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Questions**

*for*

**ESE 2021**

# **General Studies & Engineering Aptitude**

**Day 6 of 11**

**Q.231 - Q.270**

(Out of 500 Questions)

General Principles of Design, Drawing, Importance of Safety  
+ Standards and Quality Practices in Production

## General Principles of Design, Drawing, Importance of Safety + Standards and Quality Practices in Production

**Q.231** Consider the following statements regarding importance of engineering design process:

1. The aspect of quality is to be incorporated within the product.
2. Determines product competitiveness.
3. Increase marketability of a product.

Which of the above statements is/are correct?

- (a) 1 only (b) 2 only  
(c) 1 and 3 only (d) 1, 2 and 3

**231. (d)**

Engineering design process must ensure quality of product, the performance of the product, that are truly derived by the customer who purchases the product. Engineering design process helps to determine product competitiveness and it reduces cycle time, increase the marketability of a product.

**Q.232** Consider the following statements about perspective projection:

1. The position of picture plane relative to the object, determines the size of perspective view.
2. No knowledge of principles of orthographic projection is required for drawing perspective view, as station point and picture plane is only required for perspective projection.

Which of the above statements is/are correct?

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

**232. (a)**

When picture plane is between station point and object then perspective projection is smaller than elevation of object.

When object is between station point and picture plane then perspective projection is larger than elevation of object.

There are two methods available for making perspective projection of a point:

1. Visual ray method.
2. Vanishing point method.

Both methods require thorough understanding of principles of orthographic projection.

**Q.233** Consider the following statements regarding minimum hearing protection requirements:

1. Hearing protection is to be made available to all employees in areas where the 8-hour TWA (the allowable time-weighted average concentrations for a normal 8-hour work day or 80-hour work week) sound level equals or exceeds 85 dBA.
2. The employee's supervisor should enforce that they are wearing proper hearing protection by affected employees.
3. All persons entering posted areas are to wear hearing protection in accordance with the posted warning.

Which of the above statements is/are correct?

- (a) 1 only (b) 2 only  
(c) 3 only (d) 1, 2 and 3

233. (d)

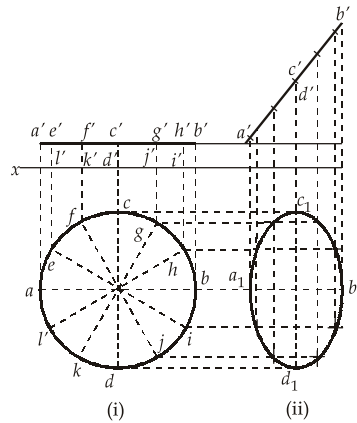
**Q.234** A circle of 50 mm diameter, having its plane perpendicular to V.P. and inclined at  $53^\circ$  to the H.P. is projected on horizontal and vertical plane. The area of projection ( $\text{mm}^2$ ) on horizontal plane is (Take  $\sin 53^\circ = \frac{4}{5}$ )

- (a)  $1500\pi$  (b)  $750\pi$   
(c)  $375\pi$  (d)  $1000\pi$

234. (c)

The projection on H.P. (top view) will be an ellipse and on V.P. (front view) will be a line inclined at  $53^\circ$  as shown in figure.

The major axis of ellipse ( $2a$ ) is parallel to H.P. Hence it will represent its true length in horizontal plane i.e. the diameter of circle.



From figure it is clear that,

$$\text{Major axis of ellipse } (2a) = 50 \text{ mm}$$

$$\text{Minor axis of ellipse } (2b) = 50 \times \cos 53^\circ \left[ \cos 53^\circ = \sqrt{1 - \sin^2 53^\circ} = \sqrt{1 - \left(\frac{4}{5}\right)^2} = \frac{3}{5} \right]$$

$$= 50 \times \frac{3}{5} = 30 \text{ mm}$$

$$\text{Area of ellipse} = \pi ab$$

$$= \pi \times \frac{30}{2} \times \frac{50}{2} = 375\pi \text{ mm}^2$$

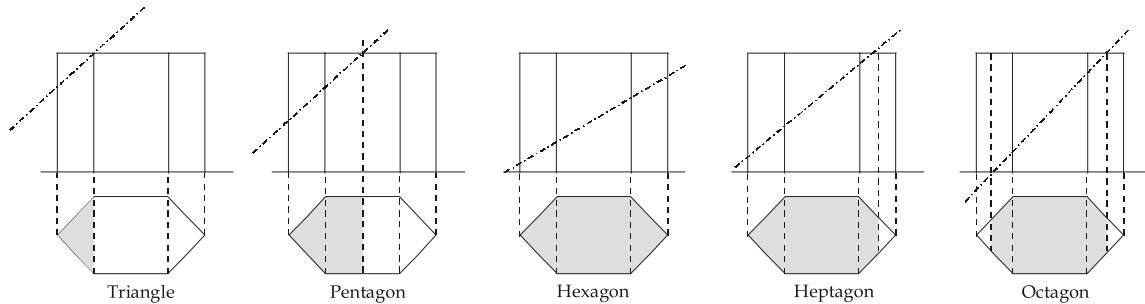
**Q.235** A right regular hexagonal Prism having its axis vertical, is resting on H.P. with two edges parallel to V.P. It is cut by plane perpendicular to V.P. Among the following shapes which sections are possible:

1. Triangle (b) Pentagon  
3. Hexagon (d) Heptagon  
5. Octagon

Select the correct answer using codes given below:

- (a) 2, 3 and 4 (b) 1, 4 and 5  
(c) 1 and 4 (d) All are possible

235. (d)



**Q.236** Consider the following statements regarding different concept selection methods in design:

1. Pugh's method compares each concept relative to a reference or datum concept and for each criterion determines whether the concept in question is better than, poorer than, or about the same as the reference concept.
2. In Harris method, competing concepts are evaluated by ranking the design criteria with weighting factors and scoring the degree to which each design concept meets the criterion.
3. In weighted decision matrix, a list of evaluation criteria is prepared and each criterion is standardized according to the strategic objectives of the company.

Select the INCORRECT statement(s) by using the codes given below:

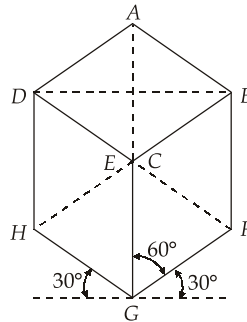
- (a) 3 only (b) 1 only  
(c) 2 and 3 only (d) None of these

236. (c)

- Weighted decision matrix is a method of evaluating competing concepts by ranking the design criteria with weighting factor and scoring the degree to which each design concept meets the criterion. To do this it is necessary to convert the values obtained for different design criteria into a consistent set of values.
- For the selection of solution, it is first necessary to reduce the usual long list of generated concepts to manageable proportion. It is recommended that a maximum of six concepts should be chosen for further investigation. The selected concepts are subjected to a formal evaluation procedure according to a modified form of what is known as the Harris method. In this method list of evaluation criteria is established and each criterion is standardized according to the strategic objectives of the company.



**Q.237** In the isometric projection of a cube of side  $\sqrt{3}$  mm (as shown in the figure), what is the isometric length of the edge of the cube?

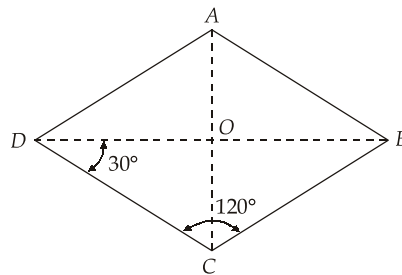


- (a)  $\sqrt{2}$  mm (b) 2 mm  
(c)  $\sqrt{3}$  mm (d) 3 mm

**237. (a)**

In isometric projection of face  $ABCD$  will be shown as rhombus

So,  $\angle AOD = 90^\circ; \angle ODC = 30^\circ$   
 $\angle OCD = 60^\circ$



Diagonal  $BD$  of top face is parallel to vertical plane hence,  $BD$  will represent the true length,

So, Diagonal's length =  $\sqrt{2} \times$  side of cube

$$BD = \sqrt{2} \times \sqrt{3} \text{ mm}$$

and 
$$OD = \frac{BD}{2} = \frac{\sqrt{6}}{2} \text{ mm} = \sqrt{\frac{3}{2}} \text{ mm}$$

In  $\triangle ODC$

$$\cos \angle ODC = \cos 30^\circ = \frac{OD}{DC}$$

$$\Rightarrow DC = \frac{OD}{\cos 30^\circ} = \frac{\sqrt{3/2}}{\sqrt{3}/2} = \sqrt{2} \text{ mm}$$

**Q.238** Which of the following methods is used for development of transition pieces?

- (a) Parallel line method (b) Triangulation method  
(c) Radial line method (d) Approximation method

238. (b)

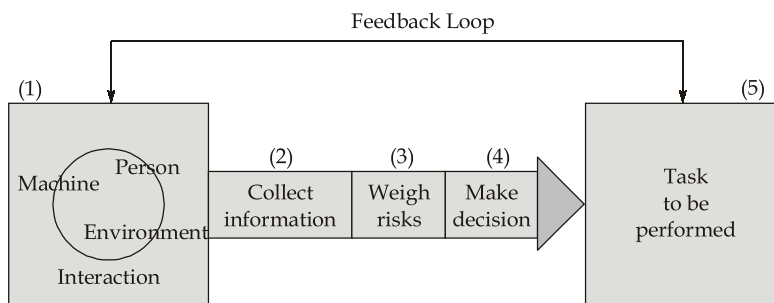
Parallel line method is used for development of prism and cylinders. Radial line method is used for the development of pyramid and cones. Triangulation method is used for development of transition pieces. For development of doubly curved surfaces e.g. sphere, ellipsoid, paraboloid, approximation method is used.

Q.239 Which one of the following is correct regarding the systems theory of accident causation?

- (a) It introduces new elements as ergonomic traps, the decision to err, and systems failures.
- (b) It attributes accidents to a chain of events ultimately caused by human error, which consists of three broad factors that lead to human error: overload, inappropriate response, and inappropriate activities.
- (c) According to this theory, there are five factors in the sequence of events leading to an accident: ancestry and social environment, fault of person, unsafe act/mechanical or physical hazard, accident and injury.
- (d) It views any situation in which an accident may occur as a system with three components: person (host), machine (agency), and environment.

239. (d)

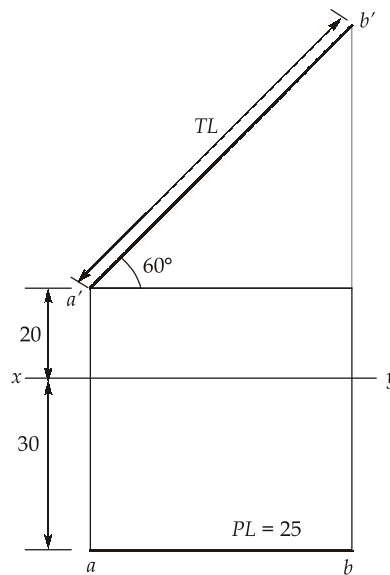
According to the systems theory of accident causation a situation in which an accident may occur as a system is composed of the following components: person (host), machine (agency), and environment.



Q.240 A line segment  $AB$  has its end 'A' 20 mm above HP and 30 mm in front of VP. This line is inclined at  $60^\circ$  to HP and parallel to VP. If the plan length is 25 mm, the true length of the line  $AB$  is

- (a) 25 mm
- (b) 30 mm
- (c) 50 mm
- (d) 75 mm

240. (c)



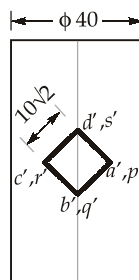
Plan length,  $PL = 25 \text{ mm}$

$$\cos 60^\circ = \frac{PL}{TL} = \frac{25}{TL}$$

$$TL = \frac{25}{\cos 60^\circ} = \frac{25}{\frac{1}{2}}$$

True length,  $TL = 50 \text{ mm}$

**Q.241** Figure shows the front view of cylinder of diameter 40 mm, in which a through hole of square cross section of side  $10\sqrt{2}$  mm has been made. What will be the distance between point A and P in the development of cylinder?



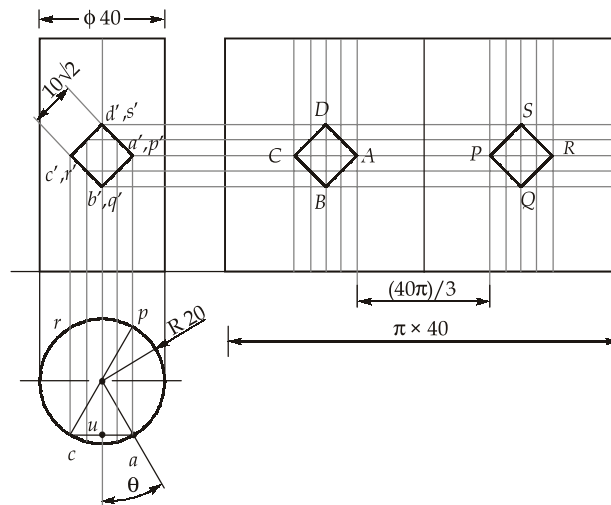
(a)  $\frac{40\pi}{3} \text{ mm}$

(b)  $\left\{ \left( \frac{40\pi}{2} \right) - (20) \right\} \text{ mm}$

(c)  $\frac{40\pi}{6} \text{ mm}$

(d) None of the above

241. (a)



$$\text{Chord } ac = \sqrt{(10\sqrt{2})^2 + (10\sqrt{2})^2} = \sqrt{200 + 200} = \sqrt{400} = 20 \text{ mm}$$

From top view we get

$$\sin \theta = \frac{ua}{uo} = \frac{10}{20} = \frac{1}{2}$$

$$\theta = 30^\circ$$

A little thinking helps to understand that

$$\angle AOP = 120^\circ$$

$$\text{Arc } AP = \frac{120}{360} \times 40\pi = \frac{40\pi}{3} \text{ mm}$$

**Q.242** In a right circular cone, the maximum angle between the generators of the cone is  $\frac{\pi}{2}$  radian. If

the height of the cone is 5 cm, the diameter of the cone is:

- (a) 5 cm
- (b)  $5\sqrt{3}$  cm
- (c) 9 cm
- (d) 10 cm

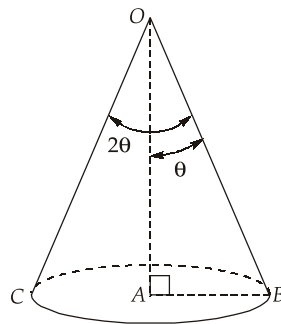
242. (d)

The maximum angle between the generators of cone is,

$$\text{Apex angle } (2\theta) = \frac{\pi}{2} = 90^\circ$$

$\therefore$  In  $\Delta OAB$ ,

$$\Rightarrow \tan \theta = \frac{AB}{OA} = \frac{d/2}{h}$$



$\Rightarrow d = 2h \tan\theta = 2 \times 5 \times \tan 45^\circ = 10 \text{ cm}$

**Q.243** Consider the following elements regarding Fire Brigade's Responsibilities :

1. Supervise department fire drills and exercises when a member is on vacation.
2. Operate fire fighting equipment (e.g. ladders, hoses, extinguishers).
3. Conduct inspections of particular departments.
4. Implement emergency shutdown procedures.

Which of the above statements are correct?

- |                   |                  |
|-------------------|------------------|
| (a) 1, 2, 3 and 4 | (b) 2 and 3 only |
| (c) 1 and 3 only  | (d) 2 and 4 only |

**243. (a)**

Fire Brigade's Responsibilities:

- Supervise department fire drills and exercises when a member is on vacation.
- Provide emergency scene first aid, Cardiopulmonary resuscitation (CPR) and Automated External Defibrillators (AED) if necessary.
- Operate fire fighting equipment (e.g. ladders, hoses, extinguishers).
- Conduct inspections of particular departments.
- Implement emergency shutdown procedures.

**Q.244** Which of the following is not the method of drawing ellipse in AutoCAD?

- |                    |                           |
|--------------------|---------------------------|
| (a) Center method  | (b) Axis, end method      |
| (c) 3-point method | (d) Elliptical arc method |

**244. (c)**

There are 3 methods of drawing ellipse in AutoCAD.

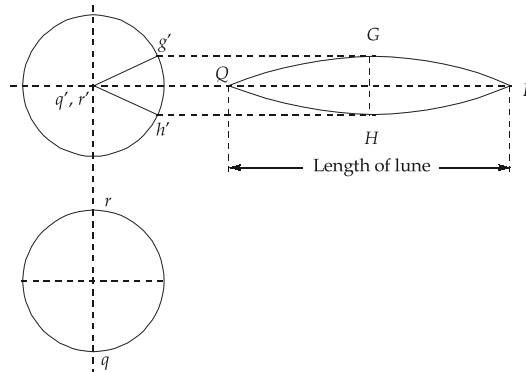
1. Center method
2. Axis, end method
3. Elliptical arc method

Three point method is used to create an arc using three points.

**Q.245** The length of development of a single lune in the development of a sphere of 50 mm diameter, by lune method is

- |                         |                         |
|-------------------------|-------------------------|
| (a) $100\pi \text{ mm}$ | (b) $750\pi \text{ mm}$ |
| (c) $50\pi \text{ mm}$  | (d) $25\pi \text{ mm}$  |

245. (d)



$$\text{Length of lune} = \text{Length of arc } qr = \pi \cdot r = 25\pi \text{ mm}$$

**Q.246** Consider the following statements about dimensioning in engineering drawing:

1. In chain dimensioning, all dimensions are shown from a common base line.
2. Dimension of a cylinder should be given as radius.
3. Dimension of arcs of circle should be given by their respective diameter.
4. Letter 'SQ' should precede the dimension for a rod of square cross-section.

Which of the above statement(s) is/are not correct?

- |                |             |
|----------------|-------------|
| (a) 1, 2 and 3 | (b) 3 and 4 |
| (c) 4 only     | (d) 2 only  |

246. (a)

- In progressive or parallel dimensioning, all dimensions are shown from a common base.
- Dimensions of a cylinder should be given as diameter.
- Dimension of arcs of circle should be given by their respective radii.

**Q.247** Which one of the following best describes about the Energy Isolating Device?

- (a) A device that utilizes a positive energy to hold an energy-isolating device in the safe position and prevent the energizing of machine or equipment.
- (b) A mechanical device that physically prevents the transmission or release of energy. The term does not include a push button, selector switch and other control circuit type devices.
- (c) The machine or equipment has no potential for stored or residual energy or reaccumulation of stored energy after shutdown.
- (d) The machine or equipment is isolated from the energy source and locked out during servicing or maintenance.

247. (b)

**Q.248** Which of the following correctly defines the quality of conformance?

- (a) It is basically meeting the standards defined in the design phase after the product is manufactured or while the service is delivered.
- (b) It measures the degree to which the product or service satisfies the customer expectations.
- (c) It is all about set conditions that the product or service must minimally have to satisfy the requirements of the customer.
- (d) None of the above

248. (a)

- **Quality of Design** – It is all about set conditions that the product or service must minimally have to satisfy the requirements of the customer
- **Quality of conformance**- It is basically meeting the standards defined in the design phase after the product is manufactured or while the service is delivered.
- **Quality of Performance**- -It measures the degree to which the product or Service satisfies the customer expectation

**Q.249** Quality Function Deployment is the technique used for

- (a) translating voice of the customers with technical design requirements.
- (b) making product life cycle.
- (c) implementation of process planning and control for achieving zero defects philosophy .
- (d) reverse engineering methodology.

249. (a)

Quality Function Deployment (QFD) or the house of quality is the foundation to link the voice of the customers with technical design requirements of a product. In other words, abstract specifications required by the targeted customers are translated into specific product technical requirements.

**Q.250** Consider the following statements regarding product's quality audit:

1. Product audits are narrower in scope than inspections.
2. Product audits are generally conducted from the customer's perspective.
3. Process audits focus on specific activities or organizational units. Examples include engineering, marketing etc.

Which of the above given statement(s) is/are correct?

- (a) 1 only
- (b) 3 only
- (c) 2 and 3 only
- (d) 1 and 2 only

250. (c)

Product audits differ from inspection in the following ways:

- audits are broader in scope than inspections,
- audits provide more depth than inspections,
- audits provide information useful for product quality improvement, and
- audits offer another level of assurance beyond routine inspection.

**Q.251** Match **List-I** (Quality cost) with **List-II**(Associated areas) and select the correct the code given below:

**List-I**

- A. Prevention Costs
- B. External Failure Costs
- C. Appraisal Costs
- D. Internal Failure Costs

**List-II**

1. Sub assemblies, components or material failure cost
2. Education and training
3. Product inspection
4. Warranty cost

**Codes:**

- |     | A | B | C | D |
|-----|---|---|---|---|
| (a) | 1 | 4 | 2 | 3 |
| (b) | 2 | 3 | 4 | 1 |
| (c) | 2 | 4 | 3 | 1 |
| (d) | 1 | 2 | 4 | 3 |

251. (c)

**Q.252** Consider the following statements regarding Focus Group for collecting data on customer's expectation and needs:

1. A focus group is typically composed of seven to ten participants who are familiar with each other.
2. In quality management, focus groups are useful to determine customer decision criteria.
3. The quality of focus group research does not depend on the qualifications of the interviewer.
4. The focus group is a socially oriented research procedure.

Which of the above statement(s) is/are correct?

- |                   |             |
|-------------------|-------------|
| (a) 1, 2, 3 and 4 | (b) 2 only  |
| (c) 1 only        | (d) 2 and 4 |

252. (d)

The focus group is a special type of group in terms of purpose, size, composition and procedures. A focus group is typically composed of seven to ten participants who are unfamiliar with each other. These participants are selected because they have certain characteristic(s) in common that relate to the topic of the focus group. The quality of focus group research is highly dependent on the qualifications of the interviewer. Trained and skilled interviewers are hard to find. In quality management, focus groups are useful to:

- Gather insight useful in the strategic planning process.
- Generate ideas for survey questionnaires.
- Develop needs assessment, e.g. training needs.
- Test new program ideas.
- Determine customer decision criteria.
- Recruit new customers.

**Q.253** The ceilings of the house of quality in QFD represent:

- (a) Voice of the customers
- (b) Voice of the organization
- (c) Interrelationship between technical descriptors
- (d) Relationship between requirements and descriptors



253. (b)  
House of Quality:

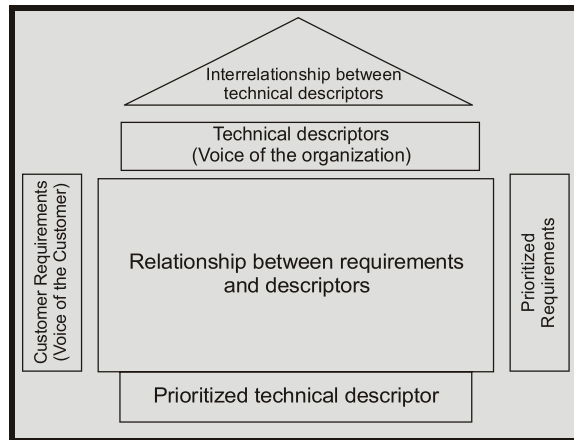


Figure: House of Quality

- The outside walls of the house are shown as the customer requirements and their priorities. On the left side is a listing of voice of customer. On the right side is the prioritized customer requirement, which is derived from customer survey. The ceilings of the house contain the technical descriptors or requirements with expert's priorities. The central or interior walls of the house are the relationships between customer requirements and technical requirements. Customer voices (customer requirements) are translated into engineering requirements (technical descriptors). The roof of the house is the interrelationship between independent technical requirements. Here the trade-offs between similar and/or conflicting technical requirements are identified. The aim of the house is to determine prioritized technical requirements.

**Q.254** Assume that reliability of a component is 0.80 and if it is back it up with another component with reliability of 0.80. What is the resulting reliability of a system?  
(a) 0.8 (b) 0.64  
(c) 0.16 (d) 0.96

254. (d)  
 $R_s = (\text{Probability of first component working}) + (\text{Probability of second component working} \times \text{Probability of needing second component i.e. first component not working})$   
 $= 0.8 + [0.8 \times (1 - 0.8)]$   
 $= 0.8 + 0.16 = 0.96$

**Q.255** Twenty air conditioning systems designed for use by astronauts in Indian spacecraft were operated for 1000 hours at a ISRO test facility. Two of the systems failed during the test; one after 200 hours and the other after 800 hours. What is the failure rate (in failure per unit hour)?  
(a)  $0.1 \times 10^{-3}$  (b)  $0.4 \times 10^{-3}$   
(c)  $6 \times 10^{-3}$  (d)  $2 \times 10^{-3}$

255. (a)

$$\text{Failure rate FR(N)} = \frac{\text{Number of failures}}{\text{Number of unit-hours of operation time}}$$

$$\begin{aligned} \text{Total time} &= 1000 \text{ hr} \times 20 \text{ units} \\ &= 20000 \text{ unit-hour} \end{aligned}$$

$$\begin{aligned} \text{Non-operating time} &= 800 \text{ hr of 1}^{\text{st}} \text{ failure} + 200 \text{ hr for 2}^{\text{nd}} \text{ failure} \\ &= 1000 \text{ unit-hour} \end{aligned}$$

$$\begin{aligned} \text{Operating time} &= \text{Total time} - \text{Non operating time} \\ &= 20000 - 1000 = 19000 \text{ unit-hour} \end{aligned}$$

$$\text{Failure rate FR} = \frac{2}{19000} = 0.105 \times 10^{-3} \text{ failure/unit-hours}$$

**Q.256** Which of the following discontinuity types can typically be found with a liquid penetration test?

- (a) Internal slag in a weld
- (b) Internal slag in a casting
- (c) Sensitization in austenitic stainless steel
- (d) Fatigue crack

256. (d)

It is a surface NDT method. Any flaw which is limited at surface is detected by liquid penetration test. Ease and flexibility are two aspect which makes die penetration test most popular method. All sorts of surfaces like metal, grass, ceramics, rubber and plastics are checked. Fatigue crack which starts at surface will be limited on surface. Hence this method is used.

**Q.257** Surface defects have been counted on 5 rectangular steel plates and data is shown below: What is the standard deviation for the given data?

Sheet no.	1	2	3	4	5
No. of defects	3	2	2	4	4

- (a) 1.4
- (b) 0
- (c) 1
- (d) 1.73

257. (d)

The given data is for control chart and C chart is based on the Poisson probability distribution. The standard deviation for Poisson distribution is the square root of the mean

$$\text{Mean, } \bar{C} = \frac{C_1 + C_2 + C_3 + C_4 + C_5}{5} = \frac{3 + 2 + 2 + 4 + 4}{5} = \frac{15}{5} = 3$$

$$\text{Standard deviation, } s = \sqrt{\bar{C}} = \sqrt{3} = 1.73$$

**Q.258** Consider following statements regarding Toyota production system:

1. Jidoka refers to a production problem warning system.
2. Jidoka consists of battery of yellow and red light called Andon.
3. Yellow light indicates stoppage of production on and red light indicates minor problem.
4. Elements of waste are classified as 3Ms of Mura, Muda and Muri.
5. Shigoto refers to actual work that adds value to product.

258. (c)  
Yellow light indicates minor problem and red light indicates stoppage of production.

Q.259 Identify correct sequence of 5-s technique  
(a) sort-shine-sustain-set in order- standardize  
(b) set in order-sort-shine-sustain-standardize  
(c) set in order-shine-sort-sustain-standardize  
(d) sort-set in order-shine-standardize-sustain

259. (d)  
5-s is a philosophy and a way of organizing and managing the workspace and workflow with the intent to improve efficiency by eliminating waste. It helps to have a basis of strong management of workplace.

Q.260 Which of the below given statements is incorrect?  
(a) Affinity diagram is used to organize abstract thinking about a problem  
(b) Relationship diagram shows cause-and-effect relationships and helps to analyses the natural links between different aspects of a complex situation  
(c) Arrow diagram is a derivative of PERT and CPM techniques  
(d) None of the above

260. (d)  
Seven new Quality Control tools often called as management and planning tools are used for problem solving have proved useful in areas such as product quality improvement, cost reduction, new product development and policy deployment. They are beneficial to the top- and middle management in an organization for strategic planning, goal setting and problem solving. They are not replacements for the old seven tools. Seven new quality control tools are given below:

1. Affinity diagram.
2. Relationship diagram.
3. Systematic/tree diagram.
4. Matrix diagram.
5. Matrix data analysis method.
6. Arrow diagram.
7. Process decision program chart.

Q.261 Consider the following statements regarding inventory management:

1. In XYZ analysis, the classification is based on an inventory item's importance in terms of its average inventory during a period of time.
2. In SDE analysis, the classification is based on an inventory item's importance with respect to its availability.

Which of the above statements is/are incorrect?

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

261. (d)

**Q.262** Consider the following statements regarding Dye Penetration Test?

1. It has low sensitivity to small flaws.
2. It can be applied to all sort of surfaces.
3. Large area/volume can be inspected at low cost.
4. Surface finish and roughness can affect the result.

Which of the above statements is/are correct?

- (a) 1, 2 and 3 only                      (b) 2 only  
(c) 2, 3 and 4 only                      (d) 1, 3 and 4 only

**262. (c)**

Dye penetration test is surface type NDT. Advantages of Dye penetration include high sensitivity to small flaws, ease and flexibility. All sort of surface like metals, ceramics, glass rubber and plastics are checked. It is economical but surface finish and roughness can affect the result.

**Q.263** What will be the value of Average Total Inspection (ATI) for the following data, given  $N = 10000$ ,  $n = 89$ ,  $c = 2$  and the incoming lots are of quality  $p = 0.01$ ,  $P_a = 0.9397$ ?

- (a) 842                                      (b) 687  
(c) 459                                      (d) 287

**263. (b)**

If the lot of quality  $p$  and the probability of acceptance is  $P_a$ , then the average total inspection per lot for single sampling plan is:

$$\begin{aligned} \text{ATI} &= n + (1 - P_a)(N - n) \\ &= 89 + (1 - 0.9397) \times (10000 - 89) \\ \text{ATI} &= 687 \end{aligned}$$

**Q.264** Twenty air conditioners designed for use in a space shuttle were operated for 1000 hours in a test facility. Two of the air conditioners failed during the test one after 200 hours and the other after 600 hours. What is the operating time of twenty air-conditioners in hours?

- (a) 19,000                                  (b) 20,000  
(c) 18,800                                  (d) 17,500

**264. (c)**

Total time of operation = 1000 hours  $\times$  20 units  
= 20000 unit hours  
Non-operating time = 800 hours for the first unit + 400 hours for the second unit  
= 1200 unit hours  
Operating time = Total time - non operating time  
= 20000 - 1200 = 18800 unit hours

**Q.265** Which of the following is the correct set of formulae used to find the control limits in  $p$  charts?

- (a)  $UCL = \bar{p} + 3\sqrt{\frac{\bar{p}(1-\bar{p})}{n}}$ ,  $LCL = \bar{p} - 3\sqrt{\frac{\bar{p}(1-\bar{p})}{n}}$   
(b)  $UCL = \bar{p} + \sqrt{\frac{\bar{p}(1-\bar{p})}{n}}$ ,  $LCL = \bar{p} - \sqrt{\frac{\bar{p}(1-\bar{p})}{n}}$

$$(c) \quad UCL = \bar{p} + \sqrt{\frac{\bar{p}(1+\bar{p})}{n}}, LCL = \bar{p} - \sqrt{\frac{\bar{p}(1+\bar{p})}{n}}$$

$$(d) \quad UCL = \bar{p} + 3\sqrt{\frac{\bar{p}(1-\bar{p})}{n}}, LCL = \bar{p} - 3\sqrt{\frac{\bar{p}(1-\bar{p})}{n}}$$

265. (d)

**Direction:** The following items consists of two statements, one labelled as **Statement (I)** and the other labelled as **Statement (II)**. You have to examine these two statements carefully and select your answers to these items using the codes given below:

**Codes:**

- (a) Both Statement (I) and Statement (II) are true and Statement (II) is the correct explanation of Statement (I).
- (b) Both Statement (I) and Statement (II) are true but Statement (II) is not a 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.

**Q.266 Statement (I):** A line parallel to horizontal plane and 50 mm above the horizontal plane will have no horizontal trace.

**Statement (II):** A line which is perpendicular to horizontal plane will have no horizontal trace.

266. (c)

A line which is parallel to horizontal plane will have no horizontal trace.

**Q.267 Statement (I):** Design for manufacturing (DFM) includes an accurate cost estimator that reviews the cost of parts as they are being designed in a fast and accurate way.

**Statement (II):** Competitive benchmarking is that which compares the designs with competitors' products to determine marketability and target cost.

267. (b)

**Q.268 Statement (I):** Line whose top view is parallel to reference line, will always show its true length in its projection on horizontal plane.

**Statement (II):** If a line is parallel to V.P. then its orthographic projection on V.P. will show its true length and true inclination with H.P.

268. (d)

Line whose top view is parallel to reference line, will show its true length in front view and projection of front view will be in vertical plane.

**Q.269 Statement (I):** Engineering deals with building or improving the design of something that already exists.

**Statement (II):** Engineering, the creative application of scientific principles to design or develop structures, machines, apparatus or manufacturing processes or to construct or operate the same with full knowledge of their design.

269. (a)

**Q.270 Statement (I):** Sampling scheme is a set of sampling plans with rules provided for switching among them.

**Statement (II):** Sampling system is a collection of sampling schemes which provides rules for selection of an appropriate sampling plan.

270. (b)

Both statements are correct. Definition of sampling scheme and sampling system are given in statements.

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