the choice of total duration and quality standards.

**Statement (II):** Of the four dimensions (not denying that there can be some more) of a project. viz., scope, cost, time and quality, only any two can be pre-assigned; others have to abide by these two prescriptions.

- (a) Both Statement (I) and Statement (II) are individually true and Statement (II) is the correct explanation of Statement (I).  
(b) Both Statement (I) and Statement (II) are individually true but Statement (II) is **not** the correct explanation of Statement (I).  
(c) Statement (I) is true but Statement (II) is false.  
(d) Statement (I) is false but Statement (II) is true. [ESE Prelims : 2018]

**Ans. (a)**

**Q.4** In progress of a project, the percentage of error will be less in

- (a) Definitive cost estimate (b) Detailed estimate  
(c) Preliminary estimate (d) Study estimate [ESE Prelims : 2019]

**Ans. (b)**

**Q.5** In a project life cycle, the maximum percentage of effort is done in

- (a) Concept phase (b) Definition phase  
(c) Planning and organizing phase (d) Implementation phase [ESE Prelims : 2019]

**Ans. (d)**

**Q.6 Statement (I) :** All projects have constraints or limitations that inhibit their ability to reach goals and objectives.

**Statement (II) :** Time and money are universal constraints in projects.

- (a) Both Statement (I) and Statement (II) are individually true; and Statement (II) is the correct explanation of Statement (I)  
(b) Both Statement (I) and Statement (II) are individually true; but Statement (II) is NOT the correct explanation of Statement (I)  
(c) Statement (I) is true; but Statement (II) is false  
(d) Statement (I) is false; but Statement (II) is true [ESE Prelims : 2019]

**Ans. (a)**

- Q.7** According to Black's Law Dictionary, the law treats the corporation itself as a person which can  
 (a) monitor (b) maintain  
 (c) sue and be sued (d) give response [ESE Prelims : 2024]

**Ans. (c)**

- Q.8** Those who drive automobiles are familiar with blind spots. Applying this term to organizational and business arenas, Dennis Moberg draws an analogy between business blind spots and those we experience when driving. Blind Spot is one of the significant common impediments to responsibility. Which one of the following is NOT the method under Blind Spot?  
 (a) Self-deception (b) Willful blindness  
 (c) Inattentional blindness (d) Illusion of invulnerability of group

[ESE Prelims : 2024]

**Ans. (a)**

- Q.9** Which one of the following is NOT a factor for large scale diversification into unrelated areas by some of the industry Conglomerate in India?  
 (a) Restriction in growth in the existing line of business  
 (b) Policies with respect to imports, duties, pricing and reservations  
 (c) Opening up of newer areas of investments  
 (d) Desire not to avail tax incentives

[ESE Prelims : 2024]

**Ans. (a)**

- Q.10** Which one of the following phases is predominantly a testing and final standardization effort so that operations can begin in project management?  
 (a) Conceptual phase (b) Production phase  
 (c) Operational phase (d) Evaluation phase

[ESE Prelims : 2025]

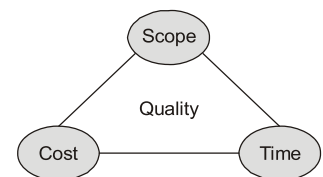
**Ans. (b)**

- Q.11** Which of the following is not considered as fundamental dimension of project plans?  
 (a) Time (b) Cost  
 (c) Scope (d) Quality

[ESE Prelims : 2025]

**Ans. (d)**

- The fundamental dimension of a project plan are scope, time and cost.
- These three elements are often referred to as the 'triple constraint' or 'iron triangle' of project management.



- Q.12** A layout which is designed in such a way that the entire process of receiving raw materials, processing and the outward movement of the finished goods takes place smoothly and efficiently is called  
 (a) Transport layout (b) Organizational layout  
 (c) General functional layout (d) Utilities layout [ESE Prelims : 2025]

**Ans. (c)**



**Directions:** Each of the next items consists of two statements, one labelled as 'Assertion (A)' and the other as 'Reason (R)'. Examine these two statements carefully and select the answers to these items using the codes given below :

**Codes:**

- (a) Both Assertion (A) and Reason (R) are individually true and Reason (R) is the correct explanation of Assertion (A).
- (b) Both Assertion (A) and Reason (R) are individually true but Reason (R) is NOT the correct explanation of Assertion (A).
- (c) Assertion (A) is true but Reason (R) is false.
- (d) Assertion (A) is false but Reason (R) is true.

**Q.36 Assertion (A):** Reading your favourite book is project.

**Reason (R):** Reading a book, which you have already read includes all predictable and repetitive element.

**Q.37 Assertion (A):** A project can have one or many phases.

**Reason (R):** Each phase of a project has IPECC process group.

**Q.38 Assertion (A):** A group of activity to produce a product or a service can be project or operation.

**Reason (R):** Point of view is very important to identify a project or an operation. As for customer the work may be project but for company doing similar activities it will be operation.

**Q.39 Assertion (A):** Detailed project report is prepared before planning starts.

**Reason (R):** Outcome of DPR will be used in execution of project activities.

**Q.40 Assertion (A):** A stakeholder is a project related person who is responsible for financing the Project only.

**Reason (R):** A stakeholder is anyone who is affected by the project.

**Q.41** What is the reason for a Project Charter?

- (a) To formally approve a venture or a stage and archive beginning prerequisites which fulfill the partner's needs and desires
- (b) To archive how the venture will be arranged, executed, observed/controlled, and shut

- (c) To connect the venture, which will be arranged, executed, and observed/controlled to the progressing work of the association
- (d) To portray the way towards playing out the work characterized in the venture administration arrange so as to accomplish the venture's targets

**Q.42** A project manager reviewing the scope of the project and the scope baseline of the project. This includes which of the following?

- (a) The original project schedule, budget, and scope.
- (b) The original project description and project charter.
- (c) The original scope of the project plus or minus any scope changes.
- (d) The current budget of the project.

**Q.43** Arrange the following elements of the Project Cycle in the right order:

- A. Project Appraisal      B. Feasibility Analysis
- C. Negotiation            D. Project Selection
- (a) A-B-C-D                (b) B-A-C-D
- (c) B-A-D-C                (d) A-B-D-C

**Q.44** Constraints common to projects include

- (a) Scope, quality, schedule, budget, and risk
- (b) Scope, teaming, planning, and resources
- (c) Scope
- (d) Resources and communication

**Answers**

- |         |         |         |         |         |
|---------|---------|---------|---------|---------|
| 1. (c)  | 2. (d)  | 3. (a)  | 4. (c)  | 5. (a)  |
| 6. (c)  | 7. (a)  | 8. (c)  | 9. (d)  | 10. (b) |
| 11. (c) | 12. (c) | 13. (d) | 14. (c) | 15. (b) |
| 16. (c) | 17. (b) | 18. (d) | 19. (a) | 20. (c) |
| 21. (b) | 22. (c) | 23. (c) | 24. (b) | 25. (a) |
| 26. (c) | 27. (c) | 28. (d) | 29. (a) | 30. (d) |
| 31. (b) | 32. (c) | 33. (d) | 34. (c) | 35. (b) |
| 36. (d) | 37. (b) | 38. (a) | 39. (d) | 40. (d) |
| 41. (a) | 42. (c) | 43. (c) | 44. (a) |         |

### Explanations

3. (a)

When the project manager is selected and assigned to the project during initiation, several of the usual start-up tasks for a project are simplify (d) In addition, becoming involved with project activities from the beginning helps the project manager to understand where the project fits within the organisation in terms of its priority relative to other projects and the ongoing work of the organisation.

5. (a)

Creation of project charter is the specific activity that is done in the Initiating Process.

21. (b)

Example (a, c) belong to operation

25. (a)

Project charter officially authorises project manager.

26. (c)

Project charter the 1<sup>st</sup> document of project authorises project manager.

27. (c)

A project is neither predictable nor repeatable.

28. (d)

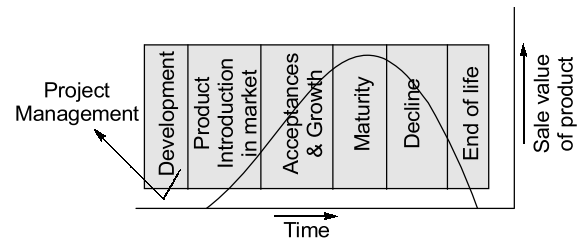
Stakeholder is anyone affected by the project either positively or negatively.

30. (d)

Stakeholders influence is most at the beginning of project.

32. (c)

Maturity phase gives the mad amount of product sale.



34. (c)

Payback period is when the breakeven point is reached and profit starts for the project.

35. (b)

Project management process groups i.e. IPECC remain same for all the projects whereas project phases may change depending on type of activity required

**Example :** Construction Project Phases will be different from software development project phase.

37. (b)

A project is broken down into number of phases which may be from one to many. But each phase includes IPECC cycle.

39. (d)

DPR is prepared in planning stage.

40. (d)

A is wrong. The world only is wrong there. Financer is one of the stakeholder.

44. (a)

The constraints include scope, schedule, budget (cost), quality, resources, and risk.

