Total No. of Questions : 6]

P4446

SEAT No. :

[Total No. of Pages : 2

[5255]-110

M.E. (Civil - Structures)
MECHANICS OF MODERN MATERIALS
(2008 Course) (Elective-IV) (Semester - II)

Time : 4 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) *Answer any two questions from each section.*
2) *Answers to the two sections should be written in separate answer books*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Figures to the right side indicate full marks.*
5) *Use of nonprogrammable pocket Calculator is allowed.*
6) *Assume Suitable data if necessary.*

SECTION-I

Q1) a) State classification of fiber composites useful as construction material.**[8]**

b) Explain Piezoelectric material? And its applications in civil construction.**[8]**

c) Explain classification of materials used in FRC and situations where these class of materials are advantageous. **[9]**

Q2) a) Explain orthotropic, anisotropy of composite material. **[12]**

b) Write compliance and stiffness matrices for plane stress condition, for cross ply laminate material. **[13]**

Q3) a) Explain at least three theories of failure applicable for FRC. **[20]**

b) Explain stress strain behavior of FRC against plain concrete. **[5]**

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SECTION-II

Q4) a) Derive Naviers equation for FRP laminate with all side simply supported. **[9]**

b) Explain and sketch. **[16]**

   i) Orthotropic, Anisotropic laminate.

   ii) Symmetric, balanced laminate.

   iii) Antisymmetric and cross ply laminate.

Q5) a) Explain factors affecting mechanical properties of composite laminate. **[7]**

b) Find coefficient of thermal expansion for a 90 degree orthotropic laminate.

   E_1=60 GPa, $\qquad$ E_2=14 GPa, $\qquad$ E_3=14 GPA

   $\mu_{12} = 0.29 = \mu_{21}$

   α_1=0.9*10^{-6} /C° , α_2=27*10^{-6} / C° **[18]**

Q6) a) Explain manufacturing process of composite. **[8]**

b) List tests carried out for determination of mechanical properties of composite. **[9]**

c) State advances in technology for high performance of composites. **[8]**

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