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ESE- 2018 (Prelims) - Offline Test Series

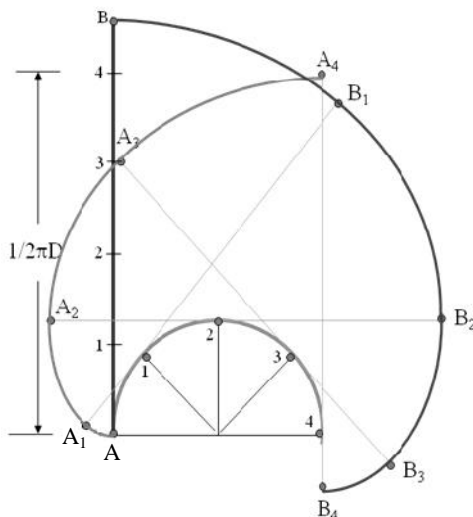
Test-12

GENERAL STUDIES

SUBJECT: GENERAL PRINCIPLES OF DESIGN, DRAWING AND IMPORTANCE OF SAFETY SOLUTIONS

01. Ans: (d)

Sol: The curve traced by the end points of a straight when it is rolled on a semi circle is involute.



02. Ans: (a)

Sol: In parallel projections the distance between the observer and the object is not considered.

03. Ans: (d)

Sol: The front view is chosen such that it should give maximum information with less number of hidden lines.

04. Ans: (b)

Sol: In first angle projection object is placed in between the observer and the reference plane. Hence all the views are positioned in opposite direction to view.

05. Ans: (a)

Sol: Keeping a line parallel to VP and perpendicular to HP, its front view looks like a straight line and its top view a point.

06. Ans: (a)

Sol: When a line is inclined to the HP and VP then its front view angle () measures greater than true angle with HP () and top view angle () both measures greater than the true angle with VP ().

07. Ans: (b)

Sol: If a line is parallel to both HP and VP then its front view (elevation) and top view (plan) look like a straight horizontal line parallel to the reference line. Trace occurs only when the line is inclined to the reference plane.

08. Ans: (a)

Sol: The centre of Gravity lies at the midpoint of the axis for a cylinder and prism. The line joining the Centre of Gravity and the top point of generator of cylinder through which it is hanged will be vertical.

Pre GATE-2018

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09. Ans: (b)

Sol: The maximum number of point of intersections by the section plane when it resting on base in VP and faces perpendicular to HP will be $n+1$, where n is number of sides of base.

10. Ans: (b)

Sol: The maximum number of point of intersections by the section plane when it resting on base in VP and faces equally inclined to HP will be $n+2$, where n is number of sides of base.

11. Ans: (b)

Sol: To Visualize the inside feature, the portion of the object that lies between the observer and the cutting plane has to be removed.

12. Ans: (c)

Sol: The angle between the slant edges is:

$$\theta = \frac{\text{radius}}{\text{slanted edge}} \times 360^\circ$$
$$= (r / (4 \times r)) \times 360 = 90^\circ$$

13. Ans: (b)

Sol: In development of surfaces we consider the true dimensions of the objects which will be equal to the perimeter of the base and the true length of the lateral edge.

14. Ans: (c)

Sol: As the Bureau of Indian Standards, the drawing sheets are followed by IS 10711:2001. The size of A₃ is 294 × 420 and A₄ sheet is recommended to follow vertical type.

15. Ans: (d)

Sol: When a plane is parallel to reference plane then it shows the true shape of the plane, but when the plane perpendicular to reference plane, looks like a straight line.



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16. Ans: (b)

Sol: In projections, always front view (elevation) looks on VP and top view (plan) on the HP. If an object is considered in first quadrant, then after taking the projection HP is rotated in clockwise 90° . Now VP will be above the reference line and HP will be below it.

17. Ans: (c)

Sol: eccentricity = $\sqrt{\frac{180}{80}} = 1.5$

18. Ans: (b)

Sol: 1. When a line is parallel to both HP and VP then in both elevation and plan it looks like a straight horizontal line parallel to the reference line.
2. When a line is inclined to HP and parallel to VP then in elevation it looks like a straight line with an inclination with the reference line and its plan is foreshortened.

19. Ans: (d)

Sol: When a plane is perpendicular to reference plane, then it looks like a straight line equal to surface length irrespective of the plane shape.

20. Ans: (c)

Sol: A square pyramid resting on its base in the HP and a side of base parallel to VP when it is cut by Auxiliary inclined plane (inclined to HP and perpendicular to VP) then the true shape of the section is trapezium.

21. Ans: (c)

Sol: When a plane is hinged vertically then its elevation is true shape. Its plan and profile view is a straight line. The line joining the hinged point with the centroid will be always vertical perpendicular to the reference line.

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22. Ans: (d)

Sol: When a regular plane is resting on a side on the HP with a corner opposite the side is in VP then the sum of the inclination of the plane with HP and VP is 90° . Its front View (elevation) and top view (Plan) look like a reduced shape (foreshortened).

23. Ans: (b)

Sol: If a line is in 1st quadrant then HT will be below the reference line and VT will be above the reference line or both the traces can be on the same side of the reference line or both can on the reference line but HT cannot be on above the reference line (VP) and VT cannot be below the reference line (HP).

24. Ans: (b)

Sol: In second quadrant all the views are placed above the reference line.

25. Ans: (d)

Sol: As per the precedence of line, when a visible line, hidden line and axis line coincides then visible line is given more preference then hidden line and last will be axis line.

26. Ans: (c)

Sol: From the right side view the bottom appears as three rectangles above it, left and right have two rectangles in middle the curved portion appear as one more rectangle with centre line. The removed cylindrical portion cannot be seen so it is drawn with dashed line with a centre line.

27. Ans: (d)

Sol: Reverse Engineering is exactly the vice-versa of Functional decomposition.



28. Ans: (a)

Sol: Pugh's Method is used for concept evaluation. Where as Brainstorming, Brain writing, Synectics, concept mapping etc are used for concept (idea) generation

29. Ans: (c)

Sol: Definition of decision making:
Method of identifying the alternatives, outcomes of each alternative and subjecting this information for a logical process of making decision.

30. Ans: (d) 31. Ans: (d) 32. Ans: (d)

33. Ans: (d)

Sol: Train derails for the following causes:

- Broken rails
- Defective wheels
- Improper operation of control systems where the train junction switches donot function properly
- Over speeding or Harsh train handling
- Derailment following a collision etc.

34. Ans: (d)

35. Ans: (c)

Sol: Based on fire triangle or combustion triangle the key requirements for fire to ignite or spread are:

- Ignition conditions
- Oxidizer
- Fuel

36. Marks to all

37. Ans: (c)

38. Ans: (b)

Sol: All the stakeholders (i.e the workers, supervisors and the management) should participate in developing safety goals for an organization.

39. Ans: (d)

40. Ans: (d)

Sol: Hazards are of 3 types:

1. Hazards with in the control of designers like design assumptions, leakages etc.
2. Hazards that cause constraint to design like earthquakes, Tsunamis etc
3. Sociopolitical disruption - war, terrorism etc

41. Ans: (d)

Sol: All the stakeholders of the concurrent engineering are identified before the design begins.

42. Ans: (d)

43. Ans: (d)

44. Ans: (a)

Sol: Ergonomics (or human factors) is the scientific discipline concerned with the understanding of the interactions among humans and other elements of a system. Thereby reducing the effort for doing a task.

45. Ans: (d)

Sol: The types of risks in design are:

1. Risks arising from assumptions that were considered as safe during design however proven unsafe at a later stage.
2. Risks arising from abnormal usage of the product or using the product beyond the designed limits
3. Risks due to Design errors or miscalculations done by the designer or defects

46. Ans: (a)

Sol: In Parametric design attributes of components identified in before stages are used as design variables which are under the control of the designer. This design variables are modified until the best possible design is obtained.



47. Ans: (b)

Sol: Both the statements are independently correct.

48. Ans: (d)

Sol: Diwali fireworks or crackers are hazardous materials. The building that stores or processes hazardous materials is known as hazardous buildings.

For the safety purposes the hazardous buildings are generally established outside the city or town or village.

49. Ans: (a)

Sol: Both the statements are correct and statement (II) is correct explanation of statement (I).

50. Ans: (a)

Sol: Both the statements are correct and statement (II) is correct explanation of statement (II).

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