DETAILED SOLUTIONS

# MADE EASY

India's Best Institute for IES, GATE & PSUs

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

## ESE 2023 : Prelims Exam | GS & ENGINEERING APTITUDE

CLASSROOM TEST SERIES

## Test 11

**Section A :** Information and Communication Technologies (ICT) **[All Topics]**

**Section B :** Ethics and Values in Engineering Profession **[All Topics]**

**Section C :** Basics of Project Management **[All Topics]**

### ANSWER KEY

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

## Section A : Information and Communication Technologies (ICT)

**1. (b)**

- **Passive tags:** There is no power supply for passive tags. They acquire their power from the readers' incoming radio waves. Passive RFID tags do not have a battery and are powered by the reader.
- **Semi-passive tags** : Semi-passive tags comprise an internal circuit with a power source, but rely on the radio waves received from the reader to transmit the response.

**2. (c)**

Assisted GPS (A-GPS) is a type of GPS that allows receivers to get information from local network sources, which helps in the location of satellites.

**6. (a)**

Primary Memory stores data that is being currently used by the computer. It gets lost after power is switched off.

**8. (c)**

USB stands for Universal Serial Bus, an industry standard for short-distance digital data communications.

**10. (b)**

The 5G Network has high frequency. The higher the frequency, the lower the wavelength, which means that the distance they travel is less.

**12. (d)**

Parallel transmission is common especially where the distance between the two devices is short.

**13. (a)**

Star topology is designed with each node connected directly to a central network hub or switch.

**14. (d)**

- The data link layer provides a flow control mechanism in case data rate absorbed by receiver is less than rate produced at sender.
- Medium Access Control (MAC) is a sublayer in the data link layer that deals with the issue of access control to shared channels.

**16. (c)**

Both the devices must contain NFC chips, as transactions take place within a very short distance.

**23. (b)**

Integrative learning approach eliminates the artificial separation between different disciplines and between theory and practice.

**25. (c)**

Courses delivered through SWAYAM are available to learners free of cost.

**27. (a)**

Virtue ethics is an approach to ethics that emphasizes an individual's character as the key element of ethical thinking.

**28. (b)**

- Courage involves element of mastery on fear. Hence statement 2 is incorrect
- Courageous action must be voluntarily. Hence statement 3 is incorrect
- Courage involves presence of danger, loss, risk or potential injury. Hence statement 4 is incorrect.

**30. (c)**

The principle of non-maleficence is sometimes also referred as a negative injunction since it tells us what not to do.

**35. (b)**

Best way to create trustworthiness is to act with trustfulness. Hence statement 1 is incorrect.

**36. (d)**

Conflicts where values are involved tend to be contentious. Hence statement (I) is incorrect.

**38. (c)**

No objection is strong or convincing enough to conclude that code of conduct is undesirable. Hence statement (II) is false.

**39. (c)**

Project charter outlines what the project has to achieve (scope of work) and how to achieve the stated objectives and gives the project manager the authority to use company resources.

**40. (d)**

- Project success from the project manager's perspective is related to delivering the project deliverables (as outlined in the project charter). If the project is delivered on time, on budget and to the required quality, the project would be deemed to have been a success from the project manager's perspective.
- In the given case study the project was not on time and it was over budget. So it is a failure from project manager's perspective.
- On the other hand, project success from the project sponsor's perspective is generally related to whether the benefits were realized by the company as outlined in the business case.
- Since the building has become a national icon and tourist attraction, the purpose is served and hence it is success from project sponsor's perspective.
- But it is misleading to consider the project's success only from the project manager or project sponsor's perspective, particularly in a changeable market.

**41. (b)**

Project life cycle has 4 phases:

| Phase of project life cycle | Input | Output |
|---|---|---|
| Project feasibility phase | Business case, project charter, phase charter | Project feasibility study |
| Project definition phase | Project charter, project feasibility study | Project design, project plan |
| Project execution phase | Phase charter, project design, project plan | Certificate of completion |
| Project commissioning and handover phase | Project charter, certificate of completion | Closure report |

**42. (c)**

$$\text{ARR} = \frac{\text{Average annual profit after taxes}}{\text{Average investment over the project life}} \times 100$$

$$\text{Average investment over project life} = \frac{1}{2}[\text{Initial cost} - \text{Salvage value}] + \text{Salvage value} + \text{Working capital}$$

$$\text{Average annual profit} = \frac{4000 + 5000 + 7000 + 9000 + 12000}{5}$$

$$= ₹7400 \text{ per year}$$

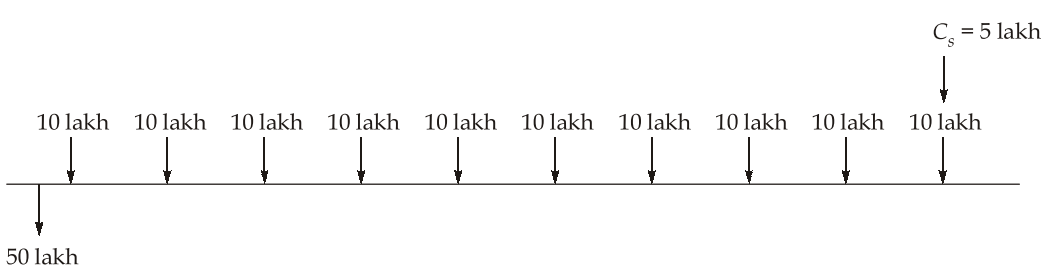
$$\text{Average investment} = \frac{1}{2}(I - S) + S + \text{Working capital}$$

$$= \frac{1}{2}(60000 - 3000) + 3000 + 0$$

$$= ₹31500$$

$$\therefore \quad \text{ARR} = \left(\frac{7400}{31500}\right) \times 100 = 23.49\% \simeq 23.5\%$$

**43. (b)**




$$\text{Annuity, } A = ₹10 \text{ lakh}$$

$$\text{Present worth of inflow} = A\left[\frac{(1+i)^{10} - 1}{i(1+i)^{10}}\right] + \frac{S}{(1+i)^{10}}$$

$$= \left[10\left(\frac{(1.15)^{10} - 1}{0.15(1.15)^{10}}\right) + \frac{5}{(1.15)^{10}}\right] \text{lakh}$$

$$= \frac{10}{0.15}[1-0.25]+5(0.25) = 50+1.25 \text{ lakh}$$

$$= ₹51.25 \text{ lakh}$$

**44. (a)**

$$\text{Present value of perpetual annuity} = \frac{A}{i} = \frac{1200}{0.16}$$

$$= ₹7500$$

**46. (b)**

$$\text{Cost of equity } (C) = \frac{D+\left(\frac{FV-PV}{n}\right)}{\left(\frac{FV+PV}{2}\right)}$$

There are no tax deductions in this type of fund.

$D$ : Annual dividend

$FV$ : Future value

PV : Present value

$$C = \frac{(0.09\times 100)+\left(\frac{100-97}{8}\right)}{\left(\frac{110+97}{2}\right)}$$

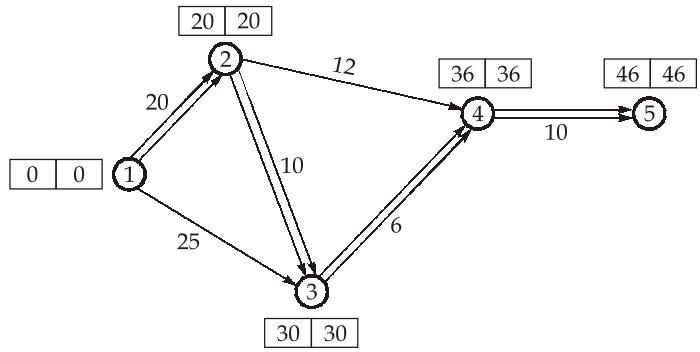
$$C = 0.1026 = 10.26\% \simeq 10.3\%$$

**47. (b)**

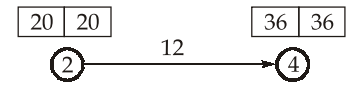
| **Contractor** | **Variance** $=\left(\frac{t_p - t_0}{6}\right)^2$ |
|---|---|
| $P$ | $\left(\frac{13-5}{6}\right)^2 = 1.78$ |
| $Q$ | $\left(\frac{12-6}{6}\right)^2 = 1$ |
| $R$ | $\left(\frac{14-5}{6}\right)^2 = 2.25$ |
| $S$ | $\left(\frac{16-4}{6}\right)^2 = 4$ |

As variance of contractor 'Q' is less compared to other contractors, contractor 'Q' is more certain about completing the job in time. Hence, work is awarded to contractor 'Q'.

**48. (d)**




Activity 2-4 is




EST = 20 EFT = 20 + 12 = 32
LST = 36 – 12 = 24 LFT = 36

Total float = 36 – 32 = 24 – 20
= 4 days

**49. (d)**

If there are heavy time penalties, the resources must be increased to meet the schedule. This is called time-limited resource scheduling.

Resource-limited resource scheduling is used if the maximum number of resources is fixed and the end date might need to be extended to address any overload.

**50. (d)**

- When a company desires a strong matrix, the project manager is generally promoted from within the organization and may have had assignments in several line functions throughout the organization.
- In a weak matrix, the company may hire from outside the organization but should atleast require that the person selected understand the technology and the industry.

❍❍❍❍