### THEORY OF STRUCTURES (TS-3)

Maximum Marks – 100   **Time – 3.00 Hours**

a) Answer any FiveQuestions
b) Question No.8 is Compulsory.
c) Scientific Calculator is allowed

Q1. a. What are the assumptions made in the theory of Simple Bending?   **(20)**
     b. Write five points about Neutral axis - NA.

Q2. A wooden plank 300mm wide and 50mm thick is used to bridge a gap of 3m long. A   **(20)**
     man weighing 600N is standing at the middle of the plank. Find the max and min
     bending stress in the plank.
     (a) when the plank is laid flat.
     (b) When the plank is placed on one edge.

Q3. a) A cantilever beam 3m long carries audl of 10 KN/m over a length of 2m from   **(20)**
         fixed end and a point load of 5 KN at the free end. Calculate Max Shear force
         Bending moment and deflection. Take $E = 200$ KN/mm^2 and $I = 86 \times 10^6$ mm^4.
     b) When the beam is simply supported with same loading, calculate the same.
     c) Draw SFD and BMD for both beams.

Q4. a) What is the importance of arch over Lintel?   **(20)**
     b) What are the types of Arches in construction? Draw neat sketches.

Q5. Find the forces in the members of the roof truss shown below by methods of joints.   **(20)**
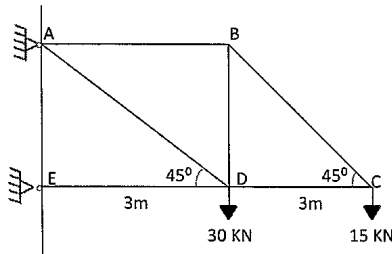
Q6. Design a reinforced concrete dome of base diameter 24m. The rise of dome is one –   **(20)**
     sixth of the diameter. Thickness of dome is 100mm. The live load on dome may be
     taken as 1.5 KN/m^2. Design suitable ring beam for the dome. Adopt M20 grade
     concrete and Fe415 grade steel.The permissible tensile stress is 100N/mm^2.

(PTO)

Q7. A double riveted double cover butt joint is used to connect plates 12mm thick. Using **(20)**
     Unwins formula,determine the diameter of rivet. Rivet value, gauge and efficiency of
     the joint using power driven rivets.
     Working stress in shear = 100 N / mm^2, fy = 260 N / mm^2
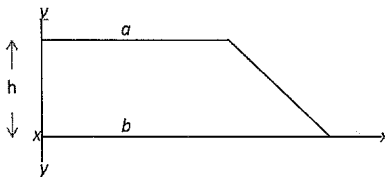   Working stress in bearing = 300N / mm^2
     Working stress in axial tension = 0.6 fy.

Q8. Answer any *Four* of the following: **(4 x 5=20)**
     a)   Any five points on Bending stress.
     b)   Types of Lintels.
     c)   Find the modules of section of hollow rectangular beam having outer dimension
          280 X 400mm and inner dimension 160 X 350mm.
     d)   Define section modulus and its importance.
     e)   Types of Loads and supports.
     f)

Area =

Centroid =