Registration No: **M.TECH**

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M.TECH 1ST SEMESTER SUPPLE EXAMINATIONS, DECEMBER 2018
MATERIAL SELECTION IN MECHANICAL DESIGN
Branch: MD, Subject Code:MMDPE1054
(Regulations 2017)

Time: 3 Hours   **Max Marks : 70**   **Question Code: SD18002089**

PART-A (10 X 2=20 Marks)

1. Answer the following questions.
   a. What do you mean by toughness? Differentiate between charpy and izod test?
   b. Define the shape factor for elastic bending of beams.
   c. What do you mean by fixed parameters and free parameters in mechanical design? Explain with an example.
   d. What do you mean by optimization of selection?
   e. Briefly describe the forming limit diagram.
   f. Describe the mass bar-chart.
   g. What are the advantages of CES software?
   h. What do you mean by the fracture toughness?
   i. What is a sandwich structure?
   j. A heat exchanger has an exchange area of $A=0.5$ m^2. It passes heat from a fluid at temperature at $T1=100^0C$ to a second fluid at $T2=20^0c$. the exchange wall is made of copper sheet of thermal conductivity 350W/m.k with thickness 2 mm. How much energy flows from one fluid to the other in one hour?

PART-B (5 X 10=50 Marks)
Answer any five questions from the following.

2.a)Classify different manufacturing process. [5]
  b) Write short notes on each manufacturing process with suitable diagrams. [5]

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

4.a) Explain the lattice family configuration of hybrid type- 3, material. [5]
  b)Explain types of heat treatment processes to improve the property of materials. [5]

5.a) Describe briefly the failure of a beam and shaft. How would you design a shaft? [5]
  b) Explain resign requirements of a connecting rod used in IC engine. [5]

6.a) Discuss the modulus- density chart, the strength density chart, modulus-strength chart and [5]
    fracture toughness-modulus chart in detail? [5]
  b) Write the function and design requirements of a heat exchanger with neat diagram.

[5]

7.a) Write the various steps involved in machine design. [5]
  b) How do atoms assemble into solid structures?

8 Write short notes on
  a) Different processes of shaping, joining and finishing. [5]
  b) Stress-strain curve for ceramic material and mild steel. [5]

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