Tutorial-1: Introductions

Q.1. A rectangular clad building having pitched roof and located in a farm of Bhavnagar City as shown in Fig.-1. Calculate wind load as per IS 875 Part-3: 2015.

Physical Parameters:

- Height (h): 3.5 m
- Width (w): 10.0m (excluding the overhangs)
- Length (*l*): 18.0m
- Roof angle (α): 5°.
- Overhang: 0.5m
- Openings on sides: 10 percent of the wall area.
- External Surface of walls: Smooth
- Flat ground.

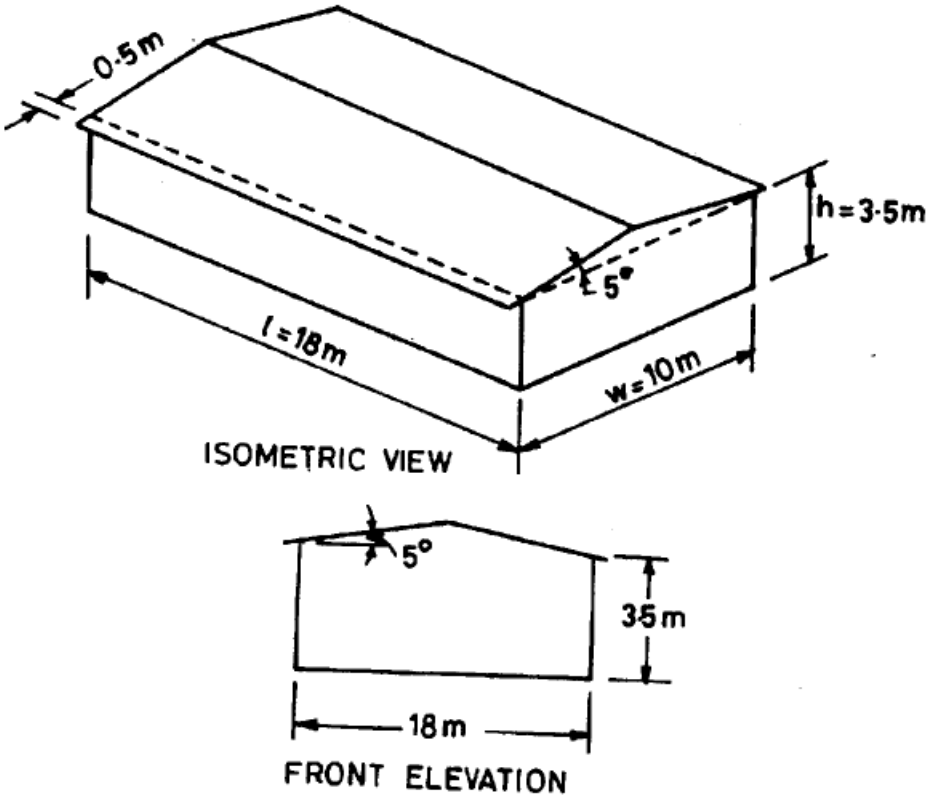

Fig.-1

Q.2. Design a framed connection to connect an ISLB @ 485.6N/m transmitting an end reaction of 450kN to the web of ISMB550 @ 1017.3N/m. (i) Design a bolted connection (ii) Design a site welded connection.

Q.3. An ISLB 225 @ 230.5N/m and 1 m long is connected at one end to the column section ISHB 200@ 365.9 N/m. It supports a load of 300kN at its free end. Design a bolted seat connection.

Q.4. An ISLB 325 @ 422.8N/m transmits a factored end reaction of 75kN and a factored end moment of 100kNm to the flange of a column ISHB 300 @ 576.8 N/m. Design a site welded connection.

Last date of submission: 03/October/2022

Tutorial-2: Design of Plate Girder

Q.1 What is the difference between a beam and a plate girder?

Q.2. Determine the buckling resistance moment for a welded plate girder consisting of 400 x 25 mm flange plates and a 1000 x 10 mm web plate in grade 410 steel. Assume a laterally braced span of 5.5 m.

Q.3. Design an 18-m long simply supported welded plate girder carrying a uniformly distributed load of 50 kN/m excluding self-weight, and two concentrated loads of 350 kN each at quarter points of the span. Assume that the girder is laterally supported throughout.

Last date of submission: 10/ October /2022

Tutorial-3: Design of foot-over bridge

Q.1. Design the foot bridge for the following data as shown in Fig.-1.

- Span 24m
- Width of walk way : 4m
- N- Type lattice girder with 8 panels, laterally supported by rakers.
- The flooring consits of RCC slab 110mm thick with floor finish 0.75 kN/m^2 Live load is 5.0 kN/m^2.

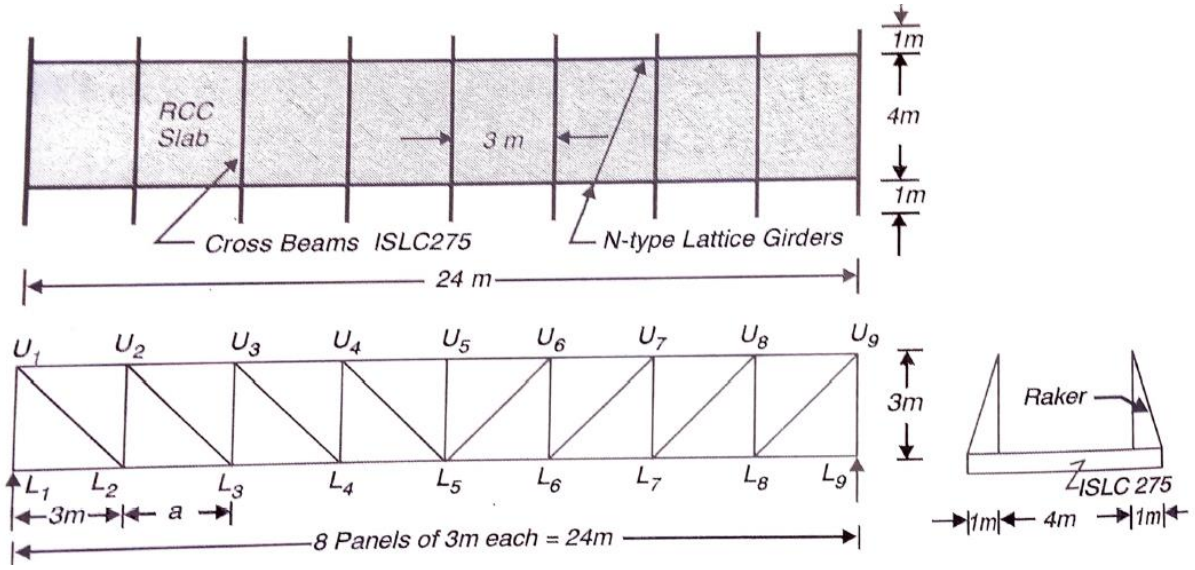

Fig.-1

Last date of submission: 10/ October /2022

Tutorial-4: Plastic Design

Q.1 Explain the concept of plastic analysis and design.

Q.2 State the assumptions made in plastic design.

Q.3 Define the shape factor, Collapse load and Plastic Hinge.

Q.4 Write advantages and disadvantages of Plastic design.

Q.5 Explain the hinge length and assumptions made in plastic analysis in detail.

Q.6 Determine the collapse load for simply supported beam carrying a concentrated load "W".

Q.7 Derive the collapse load for fixed beam of length "L", subjected to concentrated load "W" at centre.

Q. 8 Determine the collapse load for propped cantilever with eccentric point load

Q. 9 Determine plastic moment capacity for given frame as shown in Figure – 1.

Q.10 Determine plastic moment capacity of beam as shown in Figure – 2 if load shown is working loads. Take load factor as 1.5

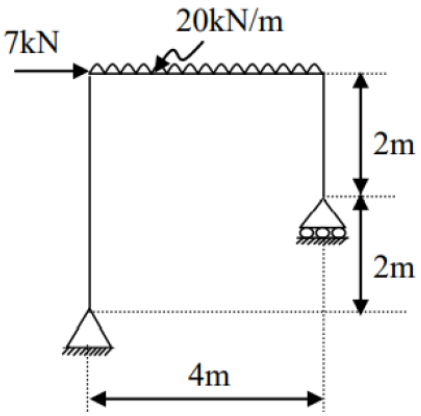

Figure – 1

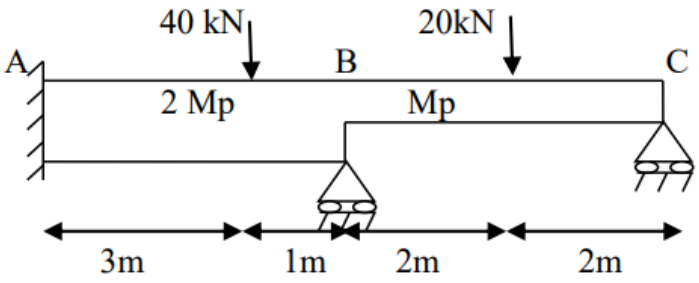

Figure – 2

Last date of submission: 10/October/2022

Tutorial-5: Design of Gantry Girder

Q.2. A 50kN hand-operated crane is provided in a building and has the following data:

- Centre-to-centre distance of the gantry beam (width of the building): 16m
- Longitudinal spacing of columns (span of gantry): 7.5m
- Weight of the crane:40kN
- Wheel Spacing :3m
- Weight of the crab:10kN
- Minimum hook aprroach:1m
- Yield stress of steel:250MPa

Design a simply supported gantry girder assuming lateral support to it.

Q.3. Design gantry girder of Q.2 by assuming lateral unsupported to it.

Last date of submission: 17/ October /2022