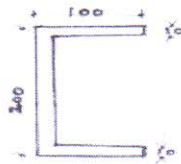**Maximum Marks – 50**   **Time – 2.00 Hours**

a) Answer any Two questions out of 1to 4 questions.
b) Question No.5 is compulsory and answer any four out of six sub-questions.
c) Scientific Calculator is allowed.

Q1. Determine the centroid of the channel section **(15M)**
200x100x10 mm as shown in Fig.1

Fig.1

Q2. A built up section consists of two channels ISLC 300 **(15M)**
placed back to back at 100mm clear distance with two
cover plates 300mmx20mm as shown in fig.2. Determine
the Moment of Inertia and Radius of Gyration of the
section about the horizontal and vertical centroidal axes
for a single channel $Iyy=3.46x10^6$ mm^4, $Ixx=6.05x10^7$mm^4
, A=4210mm^2. Distance of C.G from outer face of the web
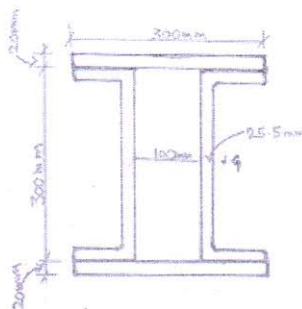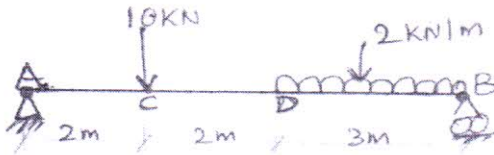Cyy=25.5mm.

Fig.2

P.T.O

Q3.   Calculate SF and BM for the beam shown in Fig (3). Also   (15M)
       draw SFD and BMD

Q4.   A floor has to carry a load of $8KN/m^2$ and is supported by   (15M)
       joists 120mm wide and 300mm deep over a span of 4m.
       Calculate the spacing centre to centre of the joists, if the
       max. permissible bending stress is $9.5 KN/mm^2$

Q5.   Write short notes on any FOUR of the following: (4x5=
                                                          20M)

       a) Vault and Dome – brief description
       b) Five assumptions made in theory of simple bending
       c) Draw the cross section of rectangular beam of size
           250x500m carries span of 6m. It is reinforced with
           20mmφ 3Nos. as main reinforcement and 12mmφ
           2Nos. as anchor bars. The reinforcement tied with
           8 mmφ stirrups @ 160mm C/C spacing. Draw the
           bending stress variation and shearing stress variation.
       d) Calculate M.I and section modules of triangular
           section base 2.2m and height 3.5m.
       e) Forces acting on Arch.
       f) Strength of Beam.

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