

Final Exam. January, 2012

- Material of Construction is Mild Steel 37
- Any Data Missing can be reasonably assumed
- All Sketches Should be Clear.

الامتحان مكون من ورقة واحدة وجهين
 - مسموح باستخدام جداول المنشآت المعدنية و الكود

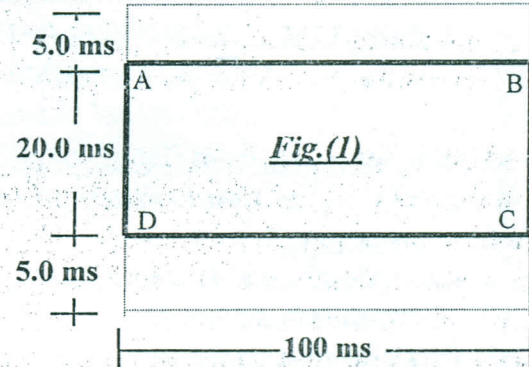
Answer all the questions:- [maximum grade= 70 marks +10 over]

Question (1) [25 marks]

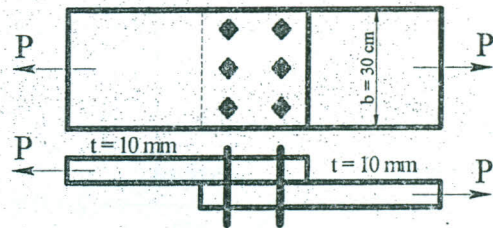
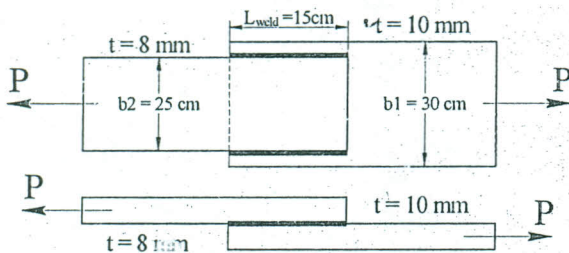
(1) Write short notes with sketches about:

- 1- Advantages and Disadvantages of steel materials
- 2- Types of Weld, maximum and minimum weld lengths and thickness
- 3- Bolt M27 grade 8.8
- 4- Modes of failure of bolted connection

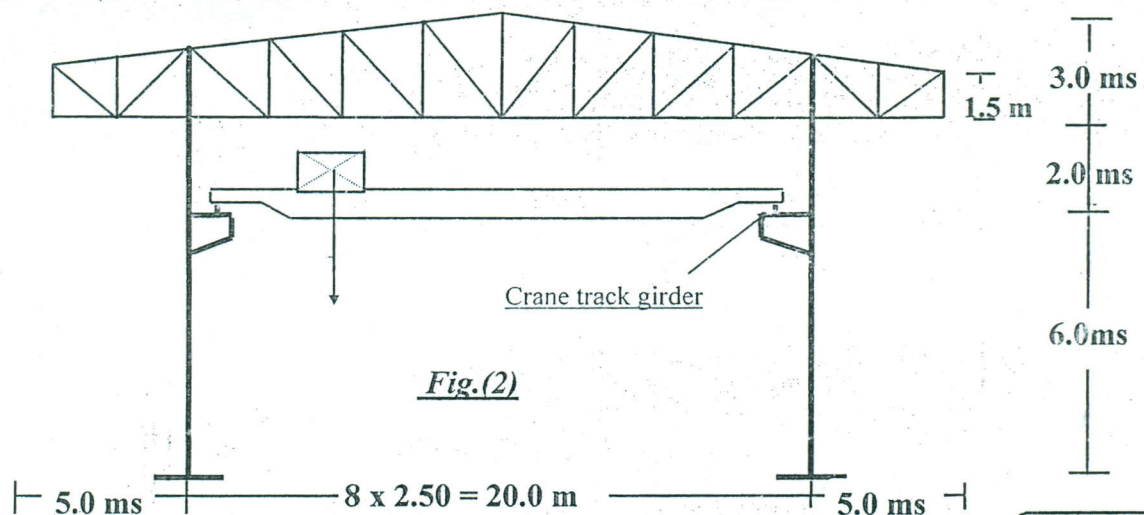
(2) A steel structure is to be designed to cover the area shown in Fig.(1). The columns may be arranged on the lines ABCD. The clear height of the total area is 8.0ms. Draw to a suitable scale a general layout showing the different elements of the structure and bracing systems (plan, elevations and side view)?



(3) Find the maximum capacity (P) which can carry by the welded connection shown in figure [Use maximum size of weld]



Question (2) [30 marks]

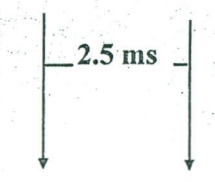


Please turn over
 Dr. Fikry Salem

The steel frame shown in fig. (2) is one of series that form the skeleton of a workshop. The frames are composed of trusses that have a span of 20.0 m, with two overhanging ends, 5.0 ms each. The truss is divided into 12 panels 2.5 ms each, spaced 5.0 ms apart. The roof covering is corrugated asbestos sheets. Sheets also cover the free ends of the truss for a depth 1.5 ms. The trusses are supported by columns 8.0 ms high. The workshop is provided with an over head crane moving on two longitudinal crane girders supported on brackets. 8.0 t 8.0 t

GIVEN DATA:-

Roof covering is corrugated sheets weighting = 25.0 kg/m²
 Total weight of steel structure is to be assumed = 35.0 kg/m² of covered area
 live load = 60.0 kg/m² of covered area
 Wind pressure(q) = 70.0 Kg/m²



Crane girder subjected to two moving load 8.0 t each and 2.5 ms distance apart
 impact coefficient = 25%
 the lateral shock = 10% of the maximum live load

REQUIREMENTS:

- (1) Draw the load distributions acting on the truss due to dead load, live load and wind load?
- (2) Design an intermediate purlin as a simple beam, all checks are required [purlin spacing = 2.59ms]?
- (3) Design a suitable rolled section (B.F.I.) as a simple beam [span of crane track girder = 5.0 ms]?

Question (3) [25 marks]

For the truss connections shown in figure, design the members which not designed, design the two connections and draw its details to scale 1:5?

Given: - For bolted connection, fig.(3) [Use bolts M16 grade 4.6, Case A]
 For welded connection fig.(4) [Use maximum size of weld, Case A]

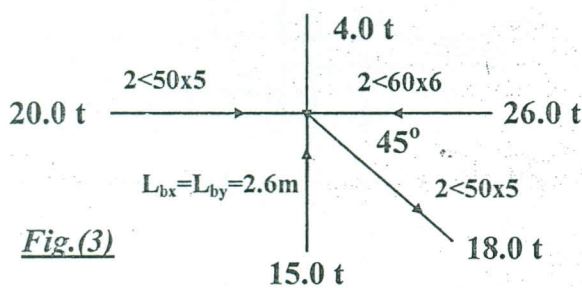


Fig.(3)

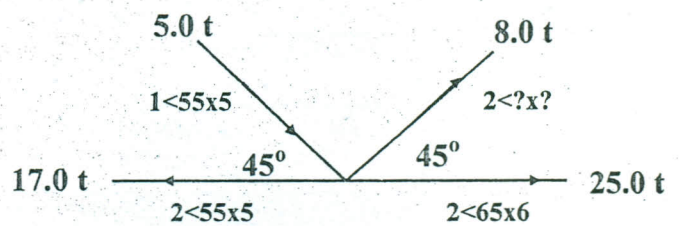


Fig.(4)