TE-SEM-VI-OLD-DDSS 10/5/15

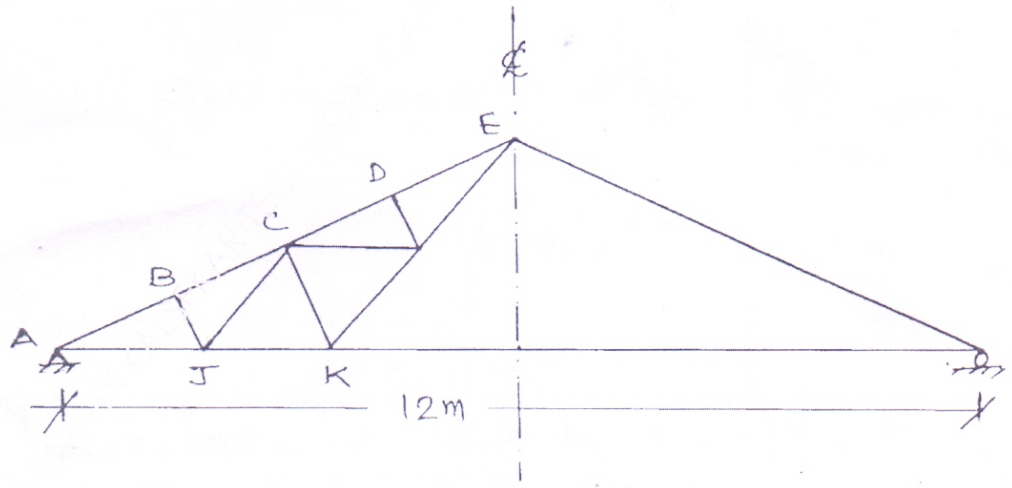
QP Code :576201

Duration: 4hrs **Maximum Marks:100**

Note: 1) Q1 is compulsory. Attempt any four out of remaining six questions.
2) Use of IS 800:2007 and steel table is permitted in the examination.
3) Assume suitable data if required and mention it clearly.
4) Support answers and solutions with suitable sketches.

Q1. A] How to assure safety of a beam in web buckling and web crippling? **[05]**
B] Why characteristic strength of material is modified to design strength? What are partial safety factors for material under different conditions? **[05]**
C] Design a slab base for a column ISHB300@58.8kg/m which has to carry 1600kN factored load. Use M20 Grade concrete for pedestal and SBC of soil as 200kN/m^2. **[05]**
D] Why ISA1001006@9.2kg/m is not advisable to use as a compression member? How its properties are modified for design? **[05]**

Q2.A] The roof truss shown below is to be designed for the following data:
Span of truss= 12m, rise of truss= 3m, spacing of trusses: 4.5m
Dead load= 430 N/m^2 on sloping area of roof
No access is provided to the roof except for the maintenance
Wind load = 1200 N/m^2 (suction) on both the slopes
Determine panel point load due to dead load, live load and wind load. Determine design force in member "JK". **[15]**



B] What is "Basic Wind Speed" of Mumbai? How wind pressure on pitched roof of a truss can be calculated? **[05]**

Q3.A] Design a beam which is provided at the periphery of a 5mx5m industrial block. Beams are connected with steel columns at the ends. Compression flange of

[Turn Over

the beams are embedded in the RCC slab of 250mm thickness. Consider 230mm thick and 1m high parapet wall on all four beams. Consider 4kN/m^2 live load on slab and 18kN/m^3 unit weight of brick masonry. [15]

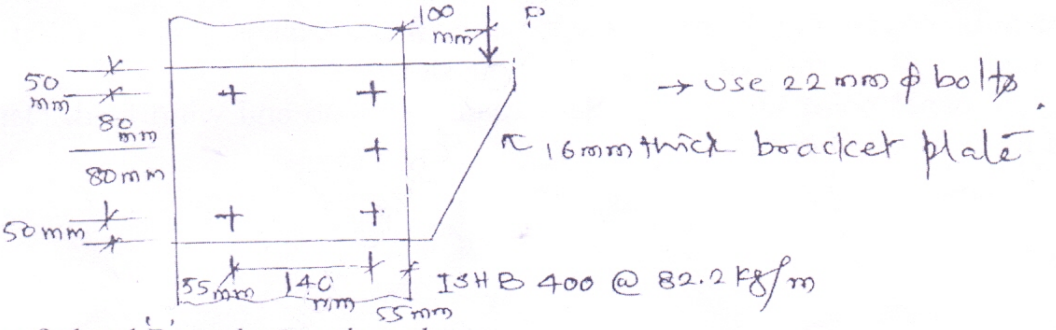
B] An ISMB450@42.4kg/m transfers an end reaction of 200kN (service load) to web of ISHB200@37.3kg/m. Design a suitable bolted frame connection. [05]

Q4. Design a laced built-up column section using two channels back to back which has to carry 2100kN characteristic load. Also design welded lacing system. Height of column is 6m. One end is held in position and free for rotation where as other end is held in position and restrained from rotation. [20]

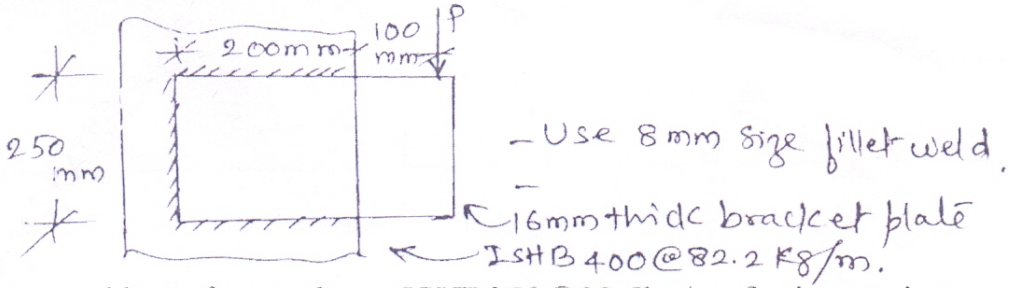
Q5. A] Determine capacity of 2ISA1259512@23.8kg/m in compression. Length of member is 3.5 m c/c between the intersections. Also design connection using site fillet weld. [10]

B] An ISMB450@42.4kg/m transfers an end reaction of 200kN (service load) to flange of ISHB200@37.3kg/m. Design a suitable bolted unstiffened seat connection. [10]

Q6. A] Determine safe load 'P' on the bracket plate. [10]



B] Determine safe load 'P' on the bracket plate. [10]



Q7.A] Design a gusseted base for a column ISHB350@92.5kg/m for its maximum capacity. Effective height of column is 5.4m. Grade of concrete is M20 and SBC of soil is 250kN/m^2. [15]

B] What are different modes of failures of tension member? Which governs the design? [05]