Time: 3 hours **Max. Marks: 80**

Note: 1. Assume suitable data if necessary
2. Figures to the right indicate full marks
3. Question No. 1 is compulsory
4. Solve any **three** out of the remaining **five** questions

Q1.	**Solve any four**	
A	Classify composites based on their fibers and matrix.	**5**
B	Explain plain stress assumption.	**5**
C	Explain failure envelopes.	**5**
D	Define thermal conduction and moisture diffusion.	**5**
E	Explain Pulse Echo method in detail.	**5**
F	Explain the factors which are required to be considered while selecting an appropriate method for repairing a composite structure.	**5**
Q2.		
A	Define viscoelastic properties in detail.	**5**
B	Explain maximum stress failure theory.	**5**
C	Explain laminate in detail.	**10**
Q3.		
A	Elaborate cracks related to laminates.	**5**
B	Define thermal expansion and moisture swelling.	**5**
C	Illustrate Tsai-Wu failure theory.	**10**
Q4.		
A	Elaborate how matrix cracks repaired in composite materials.	**5**
B	Explain ultrasonic through transmission method in detail.	**5**
C	What are the different types of laminates and how are they designated using codes.	**10**
Q5.		
A	List application of composite materials in detail.	**5**
B	Explain the process of damage removal.	**5**
C	Explain radiographic inspection of composites.	**10**
Q 6.		
A	Explain Pultrusion process	**5**
B	Derive Hooke's Law for a two dimensional unidirectional lamina.	**5**
C	Illustrate the different types of generic repair designs.	**10**