QP Code: RO20MTECH235 Reg. No | | | | | | | | | | | AR 19

GIET UNIVERSITY, GUNUPUR – 765022

M. Tech (Second Semester Examinations) – October' 2021

MPESE2032 – COMPOSITE STRUCTURES

(Structural Engineering)

Time: 2 hrs Maximum: 50 Marks

(The figures in the right hand margin indicate marks)

PART – A

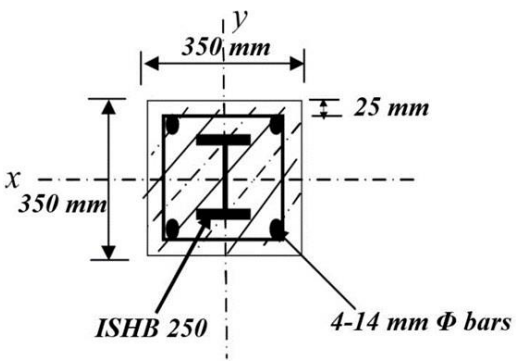
Q.1. Answer ***ALL*** questions (2 x 10 = 20)

a. What is the need for composite material?
b. Write the generalized Hooks Law for composite materials.
c. What is the role of matrix in a composite material?
d. What is laminate and how it is classified?
e. Write the compliance matrix and stiffness matrix for plane stress.
f. List components of stress-strain in a 3-D continuum.
g. What is classical plate theory? Discuss the assumptions.
h. What do you mean by Symmetric laminate and unsymmetric laminate.
i. Write transformation matrix for an angle-ply matrix.
j. Write the various engineering applications of composites.

PART – B **(6 x 5 = 30 Marks)**

Answer ***ANY FIVE*** questions Marks

2. Explain the differences between principal material axis system and reference axis system with neat sketches for each one. Why is it necessary for transformation of stresses and strains from one axis to another? (6)
3. Discuss the important applications of composites in aerospace and automobiles. (6)
4. Derive Navier's solution for finding deflection at centre of a square orthotropic laminate with all edges simply supported. (6)
5. Differentiate between (6)
   i. Thermoplastic and Thermose
   ii. isotropic and composite materials
6. What is the difference between RCC and steel-concrete composite construction? Explain the functions of shear connectors in composite construction. (6)
7. For 30/90/30 three layered laminate subjected to N_X = 120 Mpa-mm thrust, find the resultant stresses along the reference axis for each lamina. E_{11} = 120GPa, E_2 = 10 GPa, thickness of each layer is 0.1 mm, v_{12} = 0.3. (6)
8. Check the adequacy of the concrete encased composite column of dimensions 350 x 350 x 3000 mm with axial load =1200 kN. Bending Moment about X- axis =160 kN-m, Bending Moment about Y- axis=140 kN-m Use M-30 concrete and Fe-415 steel. (6)



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