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## ESE 2025 : Prelims Exam | GS & ENGINEERING CLASSROOM TEST SERIES | APTITUDE **Test 15**

**Section A :** Current Issues of National and International Importance Relating to Social, Economic & Industrial Development [All Topics]

**Section B :** Standards & Quality practices in Production, Construction, Maintenance & Services [All Topics]

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

### ANSWER KEY

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

**Section A : Current Issues of National and International Importance Relating to Social, Economic and Industrial Development**

1. (a)  
Pradhan Mantri Shram Yogi Maan-dhan (PM-SYM) Yojana is a voluntary and contributory pension scheme meant for the old age protection and social security of Unorganised Workers (UW) who are mostly engaged as rickshaw pullers, street vendors, mid-day meal workers, head loaders, brick kiln workers, etc., or in similar other occupations and whose monthly income is Rs 15,000 per month or less and belong to the entry age group of 18–40 years are eligible for the scheme.
2. (b)
  - The Z-Morh Tunnel, recently in the news, is a strategic infrastructure project in the Union Territory of Jammu & Kashmir to ensure year-round connectivity to Sonamarg, Kargil, and Ladakh. It plays a vital role in improving transportation, tourism, and defense logistics in one of the most sensitive and snow-prone areas of India.
  - The Z-Morh Tunnel is 6.5 kilometers long and is located near Sonamarg, a major tourist destination in the Ganderbal district of Jammu & Kashmir.
  - It is named after the Z-shaped hairpin bend on the Srinagar-Leh highway, near which the tunnel is built.
3. (b)
4. (c)  
The Vigyan Jyoti programme is implemented by the Department of Science and Technology (DST) under the Ministry of Science and Technology. It was launched in 2019-20 to encourage meritorious girls to pursue higher education and careers in STEM (Science, Technology, Engineering, and Mathematics).
5. (c)
6. (d)
7. (c)
  - The Turner Prize is an annual prize given to a British visual artist, established in 1984 by the Patrons of New Art, a group associated with the Tate Gallery.
  - It is named after the famous English painter J.M.W. Turner and is aimed at promoting contemporary art and outstanding exhibitions or presentations of work by artists under fifty years old.
8. (d)
  - The Union Government's interest payments—obligations on past borrowings—account for the single largest item in expenditure.
  - Revenue expenditure includes salaries, pensions, subsidies, interest payments, and grants—all necessary but non-asset-creating expenses. It has frequently exceeded 10% of GDP, especially in high-spending years.

9. (a)  
The 'Pratibimb' module was launched by the Union Home Ministry's Indian Cyber Crime Coordination Centre (I4C).
10. (b)  
Corporate bonds are debt securities but can be either secured or unsecured. Secured bonds are backed by specific assets of the issuing company, while unsecured bonds (or debentures) rely solely on the company's creditworthiness. Many corporate bonds are issued as unsecured debt, meaning bondholders have no direct claim on company assets in case of default.
11. (a)  
Digital Rupee is issued under Section 26 of the RBI Act, 1934. It is treated as legal tender, just like physical currency. It is explicitly stated to be "the liability of the Reserve Bank of India.
12. (b)
13. (a)  
The Household Consumption Expenditure Survey (HCES) 2023-24, released by the Ministry of Statistics and Programme Implementation (MoSPI), provides crucial insights into spending patterns, rural-urban disparities, and changing consumption behaviors in India. This survey is particularly significant as it offers a comprehensive assessment of household expenditures across different income groups and regions.
14. (a)
15. (a)  
The Technology Security Initiative (TSI) is an India-UK initiative launched to enhance cooperation in Critical and Emerging Technologies (CET). Focus areas: Telecom, critical minerals, semiconductors, AI, and quantum technology.
16. (b)
- Agriculture Infrastructure Fund (AIF) is a Central Sector Scheme, under the Ministry of Agriculture & Farmers Welfare.
  - The aim is to provide medium - long term debt financing facilities through interest subvention and credit guarantee.
17. (c)
18. (d)
- Stargate is a \$500 billion initiative to create an AI infrastructure in the US over the next four years.
  - USA President Donald Trump has dubbed it the largest AI infrastructure project in history. This ambitious project aims to propel the US into global leadership in AI advancements.
19. (d)  
The Partnership for Global Infrastructure and Investment (PGII) is a joint initiative by the Group of Seven (G7) countries to fund infrastructure projects in developing countries. The PGII was launched in 2022.

20. (d)

21. (a)

- PMJDY is a National Mission on Financial Inclusion encompassing an integrated approach to bring about comprehensive financial inclusion of all the households in the country.
- The plan envisages universal access to banking facilities with at least one basic banking account for every household, financial literacy, access to credit, insurance and pension facility.

22. (c)

According to recent data, India is currently ranked as the 14th largest globally in terms of goods exports with a 1.8% share in global exports.

23. (b)

24. (d)

According to the State of Forest Report (2023), India's total forest and tree cover is 25.17% of the total land area, not 29%.

25. (c)

India's external debt has remained stable over the past few years.

### Section-B: Standards & Quality Practices in Production, Construction, Maintenance and Services

26. (d)

For parallel connection system,

$$\begin{aligned} R_{\text{system}} &= 1 - (1 - R_A)(1 - R_B) \\ R_{\text{system}} &= 1 - (1 - 0.5)(1 - 0.4) \\ R_{\text{system}} &= 0.7 \end{aligned}$$

27. (c)

Taguchi's loss friction/average repair cost,

$$y = k(x - T)^2$$

where,  $k$  = Taguchi is loss constant/constant of proportionality;  $x$  = Quality characteristic of interest;  $T$  = Nominal value

$$\begin{aligned} x - T &= \text{Tolerance} \\ y &= 0.5 \times 200 = 100 \\ 100 &= k(x - T)^2 \\ 100 &= k(0.2)^2 \\ k &= \frac{100}{(0.2)^2} = 2500 \end{aligned}$$

28. (d)

Reliability when elements are in series,

$$\begin{aligned} R_{\text{system}} &= R_A \times R_B \times \dots \\ R &= e^{-\lambda_1 t} \times e^{-\lambda_2 t} = e^{-(\lambda_1 + \lambda_2)t} \end{aligned}$$

Given,

$$t = 600, \text{MTBF}_1 = 30, \text{MTBF}_2 = 20$$

$$\lambda_1 = \frac{1}{MTBF_1} = \frac{1}{30}$$

$$\lambda_2 = \frac{1}{MTBF_2} = \frac{1}{20}$$

$$R_{\text{system}} = e^{-\left(\frac{1}{30} + \frac{1}{20}\right) \times 600} = e^{-\frac{5}{60} \times 600} = e^{-50}$$

29. (c)

- Six sigma is a statistical term, represents the standard deviation, which is a measure of dispersion or variability and not average.
- Six sigma gives precision of 99.99%.
- To maintain six sigma quality, a process must not produce more than 3.4 defects per million opportunities.

30. (b)

The dimensions of quality are :

1. Performance
2. Aesthetics
3. Special feature
4. Conformance
5. Reliability
6. Durability
7. Perceived quality
8. Serviceability

31. (a)

Here,  $N = 100$ ,  $n = 10$ ,  $P_a = 0.6$ ,  $P = 0.15$

$$\begin{aligned} \therefore AOQ &= P_a P \left( \frac{N-n}{N} \right) \\ &= 0.6 \times 0.15 \times \left( \frac{100-10}{100} \right) = 0.081 \end{aligned}$$

32. (d)

- C - Chart : When number of defects per unit are counted.
- R - Chart : Shows the variation in the range of samples.
- $\bar{X}$  - Chart : Used to control the average quality of product.
- P - Chart : Used to monitor and control the fraction produced in a process that is defective or non-conforming.

33. (b)

In a systematic sampling, units are selected at regular intervals, not randomly like in simple random sampling.

Consumers risk is the probability of accepting a bad lot, not rejecting it.

34. (a)  
The ISO (International Organisation for Standardization) emphasizes prevention rather than detection. ISO standards, such as ISO 9001 (Quality management system), focus on:
- Identifying and mitigating potential risks and errors.
  - Implementing processes and control to prevent defects and non-conformities.
  - Continuously improving processes to prevent recurrence of issues.
35. (b)  
Perceived quality refers to the customer's subjective evaluation of a product or services quality, based on their experience, expectations and perceptions.
36. (a)  
Marketing and sales is not typically stage in construction project, as it is more relevant to the real estate or property development industry.
37. (d)
- DMADV (Define, Measure, Analyze, Design, Verify) is a six sigma methodology.
  - There are certain situation where the management team members may feel that a process needs to be replaced by a new process rather than simplifying and improving the existing process. In all such situation DMADV is used.
  - When an old process is improved, DMAIC is used.
38. (d)  
TQM is an approach which focusses on
1. Customer satisfaction
  2. Continuous improvement
  3. Employee involvement
  4. Process management
  5. Data driven decision making

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

39. (c)
- A Network Topology refers to the arrangement or structure of different elements (links, nodes, devices, etc.) in a computer network. Topologies may define both physical and logical aspects of the network. It defines how devices in the network are connected and how data flows between them.
  - The Internet Protocol (IP) is a set of standards for addressing and routing data on the Internet. Hence, both the statements are correct.
40. (c)  
Denial-of-service (DoS) attack floods a website with so many requests for service that it slows down or crashes. A denial-of-service attack is a type of cyber-attack in which a malicious actor aims to render a service unavailable to its intended users by overwhelming it with a flood of illegitimate requests that trigger a crash.

41. (d)
- 'IP' stands for 'Internet Protocol'. There are two versions of IP that currently coexist in the global Internet: IP version 4 (IPv4) and IP version 6 (IPv6).
  - IP addresses are made up of binary values and drive the routing of all data over the Internet. IPv4 addresses are 32 bits long, and IPv6 addresses 128 bits long.
42. (c)
- The term cybersquatting refers to the unauthorized registration and use of Internet domain names that are identical or similar to popular trademarks, service marks, company names, or personal names.
  - Cybersquatting registrants obtain and use the domain name with the bad faith intent to profit from the goodwill of the actual trademark owner.
43. (b)
- Freeware is a software that is available free of cost for use and distribution but which is copyrighted by its developer, who retains the rights to control its distribution, modify it and sell it in the future. It is typically distributed without its source code, thus preventing modification by its users.
44. (c)
- A dot matrix printer is an impact printer that prints using a fixed number of pins or wires. Typically, the pins or wires are arranged in one or several vertical columns.
  - The pins strike an ink-coated ribbon and force contact between the ribbon and the paper, so that each pin makes a small dot on the paper. Thus, a dot matrix printer prints one character at a time.
  - Dot matrix printers can create multiple copies by using carbon paper or carbonless paper. The print head strikes the ink ribbon and presses it against the carbon paper, transferring ink onto multiple sheets of paper simultaneously.
45. (d)
- Proprietary system software refers to software that is owned by a specific individual or organization and is protected by copyright. This means that the source code of the software is not freely available to the public, and users must obtain a license to use the software legally.
  - Microsoft Windows is an example of proprietary system software. It is a closed-source operating system developed by Microsoft and is only available for use on devices that are licensed by Microsoft.
  - Linux is an open-source software whereas Microsoft Office and Microsoft Internet Explorer are application software and not system software.
46. (c)
- Network Topology is the arrangement of the elements (links, nodes, etc) of a communication network.
  - Protocol is an established set of rules that determine how data is transmitted between different device in the same network.

Hence, both the statements are incorrect.

47. **(d)**  
A Logic Bomb is the type of malware embedded in a program on a computer that will set off a malicious function when certain conditions are met. They perform actions like corrupting or altering data, reformatting a hard drive, and deleting important files.
48. **(d)**  
Interoperability refers to the ability of different hardware, software, systems, or networks to effectively communicate, exchange, and use data or resources seamlessly amongst them.
49. **(b)**  
Unicode is a universal character encoding standard. This standard includes more than 100000 characters to represent characters of different languages. It assigns a unique number called a code point to each character. As it is a universal standard therefore, it allows writing a single application for various platforms. This means that we can develop an application once and run it on various platforms in different languages.
50. **(b)**  
Spyware is malicious software that enters a user's computer, gathers data from the device and user, and sends it to third parties without their consent.

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