



# MADE EASY

India's Best Institute for IES, GATE & PSUs

**Test Centres:** Delhi, Hyderabad, Bhopal, Jaipur, Bhubaneswar, Pune, Kolkata

## ESE 2024 : Prelims Exam | GS & ENGINEERING CLASSROOM TEST SERIES | APTITUDE

### Test 7

**Section A :** Basics of Project Management

**Section B :** General Principles of Design, Drawing, Importance of Safety

**Section C :** Basics of Energy and Environment

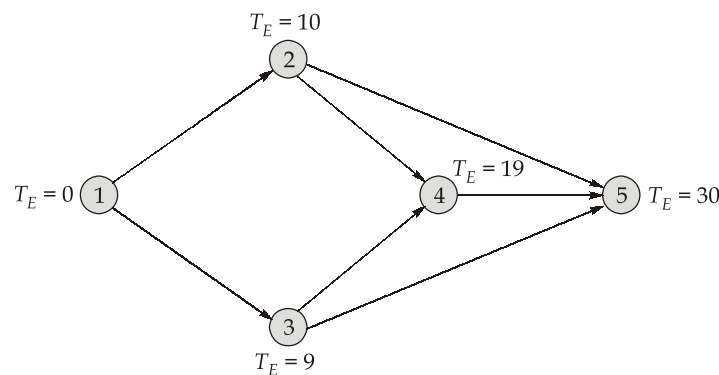
### ANSWER KEY

1. (d)	11. (b)	21. (a)	31. (a)	41. (d)
2. (c)	12. (b)*	22. (c)	32. (d)	42. (b)
3. (b)	13. (a)	23. (a)	33. (d)	43. (a)
4. (a)	14. (d)	24. (c)	34. (a)	44. (b)
5. (d)	15. (a)	25. (c)	35. (d)	45. (a)
6. (c)	16. (d)	26. (d)	36. (a)	46. (c)
7. (b)	17. (b)	27. (d)	37. (d)	47. (d)
8. (b)	18. (a)	28. (c)	38. (d)	48. (b)
9. (a)	19. (b)	29. (b)	39. (b)	49. (d)
10. (d)	20. (d)	30. (d)	40. (c)	50. (b)

**Q.12\* : Marks to all**

**DETAILED EXPLANATIONS**

1. (d)  
Payoff matrices, decision analysis and Monte Carlo process are some commonly used methodologies in quantitative risk assessment.  
Monte Carlo process is an attempt to create a series of probability distributions for potential risks.
2. (c)  
Risk management can be justified on almost all projects. However the implementation can vary from project to project depending on factors such as size, type of project, who the customer is, contractual requirements, relationship to the corporate strategic plan and corporate culture.
3. (b)  
The work breakdown structure acts as a vehicle for breaking the work down into smaller elements, thus providing a greater probability that every minor and major activity will be accounted for.
4. (a)  
Non turnkey contracts are preferred when the projects are small sized, the know how for the project is available with the promoters and when there is a strong, competent and capable project team available with the organisation.
6. (c)  
The intensity of activities binds up and reaches to peak in execution stage, however when execution approaches to completion the intensity of activities start falling again.
8. (b)  
Statement 1 is false. Concurrent engineering is an attempt to accomplish work in parallel.
10. (d)  
Both the statements are correct.
11. (b)



Critical path = (1) – (2) – (3) – (4)

Standard deviation of the project,  $\sigma = \sqrt{(\sqrt{7})^2 + 3^2 + 3^2}$

$$= \sqrt{25} = 5 \text{ days}$$

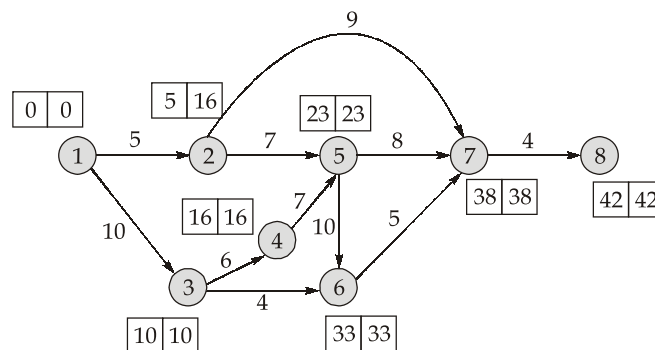
Now,

$$z = \frac{T_s - T_E}{\sigma}$$

$$z = \frac{25 - 30}{5} = -1$$

$$P_1\% = 100 - 84.13 = 15.87\%$$

12. (b)



Critical path : (1) → (3) → (4) → (5) → (6) → (7) → (8)

For activity : (2) - (7)

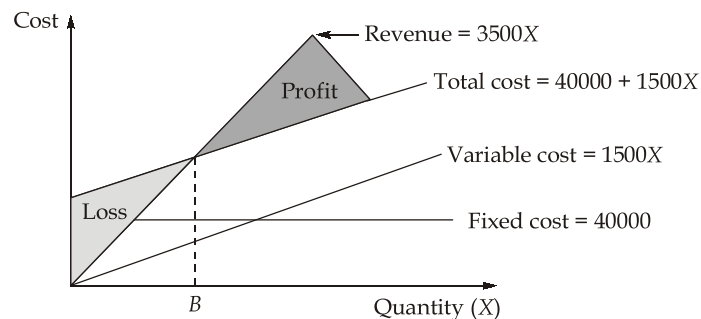
$$\begin{aligned} \text{Independent float} &= (T_{Ej} - T_{Li}) - t_{ij} \\ &= (38 - 16) - 9 \\ &= 13 \text{ days} \end{aligned}$$

13. (a)

The project manager maintains maximum project control in a pure matrix organizational form.

17. (b)

Break even chart:



$$\text{Savings (s)} = \text{Revenue} - \text{Total cost}$$

$$\text{Breakeven : } s = 0$$

⇒

$$3500X = 40000 + 1500X$$

$$\Rightarrow X = \frac{40000}{2000} = 20 \text{ m}^3$$

18. (a)

The payback period for an investment is taken as the number of years it takes to repay the original invested capital.

The pay back period for brand A = 3 years

$$\left\{ \left( \frac{50000}{1^{\text{st}} \text{ year}} + \frac{150000}{2^{\text{nd}} \text{ year}} + \frac{200000}{3^{\text{rd}} \text{ year}} \right) = 400000 \right\}$$

The pay back period for brand B = 2 years and 8 months

$$\left\{ \left( \frac{150000 \times 2}{\text{in 2 years}} + \frac{100000}{\text{in 8 months}} \right) = 400000 \right\}$$

Difference = 4 months

19. (b)

$$\begin{aligned} \text{Effective rate of interest} &= \left\{ \left( 1 + \frac{0.15}{3} \right)^3 - 1 \right\} \times 100\% \\ &= 15.76\% \end{aligned}$$

20. (d)

$$\begin{aligned} \text{Maturity value} &= A \left[ \frac{(1+i)^n - 1}{i} \right] \\ &= 1000 \left[ \frac{(1+0.12)^{10} - 1}{0.12} \right] = 1000 \left[ \frac{3.1058 - 1}{0.12} \right] \\ &= 1000 \left[ \frac{2.1058}{0.12} \right] = 17548 \end{aligned}$$

21. (a)

Pre-operations and post operations of the activity under consideration are distinctly visible.

22. (c)

Termination by starvation is water a project is not able to sustain due to lack of budget.

25. (c)

Statement II is wrong.

A-items are those items that normally accounts for only about 5% to 10% of the total items of material consumed but 70% to 75% of the total money is spent on these materials.

26. (d)

- Adaptive design occurs when a known solution is applied to satisfy a different need and a completely new application is produced.
- Industrial design deals with improving the appeal of a product to the human senses.

28. (c)

- In an integral architecture, the implementation of functions is accomplished by only one or few modules. In integral product architecture, components perform multiple functions. This reduces the number of components, generally decreases cost unless the integral architecture is obtained at the expense of extreme part complexity.

29. (b)

**Safety Inspection:** A safety inspection looks for safety hazards and unsafe practices throughout a facility. The inspection should:

- Determine whether safeguards are in place
- Examine whether the equipment presents any hazards
- Gather air, water, and other samples to test for hazardous substances
- Observe work practices to identify unsafe actions

Once recognized, any hazards present can be rectified, eliminated, or accounted for.

**Safety Audit:** A safety audit evaluates safety programs and practices within an organization. Employers conducting an audit should:

- Measure and collect information about a safety program's reliability and effectiveness
- Look at whether a safety program meets the company's stated goals
- Examine safety training and response efforts

30. (d)

Ergonomics leads to healthy and pain-free workers who are more likely to be engaged, thus reducing absenteeism.

31. (a)

#### Using The Fire Extinguisher

Using the fire extinguisher is fairly easy. Most fire extinguishers operate using P.A.S.S. technique:

- P : Pull the pin on the fire extinguisher in order to break the tamper seal.
- A : Aim the fire extinguisher low, with nozzle pointed at the base of the fire.
- S : Squeeze the handle of the fire extinguisher to release the extinguishing agent.
- S : Sweep the nozzle from side to side while pointed at the base of the fire until it is extinguished.

If fire reignites, repeat the last 3 steps.

33. (d)

- Statement 2 is correct for class C hard hats.
- Statement 4 is correct for class A hard hats.

34. (a)

Fault tree analysis is a deductive procedure used to determine the various combinations of hardware and software failures and human error that could cause undesired events (referred to as top events) at the system level.

35. (d)

$$e^2 = \frac{\text{Distance between focus}}{\text{Length of transverse axis}} \times \frac{\text{Length of transverse axis}}{\text{Distance between directrix}}$$

$$e = \sqrt{\frac{\text{Distance between focus}}{\text{Distance between directrix}}}$$

36. (a)

It is easier to measure by the help of backward vernier scale compared to forward vernier scale.

37. (d)

1. Isometric view :

- Drawn to actual scale.
- When lines are drawn parallel to isometric axes, the true length are laid off.

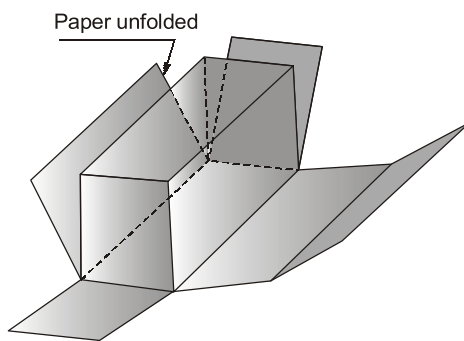
2. Isometric projection :

- Drawn to isometric scale.
- When lines are drawn parallel to isometric axes, the lengths are fore shortened to 0.816 times the actual lengths.

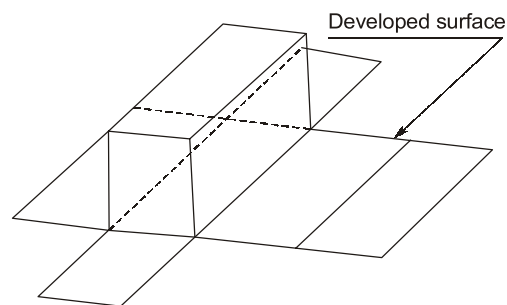
38. (d)

### Definition of Development of Surface of a Solid

When an imaginary paper wrapped on surface of a solid is unfolded and laid out on a flat plane, the flattened out paper is called the development of the surface of solid.



*Prism and Paper being unfolded*



*Prism with developed surface*

### Key points are:

1. All faces of the solid appear to be of their true shape and true size in development.
2. All lines along the surface of solid appear to be of their true length in development.
3. Surfaces of solids with double curved surface like sphere, paraboloid, hyperboloid, ellipsoid cannot be developed accurately. Only approximate methods are available for their development.

4. When we are asked to develop lateral surface of a solid then bases are not included in the development.
39. (b)
- Pradhan Mantri Kisan Urja Surakshaevam Utthaan Mahabhiyan Yojana (PM-KUSUM Scheme) was launched in March 2019 by the Ministry of New and Renewable Energy (MNRE), to subsidize farmers to install solar irrigation pumps for cultivation.
  - Each farmer will receive a 60% subsidy to set up tube wells and pump sets. They will also get 30% of the total cost as a loan from the Government.
40. (c)
- CITES works by subjecting international trade in specimens of selected species to certain controls.
  - Appendix I includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.
  - Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival. This Appendix contains species that are protected in at least one country, which has asked other CITES Parties for assistance in controlling the trade.
42. (b)
- A biodiversity hotspot is a region with a high amount of biodiversity that experiences habitat loss by human activity. In order to qualify as a biodiversity hotspot, according to Conservation International, “a region must contain at least 1,500 species of vascular plants ( $> 0.5\%$  of the world’s total) as endemics, and it has to have lost at least 70% of its original habitat.”
44. (b)
- In India, which is the world’s third largest producer of renewable energy, nearly 40 per cent of installed electricity capacity comes from non-fossil fuel sources.
46. (c)
- This method involves planting two to four different types of indigenous trees within every square metre.
  - In this method, the trees become self-sustaining and they grow to their full length within three years. The methodology was developed in the 1970s, with the basic objective to densify green cover within a small parcel of land. The plants used in the Miyawaki method are self-sustaining and don’t require regular maintenance like manuring and watering.

