

CVL 779		Formwork for Concrete Structures	MINOR EXAMINATION	
Time allowed	1 HOUR 9:30-10:30		Maximum Marks	50
Venue	LH-316		Date	28.09.2022

ANSWER ALL QUESTIONS. DRAW CLEAR SKETCHES TO EXPLAIN YOUR ANSWER WHERE EVER REQUIRED. BE BRIEF AND ANSWER TO THE POINT. ASSUME MISSING DATA SUITABLY IF REQUIRED. FOR QUESTION 3 THERE IS NO NEED FOR LENGTHY EXPLANATIONS.

Q 1 In a construction project RCC boundary wall of length 120m is to be built in 12 days. **30**
The height of the wall is 2m and its thickness is 150mm. The following formwork materials are available with the contractor.

Plywood 12mm thickness, H-16 Beam, Steel Waler of different sizes, Tie rod, Alignment props.

The properties of these materials are given below:

Material	Allowable BM	Allowable Shear	Allowable Deflection (mm)	Allowable EI
12 mm thick plywood	0.2 kNm/m	6.16 KN/m	Lesser of L/360 or 0.15cm	1.07 KNm ² /m
H-16 beam	3 kNm	6 KN	Lesser of L/360 or 0.6cm	145 KNm ²
Steel Waler	10.2 kNm	103.4 KN	Lesser of L/360 or 0.3cm	784.14 KNm ²

Assume 40 kN/m² as the design formwork pressure. Tie rod capacity 50 kN.

Use these formwork materials to prepare the desired formwork scheme economically. Support your formwork scheme with approximate design calculations and sketches.

Q 2 Short Answer Type Questions (5x 4= 20 marks)

- What are the requirements of a good formwork system?
- With the help of neat sketch describe Type I climbing formwork system.
- Distinguish among- Shoring, Reshoring, Preshoring, and Backshoring
- What is the function of a drophead?
- List the number of platforms used in automatic climbing formwork and mention their purpose.

Additional data: Use the following if needed

For 12 mm plywood, consider the following:

Allowable moment carrying capacity	0.2 kN-m/m
Allowable shear	6.16 kN/m
Permissible EI	1.1 kNm ² /m
Permissible deflection	0.730 mm

For H-16 beam, consider the following:

Depth of H-16 beam	160 mm
Flange of H-beam	65 mm
Allowable moment carrying capacity	3 kNm
Allowable shear	6 kN
Permissible EI	143 kNm ²
Permissible deflection = L/360	3.333 mm

Tie rod is rolled from 16 mm ST 58 (material specification) to form 18 x 5 PITCH (thread detail). The yield stress for tie rod is 360 N/mm².

Calculate lateral concrete pressure using the following CIRIA formula:

$$P_{\max} = D[C_1\sqrt{R} + C_2K\sqrt{H - C_1\sqrt{R}}]$$

Temperature co-efficient $K = [36/(T+16)]^2$

Load