JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

SUPPLEMENTARY EXAMINATION- JULY -2017

M.Tech II Semester

COURSE CODE: 11M1WCE212 MAX. MARKS: 100

COURSE NAME: DESIGN OF STEEL STRUCTURES

COURSE CREDITS: 04 MAX. TIME: 2 HRS

Notes: *All questions are compulsory.*

Carrying mobile phone during examinations will be treated as case of unfair means.

Illustrate your answers with neat sketches / free body diagrams wherever necessary.

For any missing data or information, you are free to make whatever simplifying assumptions that you wish, ***provided you supply a credible justification****.*

Cite the appropriate ***clause no., table no. and figure no. from IS codes****, wherever it is required.*

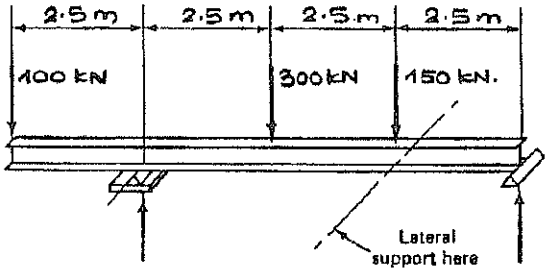
Assume the loads are given as ***factored****, unless noted otherwise.*

Preferably, write the answers in sequential order. ***IS 800: 2007, IS 808, Steel Table*** *is allowed.*

Q1. Design a strut of 3.5 m long in a building subjected to a factored load of 550 kN. Both the ends of the strut are effectively restrained in direction and position. Use steel of grade Fe 410. ***[20]***

Q2. A tension member 0.95 m long to resist a service dead load of 20 kN and a service live load of 60 kN. Design a rectangular bar of standard structural steel of grade Fe 410. Assume that the member is connected by one line of 16 mm diameter bolts of grade 4.6. ***[20]***

Q3. Select required size for the simply supported beam with overhangs as shown in the following figure. Note that lateral support is provided only at the location of 150kN load and at the reaction support. Also check if the web stiffeners are required at loading points and at the supports. If yes, design suitable stiffeners. ***[20]***



Q.4 The digital filter coefficients $w_0 = 0.375, w_1 = 0.75$ *and* $w_2 = -0.375$ are represented using 4-bits signed magnitude representation. If coefficients truncated to 3-bits then determine the truncation error introduced in these coefficients. **[10]**

Q. 5 What is the difference between convolution and correlation operations? Determine the cross-correlation between the following two sequences **[10]**

$x(n) = \{3, 7, \underset{\uparrow}{1}, 2, -3\}$,

$y(n) = \{2, -2, \underset{\uparrow}{4}, 1, -2\}$