Multi choice Question for DOS III

Gantry Girder:

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<tbody>
<tr>
<td>1</td>
<td>Gantry girders have to be designed to resist</td>
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<td></td>
<td>a) Transverse and bending loads</td>
<td></td>
<td>b) transverse and lateral loads</td>
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<td>c) transverse and axial loads</td>
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<td>d) lateral and axial loads</td>
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<td>ANSWER: B</td>
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| 2 | The condition of arranging resultant of wheel loads and one of wheel loads at equidistant from center of girder gives |   |   |   |
|   | (a) max B.M under the wheel nearest to center |   | (b) max B.M at center |   |
|   | (c) max B.M under the location of resultant wheel loads |   | (d) none of these |   |
|   | ANSWER: A |   |   |   |

| 3 | Normally the compression flange of a gantry girder is strengthened by putting channel above the top flange because |   |   |   |
|   | (a) it increases moment of inertia of compression flange |   | (b) it reduces the vertical deflection of the girder |   |
|   | (c) permissible tensile stress is always safe |   | (d) it restricts the depth of the girder |   |
|   | ANSWER: A |   |   |   |

| 4 | Which of the following loads are to be considered in designing a gantry girder in an Industrial building. |   |   |   |
|   | (1) Gravity Loads |   | (2) Lateral Loads |   |
|   | (3) Longitudinal Loads |   | (4) Wind loads |   |
|   | Select the correct answer |   |   |   |
|   | (a) 1 and 2 |   | (b) 1,2 and 3 |   |
|   | (c) 1 and 3 |   | (d) 2,3 and 4 |   |
|   | ANSWER: B |   |   |   |

| 5 | In a workshop, usually a crane girder spans between |   |   |   |
|   | (a) Adjacent columns along the length of the shop. |   | (b) opposite columns across the shop |   |
|   | (c) bottom chord members of adjacent roof trusses |   | (d) insufficient data |   |
|   | ANSWER: B |   |   |   |

Industrial Building

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<td>6</td>
<td>Wind causes pressure and suction, suction is acting</td>
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<td>(a) away from the surface of the structure</td>
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<td>(b) towards the surface of the structure</td>
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<td>(c) in the direction of gravity in case of roof</td>
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<td>(d) none of these</td>
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</table>
7. The partial safety factor for dead load and wind load for roof truss for limit state of Strength are respectively
   (a) 1 and 1.5 (b) 1.5 and 1.5 (c) 1.2 and 1.5 (d) 1.2 and 1.2
   **ANSWER: B**

8. Which among the following assumptions are made in the design of roof truss?
   1. Roof truss is restrained by the reaction
   2. Axes of the members meeting at joint intersect at a common point.
   3. Bolted joints act as frictionless hinges
   4. Wind loads act normal to roof surface.
   Select the correct answer using the codes given below:
   (a) 1,2 and 4 (b) 2,3 and 4 (c) 1,3 and 4 (d) 1,2 and 3
   **ANSWER: B**

9. The member located at the intersection of the roof truss and the exterior wall in an industrial building is known as_____
   (a) Ridge strut (b) Eave strut (c) Roof bracing (d) Purlins
   **ANSWER: B**

Connections

10. Moment curvature curve shown in figure is that of a
    a) rigid joint (b) flexible joint
    c) pin joint (d) semi rigid
    ![Moment Curvature Curve](image)
    **ANSWER: D**

11. Prying force are the additional
    (a) shearing forces on the bolts because of long joints
    (b) bending forces on the bolts because of long joints
    (c) tensile forces due to the flexibility of connected parts leading to deformation
    (d) force due to friction between the connected parts
    **ANSWER: C**

12. In the design of the framed connections, the bolts connecting the web of the beam with connecting angles are subjected to
    (a) single shearing and bearing on the web
    (b) double shear and bearing on the web
    **ANSWER: B**
13. An example of the light moment resisting connection is
(a) framed connection
(b) unstiffened seat connection
(c) clip angle connection
(d) split beam connection
ANSWER: C

14. Match list I (Types of connection) with list II (Types of beams) and select the correct answer using the codes given below the lists:

<table>
<thead>
<tr>
<th>List I</th>
<th>List II</th>
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<tbody>
<tr>
<td>A. Semi-rigid</td>
<td>1. To permit large angles of rotation and to transmit negligible moment.</td>
</tr>
<tr>
<td>B. Framed</td>
<td>2. To allow small end rotation and transmit appreciable moment.</td>
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<tr>
<td>C. Flexible</td>
<td>3. When a beam is connected to a beam or stanchion by means of an angle at the bottom of the beam which is shop-bolted to the beam and an angle at the top of which is field-bolted.</td>
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<tr>
<td>D. Seated</td>
<td>4. When a beam is connected to a beam or stanchion by means of two angles bolted to them.</td>
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Codes:
(a) A B C D – 2 4 3 1
(b) A B C D – 4 2 1 3
(C) A B C D – 2 4 1 3
(d) A B C D – 4 2 3 1
ANSWER: C

Plastic Analysis

15. The number of possible hinges are 4 and the degree of indeterminacy of the structure is 2 then number of possible independent mechanism will be
(a) 6                                             (b) 4
(c) 2                                             (d) 1
ANSWER: C

16. Which of the following condition is satisfied in elastic analysis and plastic analysis of beams
a) continuity condition b) mechanism condition
b) equilibrium condition d) plastic moment condition
ANSWER: C

17. Identify the correct answer
(i) The value of shape factor gives an indication of reserve capacity of a section from the stage of onset of yielding at extreme fibers to full plastification of the section.
(ii) A section with higher shape factor is generally more rigid and gives lesser deflection at collapse.
(iii) Greater the shape factor, higher will be the collapse load factor $\lambda_c$
(a) (i) and (ii)
(b) (i) and (iii)
(c) (ii) and (iii)
(d) (i), (ii) and (iii)
ANSWER: B

18 If the collapse load is represented by $(K \times Mp/L)$, then for uniform propped cantilever of span $L$ subjected to uniformly distributed load, and propped cantilever carrying concentrated load at its mid-span, the $K$ factors, respectively, are
(a) 16, 16
(b) 11.657, 6
(c) 8, 11.657
(d) 11.657, 16
ANSWER: B

19 The plastic section modulus $Z_{p,z}$ of a rectangular section of width $b$ and depth $h$ about its $Z$-axis is given by
(a) $bh^2/6$
(b) $bh^2/4$
(c) $hb^2/4$
(d) $bh^2/6$
ANSWER: B

Fundamental (tension member/compression member code base.)

20 The slenderness ratio in a tension member as per IS 800:2007 where reversal of stress is due to loads other than wind or seismic should not exceed.
(a) 350
(b) 180
(c) 100
(d) 60
ANSWER: B

21 Imperfection factor for buckling class “C” is
(a) 0.21
(b) 0.34
(c) 0.49
(d) 0.76
ANSWER: C

22 Identify the false statement
(a) In slip critical connections, forces are transferred by friction between the contact surfaces instead of bearing on the bolt.
(b) HSFG bolt connections have greater ductility, higher damping factor and increased endurance against fatigue.
(c) Use of clip angle connection increases ductility of the connections.
(d) All-welded connections, due to their higher rigidity, are suitable for cyclic loading conditions.
23. The block shear resistance of tension member at its connection is the sum of
   (i) Net section fracture strength on lesser surface and gross yield strength on bigger surface.
   (ii) Gross yield strength of shear path and net section fracture strength of tension path.
   (iii) Net section fracture strength on shear path and gross section yield strength of tension path.
   (a) (i) only
   (b) (i) and (ii)
   (c) (ii) and (iii)
   (d) any of the above
   ANSWER: C

24. Which of the following is a correct match?
   (a) Purlin ISLC
   (b) Girder ISHB
   (c) Joist ISWB
   (d) Castellated girder ISA
   ANSWER: A

25. Consider the following statements:
   Lateral support in case of steel beam can be achieved by
   (i) embedding its compression flange in brick.
   (ii) bracing the compression flanges of adjacent beams
   (iii) providing shear connectors on compression flange
   Of the above statements,
   (a) (i), (ii) and (iii) are correct
   (b) (ii) and (iii) are correct
   (c) only (ii) is correct
   (d) only (i) is correct
   ANSWER: B

Plate Girder:

26. A length x of web, on both side of the web acting as part of bearing stiffeners in compression is
   a) 20 tw  b) 12 tw  c) 10 tw  d) 16 tw
   ANSWER: A

27. In a plate girder, the web plate is connected to the flange plates by fillet welding. The size of fillet welds is designed to safely resist
   a) the bending stress in the flange
   b) the vertical shear force at the section
   c) the horizontal shear force between the flange & the web plate.
   d) the forces causing buckling in the web
   ANSWER: B

28. End panel design of plate girder by post critical method
   (a) makes use of tension field action

   ANSWER: D
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<td>(b) makes use of intermediate stiffeners</td>
<td>(c) makes use of end post</td>
<td>(d) avoids formation of tension field in the end panel</td>
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<td>ANSWER: D</td>
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29. To improve the buckling strength of a slender web due to shear, ________ is provided in the steel plate girder.
   (a) load carrying stiffener  
   (b) bearing stiffener  
   (c) torsion stiffener  
   (d) intermediate transverse web stiffener  
   ANSWER: D

Masonry structure

30. According to IS 1905, 1987, for masonry column design area reduction factor is applicable for area
   (a) Less than 0.2 m²  
   (b) less than 0.18 m²  
   (c) greater than 0.2 m²  
   (d) less than 0.7 m²  
   ANSWER: A