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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SECOND SEMESTER M.TECH DEGREE EXAMINATION, APRIL/MAY 2018

Branch: Civil Engineering

Stream: Structural Engineering

01CE6102 Advanced Metal Structures

Answer *any two full* questions from *each* part

Limit answers to the required points.

Max. Marks: 60 Duration: 3 hours

PART A

1. A column ISHB 400 @806.4 N/m in the lower storey is to be joined to a column ISHB 300 of the upper storey. A load of 600 kN is to be transferred from the top to bottom storey. Design the column splice and the connections. **(9)**

2. Design a stiffened seat angle connection for a reaction of 200kN from a beam of ISMB 300 connected to the flange of a column ISHB300. Assume Fe 410 grade steel. **(9)**

3. a. Briefly explain the various design philosophies. **(5)**

   b. Explain the types of failures of a bolted connection **(4)**

PART B

4. A column section ISHB 350 @710 N/m carries a factored axial load of 1500kN. Design a suitable bolted gusset plate and connections. The base resets on M20 grade concrete pedestal. **(9)**

5. Design a gantry girder to be used in an industrial building carrying a manually operated travelling crane for the following data **(9)**

   Crane capacity =250kN, self-weight of the crane girder =200kN,

   weight of crab =50kN, Approximate minimum approach of crane hook to gantry girder = 1.2m, wheel base =3.5m, center to center of gantry rails =16m,

   center to center of columns =8m, self-weight of rail section = 300N/m, diameter of crane wheel = 150mm.

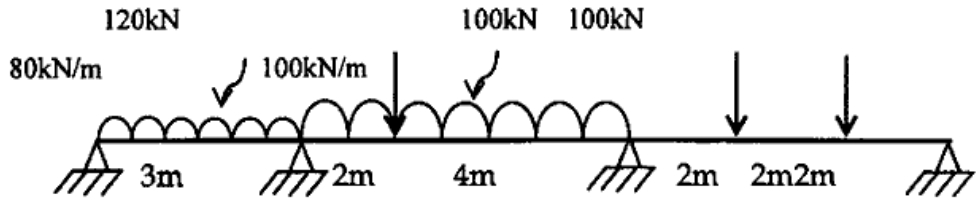
6. a. Write short note on anchor bolt and shear connectors. **(4)**

   b. Give a neat sketch and label the components of a typical structural framework for a braced industrial building **(5)**

PART C

7. Design a beam with an effective span of 4m to carry a load of 15kN/m. Assume the beam as simply supported with lateral restraints only at support points. Assume H20 alloys. (12)

8. a. Determine the plastic moment for the continuous beam shown below. Loads shown are collapse loads. (9)



b. Explain the various theorems in plastic analysis. (3)

9. a. Find the shape factor of a diamond section and circular section (6)

b. Write short notes on cold formed steel members with neat sketches. (6)