

[This question paper contains 3 printed pages]

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ASME-21-CENGG-(I)
CIVIL ENGINEERING (PAPER-I)

Roll Number

Time Allowed : 3 Hours]

[Maximum Marks : 100

QUESTION PAPER SPECIFIC INSTRUCTIONS

Please read each of the following instructions carefully before attempting questions.

1. There are total **EIGHT** questions printed in English.
2. Candidate has to attempt **FIVE** questions in all.
3. Question No. 1 is compulsory. Out of the remaining **SEVEN** questions, **FOUR** are to be attempted.
4. *All* questions carry equal marks. The number of marks carried by a question/ part are indicated against it.
5. Write answers in legible handwriting. Each part of the question must be answered in sequence and in the same continuation.
6. Wherever assumptions are made for answering a question, they must be clearly indicated prior to their use.
7. Diagrams / Figures, wherever required, shall be drawn neatly. Unless otherwise mentioned, symbols and notations carry their usual standard meanings.
8. Use of I.S. Codes of practice and Steel Sections Handbook is permitted.
9. Attempts of questions shall be counted in sequential order. Unless struck off, attempt of a question shall be counted even if attempted partly. Any page or portion of the page left blank in answer book must be clearly struck off.
10. Re-evaluation/Re-checking of answer book of the candidate is not allowed.

1. A 600 mm deep and 210 mm wide I-section has 21 mm thick flanges and 12 mm thick web. Calculate the maximum intensity of shear stress and also sketch the distribution of shear stress across the section, when a shear-force of 80 kN is acting at the section. 20
2. Write down stiffness matrix for a member, to be used in Matrix method of analysis. The member is having six degree of freedom at each end. 20
3. An ISA 125 mm × 95 mm × 10 mm used as tension member, is connected by its long leg to 8 mm thick gusset plate. Design a suitable welded joint using 6 mm fillet weld on the toe and 8 mm on the back and end. The centroid of the section from the back of short leg is at 38.8 mm.
Given $f_y = 250\text{N/mm}^2$, $f_u = 410\text{ N/mm}^2$, $\gamma_{m0} = 1.10$ $\gamma_{mw} = 1.5$. 20
4. Determine the principal moments of inertia of ISA 90 mm × 60 mm × 10 mm. 20
5. (a) Differentiate the necessity and use of Shoring, Underpinning and Scaffolding. 6
(b) What are various methods of thermal insulation ? How would you do thermal insulation of roof, exposed walls and doors and windows ? 14
6. Design and detail a slab for a room 4.5m × 6.0 m. The slab is supported on masonry walls all round, with adequate restraint and corners are held down. Imposed load on the slab is 3000 N/m². The slab has bearing of 150 mm on supporting walls. Use M20 grade concrete and Fe415 steel. Take modification factor, α_x , α_y and modified shear strength are as 1.5, 0.080, 0.056 and 0.372 N/mm² respectively. 20

7. What is CPM Cost Model and how would you determine cost of a project ?
Explain with the help of figure. 20
8. (a) Which are factors affecting permeability of soil ? Explain them in
detail. 14
- (b) How is the permeability of stratified soils determined ? Consider the
direction of flow parallel to and normal to the strata. 6

