DETAILED SOLUTIONS

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ESE 2022 : Prelims Exam | CLASSROOM TEST SERIES

GS & ENGINEERING APTITUDE

Test 13

Section A : Standards & Quality practices in production, construction, maintenance and services **[All Topics]**

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

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

ANSWER KEY

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

DETAILED EXPLANATIONS

2. (d)

Training cost is a prevention cost.

4. (a)

- Process control makes use of "Control Charts".
- In product control, proper utilization of raw materials and auxiliaries has not been done.
- Product control does not provide any information about process time and production time.

5. (c)

Type-1 error: When there is no problem within the system and still we conclude that there is some assignable cause of variation, it is termed as type-1 error.

8. (b)

By Taguchi loss function,

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

Tolerance value, $x - T = 5$

$$375 = k(5)^2$$

Taguchi loss function constant, $k = 15$

$\therefore$ Loss at 22.5

$$L(x) = 15(22.5 - 20)^2$$

$$L(x) = ₹93.75$$

9. (d)

ISO 14000 series is broadly divided into two areas, organization evaluation standards and product evaluation standards.

11. (a)

$$\text{DPMO} = \frac{\text{No. of defects}}{\left[\begin{matrix}\text{No. of opportunities for}\\ \text{error per unit}\end{matrix}\right] \times \text{No. of units}} \times 10^6$$

$$= \frac{800 + 200 + 100 + 100}{4 \times 10000} \times 10^6 = 30000$$

14. (d)

- **Fixed order system:** Order size is fixed and time of order is not fixed.
- **Periodic review system:** Time of order is fixed and order size is not fixed.

19. (d)

Bond strength testing is a destructive test of concrete.

20. (a)

$$\text{Reliability} = [0.9 + 0.8(1 - 0.9) + 0.7(1 - 0.9)(1 - 0.8)] \times 0.90$$

$$R = 0.8946$$

21. (a)

$$R(t) = \exp(-0.01t)$$
$$\lambda = 0.01$$

Mean Time Between Failure, (MTBF) = $\frac{1}{\lambda} = 100$ hours

$$\text{MTBF} = \text{MTTF} + \text{MTTR}$$
$$100 = \text{MTTF} + 10$$
$$\therefore \quad \text{MTTF} = 100 - 10 = 90 \text{ hours}$$

23. (b)

In predictive maintenance, we observe decrease in costs for parts and labour.

25. (a)

Traditional approach to quality is used as product-oriented and based on the post-production defect detection philosophy.

29. (c)

- Debugging is the process of detecting and removing existing and potential errors (also called 'bugs') in a software code that can cause it to behave unexpectedly or crash.
- To prevent incorrect operation of a software or system, debugging is used to find and resolve bugs or defects.

30. (a)

Cache memory is an extremely fast memory type that acts as a buffer between RAM and the CPU. It holds frequently requested data and instructions so that they are immediately available to the CPU when needed. Cache memory is used to reduce the average time to access data from the Main memory.

32. (d)

- A virtual private network, or VPN, is an encrypted connection over the Internet from a device to a network. The encrypted connection helps to ensure that sensitive data is safely transmitted.
- It prevents unauthorized people from eavesdropping on the traffic and allows the user to conduct work remotely.

33. (b)

- In a website, a hyperlink (or link) is an item like a word or button that points to another location.
- When you click on a link, the link will take you to the target of the link, which may be a webpage, document or other online content.
- Both images and text can be used to create a hyperlink.

35. (a)

- Peer-to-peer network refers to the direct exchange of some asset (such as a digital currency) between individual parties without the involvement of a central authority.
- A strictly peer-to-peer exchange of currency was the primary goal driving the creation of Bitcoin, the most widely used cryptocurrency.

39. (d)

Virtues for ethically responsible engineers are:

- Expertise/professionalism
- Clear and informative communication
- Cooperation
- Willingness to make compromises
- Objectivity
- Being open to criticism
- Creativity
- Striving for quality

40. (b)

Morale is the feelings of enthusiasm and loyalty that a person or group has about a task or job.

41. (b)

- Microethics is concerned with individuals and the internal relations of the engineering profession.
- Normative ethics concerned with criteria of what is morally right and wrong.

47. (a)

Ethical skills are: Responsibility, perseverance, punctuality, efficiency, etc.

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