SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK (DESCRIPTIVE)

Subject with Code : BE (13A03701) **Course & Branch**: B.Tech - CE

Year & Sem: IV-B.Tech & I-Sem **Regulation:** R13

UNIT –IV

PLATE GIRDER BRIDGE & COMPOSITE BRIDGES

1. A deck type welded plate girder railway bridge is to be constructed for a broad gauge single track on the main line. Effective span=20m, c/c distance between plate girders=2m, Dead Load on each girder= (220L+600) N/m, Dead load of track with sleepers=6800 N/m. Design the superstructure of the bridge with welded plate girders.
2. Explain the step by step design procedure of the welded plate girder bridge.
3. Explain the various components of the plate girder bridge along with the design procedure.
4. List any seven elements of the plate girder bridge & explain its important features related to the design.
5. The plate girder is to be designed for B.G. Track to suit the following data:

Effective span of the girder	= 30 m
Dead load of track (open floor)	= 7.5 kN/m
E.U.L.L. for BM calculations/track	= 2727 kN

   Design the plate girder bridge & sketch the details of longitudinal & cross-sections.
6. (a) List the different types of shear connectors used in the composite bridge
   (b) Explain the shear connector design in the composite bridge.
7. Design the plate girder to conform to the IRS loadings and IRC specifications. Sketch the typical c/s of the bridge deck.
8. Design a deck type welded plate girder bridge for the following data : Effective span=20m, c/c distance between plate girders=2m, dead load on each girders =8kN/m , dead load of track with sleepers=6.5kN/m.
9. Write the advantages of the composite bridge. Briefly explain the behavior of the composite bridge.
10. A) List the different types of connectors used in the composite bridge.
    B) What is the purpose to provide the shear connectors in the composite bridge?
    C) List out the elements of the plate girder.
    D) Write the advantages of composite bridges.
    E) Define plate girder.

Prepared by: **M.MANIKANTAN**

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QUESTION BANK (OBJECTIVE)

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1. The Plate girder bridges are the most common type of _____ bridges [ ]
   (A) Concrete (B) Steel (C) Wooden (D) None
2. The Plate girder bridges are generally used for railway crossings of _____ [ ]
   (A) Streams (B) Rivers (C) Both A & B (D) None
3. The Plate girder bridges are adopted for simply supported spans in the range of __ [ ]
   (A) 10 to 50m (B) 10 to 20m (C) 20 to 50m (D) 20 to 60m
4. The Plate girder bridges are adopted for continuous span up to [ ]
   (A) 100m (B) 250m (C) 150m (D) 200m
5. The self-weight of girder may be assumed as [ ]
   (A) (0.2L+1) kN/m (B) (0.3L+1) kN/m^2 (C) (0.5L+1) kN/m (D) None
6. The depth of web girder is calculated by [ ]
   (A) D =$\frac{5M}{\sigma_b}$ (B) D = $5\sqrt[3]{\frac{M}{\sigma_b}}$ (C) D = $5\sqrt[4]{\frac{M}{\sigma_b}}$ (D) None
7. The thickness of web not less than [ ]
   (A) 6mm (B) 7mm (C) 8mm (D) 9mm
8. The flange width may be taken as [ ]
   (A) $\frac{L}{40}$ to $\frac{L}{42}$ (B) $\frac{L}{42}$ to $\frac{L}{50}$ (C) $\frac{L}{42}$ to $\frac{L}{45}$ (D) $\frac{L}{40}$ to $\frac{L}{45}$
9. The maximum horizontal shear forces given by [ ]
   (A) $\tau = \frac{Va\bar{y}^2}{I}$ (B) $\tau = \frac{Va\bar{y}}{I}$ (C) $\tau = \frac{Va\bar{y}^2}{2I}$ (D) None
10. The minimum moment of inertia of intermediate stiffeners is given by [ ]
    (A) $I = \frac{1.5d^2t^2}{c^2}$ (B) $I = \frac{1.5d^2t^2}{c^2}$ (C) $I = \frac{1.5d^3t^3}{c^2}$ (D) None
11. The flange area can be calculated by [ ]
    (A) $A_f = [M/(\sigma_b d)]-[A_w/6]$ (B) $A_f = [2M/(\sigma_b d)]-[A_w/6]$
    (C) $A_f = [M/(\sigma_b d)]-[A_w/8]$ (D) None
12. The lateral bracings are designed to resist the [ ]
    (A) Horizontal loads (B) Horizontal wind loads (C) Racking forces (D) Both B&C
13. The outstand of stiffeners should not more than ___, for rolled section [ ]
    (A) 12t (B) 13t (C) 16t (D) 17t
14. Plate girder bridges are the most common type of----------bridges [ ]
    (A) Concrete (B) steel (C) wooden (D) none
15. Plate girder bridges are generally used for railway crossing of------- [ ]
    (A) streams (B) rivers (C) both a & b (D) none

16. Plate girder bridges are adopted for simply supported spans in the ranges of------- [ ]
(A) 10 to 50m (B) 10 to 20m (C) 20 to 50m (D) 20 to 60m
17. Plate girder bridges are adopted for continuous spans up to-------- [ ]
(A) 100m (B) 250 m (C) 150m (D) 200m
18. Crops bracings consisting of angles are provided at the ends and at intervals of----[ ]
(A) 1 to 2m (B) 2 to 3m (C) 3 to 4m (D) 4 to 5m
19. Self weight of girder may be as--------- [ ]
(A) (0.2L+ 1) KN/m (B) (0.2L + 2) KN/m^2 (C)(0.2L + 1) KN (D)none
20. Depth of web girder is calculated by------- [ ]
(A) $D=5(\sqrt{m}/\sigma_b)$ (B) $D=5(3\sqrt{m}/\sigma_b)$ (C) $D=5(2\sqrt{m}/\sigma_b)$ (D) $D=5(\sqrt{w}/\sigma_b)$
21. Thickness of the web not less than [ ]
(A) 6mm (B) 7mm (C) 8mm (D) 9mm
22. Flange width may be taken as------- [ ]
(A) L/ 40 to L/40 (B) L/40 to L/50 (C) L/42 to L/45 (D) L/40 to L/45
23. Spacing of intermediate stiffness is 'c' not greater than [ ]
(A) 0.5d (B) 0.3d (C) 1.5d (D) none
24. Maximum horizontal shear force given by---- [ ]
(A) $\tau= Vay_x/I_{xx}$ (B) $\tau= Vay/I$ (C) $\tau= Vay^2/I$ (D)none
25. _____ deck comprises of a reinforced concrete continuous slab supported by steel plate girders. [ ]
(A) Composite bridge (B) Cantilever bridge
(C) Cable wire bridge (D) Continuous bridge
26. The composite bridges are economical in the span range _____ [ ]
(A) 10 to 15m (B) 10 to 20m (C) 10 to 14m (D) 7 to 10m
27. Shear connectors are the most important structural element in a _____ [ ]
(A) Composite bridge deck (B) Continuous bridge
(C) Cantilever bridge (D) Cable wire bridge
28. _____ type of composite bridges are welded to the shear connectors for providing a rigid connection
(A) C-type (B) I-type (C) U-type (D) All the above [ ]
29. The ultimate shear resistance of one connector is given by the empirical formula, Q_u =
(A) $A_{st}\sigma_u 10^{-6}$ (B) $A_s\sigma_u 10^{-3}$ (C) $A_{st}\sigma_u 10^{-4}$ (D) $A_s\sigma_u 10^{-2}$ [ ]
30. Composite bridges is economical in the span range [ ]
(A) 10 to 15m (B) 10 to 20m (C) 10 to 14m d) 7 to 10m
31. The savings in the overall depth of the beams leads to saving in lengths of approaches in the case of [ ]
(A) Sub-grade (B) excavation (C) embankment d) none of these
32. The ultimate bond stress at the inter face should not exceed-------N/mm^2 [ ]
(A) 2.01 (B) 2.12 (C) 2.13 (D) 2.1
33. The spacing of the shear connector is computed by the relation-------- [ ]
(A) $P=\sum Q/V_l$ (B) $P=\sum K/V_l$ (C) $P=\sum H/V_l$ (D) none of these
34. The longitudinal shear [working or ultimate] is computed using the equation-- [ ]
A) $V_L= V_{AC}X/I_{xx}$ & $V_w= V_U A_C X/I_{xx}$ (C) $V_L= V_{AC}Z/I$ & $V_{LU}= V_U A_U Z/I$
B) $V_L= V_{AC}Y/I$ & $V_{LU}= V_U A_C Y/I$ (D) none of these
35. Shear connectors are the most important structural element in a-----bridges. [ ]

(A) Composite (B) continuous (C) cantilever (D) cable wire

36. Victor has reported that flexural stiffness of a composite beam will be about ------that for a corresponding steel beam. [ ]
(A) 2 to 3 times (B) 2 to 4 times (C) 2 to 5 times (D) 2 to 6 times
37. Composite bridges deck comprises of a reinforced concrete continuous slab supported by-------- girder. [ ]
(A) Steel plate (B) concrete plate (C)pre stressed concrete (D) All of these
38. This type of bridge deck provides for speedly erection of the _____girder [ ]
(A) Fabricated (B) pre fabricated steel (C) steel (D) R.C.C
39. -----type of are welded to the shear connectors for providing a rigid connection. [ ]
(A) C – type (B) I – type (C) U – type (D) All of these
40. The deflection of composite section is------deflection of non-composite section due to increase in moment of inertia. [ ]
(A) More than (B) less than (C) equal (D) All the above

Prepared by: **M.MANIKANTAN**