M.E. First Semester (Mechanical Engg. (Adv. Manu. & Mech. Sys. Desig.)) (New-CGS)

13460 : Computer Aided Design and Engineering : 1 MMD 3

P. Pages : 2 | AW - 3820

Time : Three Hours | Max. Marks : 80

Notes : 1. Answer **three** question from Section A and **three** question from Section B.
2. Due credit will be given to neatness and adequate dimensions.
3. Assume suitable data wherever necessary.
4. Illustrate your answer necessary with the help of neat sketches.
5. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION – A

1. a) How a complex geometry is created by using the concept of solid modeling? Explain with the help of example. **7**

b) Explain the important types of coordinate systems used in the graphics system. **6**

2. a) Explain the meaning of analytical & synthetic curve. **7**

b) What is feature based modeling? Explain the steps used in feature based modeling. **6**

3. a) Describe briefly the description of STEP file highlighting the philosophy of the conversion methodology. **7**

b) What do you understand by C_0, C_1 & C_2 continuity conditions in curves? Explain. **6**

4. a) Discuss the taking suitable examples, the use of various mating conditions in the assembly modeling. **7**

b) Explain the following. **6**

i) Bottom-up assembly.

ii) Top-down assembly.

Also write the advantages & disadvantages of its.

5. a) State & describe the various assembly analysis activities provided by CAD systems. **7**

b) Explain in briefly the B. rep modeling & parametric modeling. **7**

SECTION – B

6. a) Explain the general structure of a FE Analysis procedure with flow diagram. **7**

b) What do you mean by shape function? What are the characteristics of a shape function? **6**

7. a) Explain following terms. **7**

   i) Discretization of element.

   ii) Nodes.

   ii) Degree of freedom.

   b) Describe by taking suitable example the three phases of FEA using a commercial FEA software. **6**

8. Derive the shape function & stiffness matrix equation for the CST element. Let take nodal variables be u_1, u_2, u_3, v_1, v_2 & v_3. **13**

9. Derive the stiffness matrix equation for 2-D truss element using potential energy minimization method. **14**

10. a) Discuss the desirable features of FEA packages. **7**

    b) Explain the various applications of a FEM in heat transfer analysis in engineering with example. **6**

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