**POORNIMA UNIVERSITY, JAIPUR**

**END SEMESTER EXAMINATION, November 2022**

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|  | **3BT5155** | Roll No. | Total Printed Pages: 2 |
| **3BT5155** |  |
| B. Tech. III Year V Semester (Main/Back) End Semester Examination, November 2022  **(Civil Engg.)** | |
| **BCV05103 :** **Design of Steel Structures** | | | |

# Time: **3**Hours. Total Marks: **60**

Min. Passing Marks: **21**

Attempt **five** questions selecting one question from each Unit. There is internal choice from Unit I to Unit V. Marks of each question or its parts are indicated against each question / parts. Draw neat sketches wherever necessary to illustrate the answer. Assume missing data suitably (if any) and clearly indicate the same in the answer.

Use of following supporting material is permitted during examination for this subject.

# **IS: 800-2007** **2. STEEL TABLE**

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|  |  | **UNIT-I (CO1)** | **Marks** | **Bloom Level** |
| **Q.1** | **(a)** | What do you understand by the structural steel? Explain the various types of Steel with compositions. | **(8)** | **Understand** |
|  |  |  |  |  |
|  | **(b)** | What are the Physical properties of steel structure? | **(4)** | **Understand** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.2** |  | Find the shape factor of following shape  a) Triangular (height=h, Base=b)  b) Diamond (square placed along diagonal)  c)Rectangular  d) Hollow Circular (inside diameter=d, Outside diameter=D) | **(3x4)** | **Evaluate** |
|  |  |  |  |  |
|  |  | **UNIT-II (CO2)** |  |  |
|  |  |  |  |  |
| **Q.3** | **(a)** | (1) What are differences between bolted and welded joints?  (2) Explain in detail web buckling & web crippling.  (3) Which is better welding or bolting? | **(2x3)** | **Understand** |
|  |  |  |  |  |
|  | **(b)** | (1) What is the significance of Stress strain curve, Write the various silent points of Stress strain curve?  (2) Write the explanatory note on working stress method and limit state method. | **(3x2)** | **Understand** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.4** |  | Design a connecting system as battens with bolted connection for the column having length 10m, axial load 900kN, and column is restrained at both ends in position and direction. Use channel section back to back. | **(12)** | **Evaluate, Apply** |
|  |  |  |  |  |
|  |  | **UNIT-III (CO3)** |  |  |
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| **Q.5** |  | Design a built-up column with four angles. The column is 12m long and supports a factored axial compressive load of 700KN. The ends of the column are held in position and restrained against rotation. Design a suitable connecting system. Use steel of grade Fe 410. | **(12)** | **Evaluate** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
| **Q.6** |  | Design a built-up column 9m long to carry a factored axial compressive load of 1100KN. The column is restrained in position but not in direction at both the ends. Design the column with connecting system as battens with bolted connections. Use two channel sections back to back. Use steel of grade Fe 410. | **(12)** | **Evaluate** |
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|  |  | **UNIT-IV (CO4)** |  |  |
|  |  |  |  |  |
| **Q.7** |  | Design a laterally unsupported beam for the following data.  Effective span: 4m  Maximum bending moment : 550 KNm  Maximum shear force: 200KN  Steel of grade: Fe410 | **(12)** | **Evaluate** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.8** |  | Design a laterally supported beam of effective span 6m for the following data.  Grade of steel: Fe410  Maximum bending moment: M=150KNm  Check for deflection is not required | **(12)** | **Evaluate** |
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|  |  | **UNITV (CO5)** |  |  |
|  |  |  |  |  |
| **Q.9** |  | Writes short notes on:  (a) Top lateral; bracing for deck type plate girder railway bridges.  (b) Use of internal gusset plates in through types plates girder railway bridges | **(2x6)** | **Understand** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.10** | **(a)** | What is the difference between portal bracings and sway bracings used in through type truss girder railway bridges? | **(6)** | **Understand** |
|  |  |  |  |  |
|  | **(b)** | Sketches four typical forms of portal bracings and state the two general assumptions in analysis of the portal bracings. | **(6)** | **Understand** |