Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

V SEMESTER B.TECH. (CIVIL ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2016

SUBJECT: BASIC STRUCTURAL STEEL DESIGN [CIE 3102]

REVISED CREDIT SYSTEM
(26/11/2015)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions. Use ofIS800-2007 and SP-6 is Permitted
- Assume suitable data if missing. Answer all the questions. All plates are Fe410 (250) grade and bolts are grade 4.6 unless specified in the question**.**

1A.	Define Bolt value with formulae.	**3**	**CO1**
1B.	Find the safe working load P the bracket can safely carry as shown in **Fig Q. No.1(B).** The bolts are 20mm diameter.	**7**	**CO1**
2A.	Explain with neat sketch Lug angle and design principle.	**3**	**CO2**
2B.	Check the adequacy of two nos. ISA 75 x 50 x 8 mm with longer leg connected on either side of gusset plate of 10mm thick and is subjected to tensile factored load of 375 kN. Connect the angles with M20 bolts of grade 4.6.	**7**	**CO2**
3A.	Design a single lacing system for a built-up column 8.0m long to carry a factored load 1800kN. Column consists of 2 nos lSMC350@41.3kg/m placed toe to toe with clear spacing 220mm. Connection need not be designed.	**4**	**CO3**
3B.	Design a 3.6m high stanchion welded with steel plates of 10mm thick to the flanges to support service axial load of 4000kN. The column is effectively held in position and restrained against rotation at both the ends.	**6**	**CO3**
4A.	Design a suitable column splice for a column ISHB 450 @ 87.2 kg/m to transfer the compression load to its capacity about minor axis if effective length of column is 4.5m. Using M25 bolts design the connection details. Draw a neat sketch of the design details. Assume the ends are not milled or machined.	**7**	**CO4**
4B.	Calculate the plastic section modulus for ISMB 400 @ 61.6 kg/m about its minor axis.	**3**	**CO4**
5A.	A welded plate girder is simply supported over a span of 27.5 m and carries a, factored superimposed load of 35kN/m. Assume the compression flange is laterally restrained and prevented against rotation. Design the plate girder without stiffeners. Assume stiff bearing of 400 mm. Draw a neat Sketch of the final design.	**10**	**CO5**

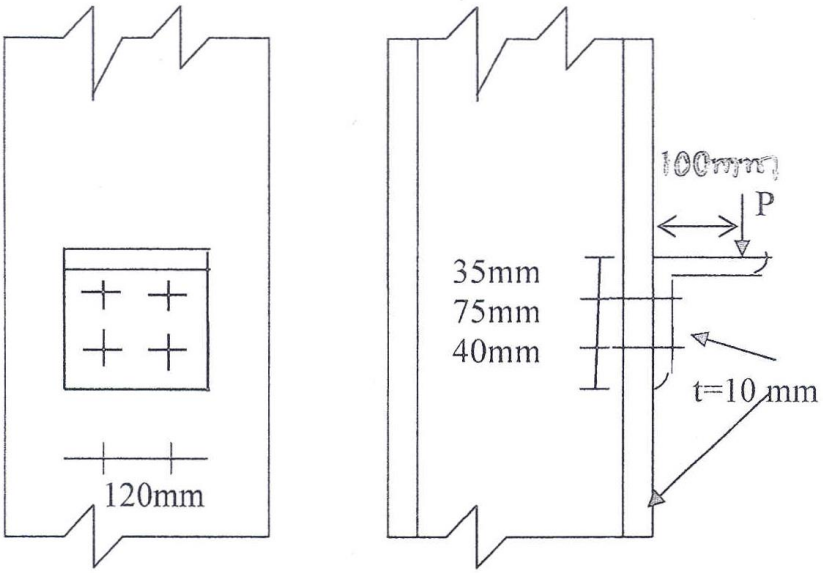

Fig Q.No.1(B)