Registration no:

M.TECH

MDPE108

1st Sem M.Tech Regular/ Back Examination – 2015-16
SUBJECT NAME: MATERIAL SELECTION IN MECHANICAL DESIGN
BRANCH(S): MECHANICAL SYSTEM DESIGN
Time: 3 Hours
Max marks: 70
Q.CODE:T875
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1   Answer the following questions: (2 x 10)
   a) Define the shape factor for elastic bending of beams.
   b) Draw the stress-strain diagram of mild steel.
   c) What do you mean by fixed parameters and free parameters in mechanical design? Explain with an example.
   d) A tube has a radius r=10mm and a wall thickness t=1mm.How much stiffer is it in bending than a solid cylinder of the same mass per unit length?
   e) What is a sandwich structure?
   f) State the application of leaf spring and how it is differ from helical spring?
   g) What do you mean by the fracture toughness?
   h) Young's modulus for cupper is 124 Gpa its Poisson's ratio is 0.345.What is its shear modulus?
   i) what are the advantages of CES software.
   j) what is "A+B+configuration +scale" method?

Q2 a) Discuss mechanical properties of materials with necessary diagrams and graphs   (5)
    b) What do you mean by toughness? Differentiate between charpy and izod test.   (5)
Q3 a) Classify different manufacturing process and write short notes on each process with   (10)
       suitable diagrams.

Q4   What do you mean by mechanical design? Draw the design flow chart and give brief   (10)
        description about   each stage with an example.

Q5 a) Give brief description about finishing processes.   (5)
    b) What are the design requirements for a light pressure vessel?   (5)

Q6 a) Write the function and design requirements of a heat exchanger with neat diagram   (5)
    b) Discuss about different joining processes.   (5)
Q7 a) Explain different type of heat treatment processes to improve the property of   (5)
       materials.
    b) Do the case study for forming a fan.   (5)
Q8   Write short notes on any two   (5 x 2)
   a) Strength and Density chart

   b) Fracture toughness and modulus chart
   c) Case study of flywheel
   d) Design requirements of connecting rod of IC engine