

DEPARTMENT OF CIVIL ENGINEERING: IIT DELHI
CVL875: SUSTAINABLE MATERIALS AND GREEN BUILDINGS. MINOR TEST-I
DURATION: 1.0 Hour. SECOND SEMESTER- 2022-2023. Max. Marks: 20
DATE:- 07/02/2023 TIME:- 16.00 P.M. 17.0 PM Venue: LH410

All relevant charts are supplied and only chart supplied need be used.
DRAW DIAGRAMS TO EXPLAIN YOUR ANSWER WHERE-EVER REQUIRED
BE BRIEF AND ANSWER TO THE POINT
ASSUME MISSING DATA SUITABLY IF REQUIRED

1. State the classifications of land on earth, for human use in the context of estimation of bio-capacity (BC) and ecological foot print (EFP); why there is a difference in classification with regard to BC and EFP? Consider the following table and obtain the planet equivalent in terms of X_i and Y_i etc. You may omit a term in case it is zero.

Land type	Bio Capacity	Ecological Foot print
Crop Land	X1	Y1
Grazing Land	X2	Y2
Marine Fishing Grounds	X3	Y3
Inland Fishing Grounds	X4	Y4
Forest Land	X5	Y5

2. OPC has 65% CaO and lime saturation factor (LSF) in the raw material is 98%. was, using a fuel that contains 97% Carbon, the OPC requires 160 kg/t of clinker heated to 1400°C . High Belite cement using LSF 80% and heated to 1200°C. Compare the carbon emission from the two cements, assuming: fuel consumption to be proportional to temperature of production and also assume that the relative proportions of silica, alumina and iron oxide same in both the cements. Assume any other data needed.

3. Explain how GGBFS, Silica fume (SF), Type C fly ash, Type F fly ash and Rice husk ash (RHA) differ in their physical and chemical characteristics. Explain the implications of these characteristics on consistency of paste, hydration process and resulting microstructure developments.
