End-Autumn Semester Examination (2010-2011)
Dept. of Architecture & Regional Planning
Indian Institute of Technology Kharagpur

Sub. No:	AR22001	Sub. Name :	Advanced Building Materials and Composites
Time :	3 hours	Full Marks:	100

1 Compare: 5x3
a. Cast & wrought iron b. Pre & post-tensioning. c. thermoplastic & thermoset

2 a Describe corrosion mechanism of iron. 5+2+3
b Using this, explain the statement 'Corrosion is reverse metallurgy'.
c Mention common methods of corrosion prevention.

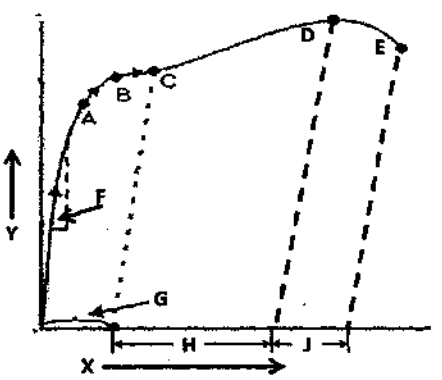
3 a For oil-based paints, discuss the major components and their main functions. 7+3
b What are the desirable properties of an ideal paint?

4 a Describe 5 different types of glass. 5+5+5
b How float glass is manufactured?
c A design studio is on 14th floor of an office tower. Its windows face south-west and a busy street. For the windows, what type of glass will you recommend and why?

5 In a water tank, you are floating in a boat with a big concrete block in your hand. If you drop the block in water, will the water level rise, fall or remain same? You repeat the experiment, but this time the block has many holes drilled in it. The holes extend from one surface to other surface of the block. What will happen to water level now? Logically support your answer. Make necessary assumptions. 10

6 The nest figure shows stress-strain behavior of a typical ductile material. Match points (A,B,C etc) shown in figure with the following alphabetical list of terminologies . 10
One is done for you. Eg. X= strain.

- Creep
- Ductility
- Elastic limit
- Fatigue
- Force per / area
- Fracture point
- Modulus of rupture
- Necking region
- Permanent deformation
- Plastic deformation starts
- Proportional limit
- Strain
- Strain hardening region
- Ultimate tensile strength
- Yielding region
- Young's modulus



7 A room has composite type external wall. Check the wall's thermal performance. Given, 10

- Area of wall = 5m x 3m
- Conduction heat flow rate = 95W.
- Average outside and desirable inside temperatures are 27°C and 22°C respectively.
- Surface resistances of the wall are 0.176 (external) and 0.123 (internal)

Construction detail of the wall:

- 125mm thick outer brick layer (k=1.15)
- 50 mm cavity (resistance =0.176)
- 125mm thick inner brick layer (k=1.15)
- 25mm thick glass wool (k=0.042)
- 12 mm thick plaster (k=0.159)

(k= conductivity)

8 Write Short notes on (any four): 5x4
a Embedded energy of construction materials b Use of flyash in concrete
c Behavior of FRPs under loading d Recycled material in landscaping.
e Timber in earthquake resistant buildings f Waterproofing on walls.