



BLACK DIAMOND SCHOOL OF ENGINEERING

CIVIL ENGINEERING DEPARTMENT

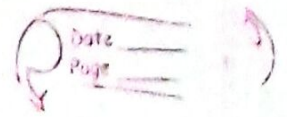
QUESTION BANK

6TH SEMESTER

SUB: STRUCTURAL DESIGN-II

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[Steel design-II]  
6th sem, civil



[5 marks questions]

- (1) (a) What is meant by the design of steel structure?
- (b) Name the grade of steel for standard structural design?
- (c) How structural steel is classified?
- (d) What is meant by ISJC 100 @ 56.9 N/m structural steel section?
- (e) Name the various types of major loads that may be act on a steel structure.
- (f) What are the connections are used in steel design?
- (g) What do you mean by pitch distance?
- (h) What is welding in structural design?
- (i) How the size of rivet is determined?
- (j) Define slenderness ratio?

[5 marks questions]

- (2) (a) Write down the advantages of steel structure?
- (b) Explain special consideration in steel design?
- (c) Discuss advantages and disadvantages of bolted connections?
- (d) State assumption in design of bearing bolt?
- (e) What are the factors that determine the buckling class of structural elements?  
Determine the buckling class of ISHB @ 806.4 N/m?



④ Determine the plastic section modulus of a T-section having flange width 200 mm, flange thickness 15 mm, depth of web 180 mm and width of web 20 mm?

⑤ Design a suitable slab base for a column section ICHB 200 @  $365.9 \text{ N/m}$  supporting an axial load of  $400 \text{ kN}$ . The base plate is to rest on a concrete pedestal of  $M20$  grade. Use steel of grade  $Fe-410$ ?

⑥ Explain buckling class of cross-section in compression member?

[10 marks questions]

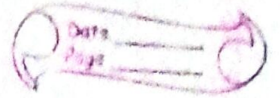
① Calculate the strength of a 20 mm diameter bolt of grade 4.6 for double cover butt joint each of the cover plate being 8 mm thick and main plates to be joined are 12 mm thick?

② Calculate the design compressive load for an ICHB 250 @  $536.6 \text{ N/m}$ , 4 m high. The column is restrained in erection only at the both ends. It is to be used as an enclosed column in a single story building?

③ Design a single angle section for a tension member of a roof truss to carry a factored tensile force of  $225 \text{ kN}$ . The member is subjected to the permissible reversal action of stress due to the action of wind. The length of the member is 3 m. Use 20 mm shop bolts of grade 4.6 for the connections?



Steel design - II  
6th sem, civil



2 marks questions

- ① (a) what do you mean by gauge distance?
- (b) The diameter of the bolt is 18 mm then what is the diameter of bolt hole?
- (c) Define end distance and edge distance.
- (d) How can you define tensile strength of the plate?
- (e) What is the value of permissible shear stress?
- (f) Define a column?
- (g) Write down the different types of welds?
- (h) Define slab base?
- (i) what are the types of slab base?
- (j) Define a beam?

5 marks questions

- ② (a) write down different types of butt welds with its sketches?
- (b) Explain block shear failure with sketch for the case of bolted connections?
- (c) Determine plastic moment capacity of the unsymmetrical I-section, Given size. Top flange 100 mm x 20 mm, bottom flange - 200 mm x 20 mm and web - 200 mm x 20 mm.
- (d) write down the advantages of welded connection over bolted connection?



- (10)
- ⑥ Explain buckling class of cross-section in compression members?
  - ⑦ What do you mean by slip critical connections? Explain the principle of high strength friction grip bolt?
  - ⑧ Write short notes on web buckling & web crippling and properties of structural steel.
  - ⑤ Discuss advantages and disadvantages of bolted connection.

[10 marks questions]

- ① Find the maximum force that can be transmitted through a double bolted chain lap joint consisting of 6 bolts in two rows. Given that M16 bolts are grade 4.6 and plates of Fe 410 are used. The thickness of the plates connected are 10mm and 12mm?
- ② Design a welded lap joint for two plates of size 20mm x 2mm and 120mm x 12mm for maximum efficiency. Assume shop welding and Fe 410 grade steel?
- ③ Determine the design axial load on the column section ISMB 400, given that the height of column is 3.0m and that is pin ended. Also assuming the following  $f_y = 250 \text{ N/mm}^2$ ,  $f_u = 410 \text{ N/mm}^2$  and  $E = 2 \times 10^5 \text{ N/mm}^2$ ?