Registration No: | | | | | | | | | | |

Total Number of Pages: 1

M.TECH
MDPE108

1st Semester Regular/Back Examination – 2014
MATERIAL SELECTION IN MECHANICAL DESIGN
BRANCH(S): MACHINE DESIGN,MECHANICAL SYSTEM DESIGN

Time: 3 Hours
Max Marks: 70

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) What are the advantages of CES software.
b) What do you mean by shape efficiency?
c) What is the effect of performance indices on material selection?
d) Young's modulus for cupper is 124 Gpa;its Poisson's ratio is 0.345.What is its shear modulus?
e) Which materials are both good thermal conductors and good electrical insulators?
f) What is "A+B+configuration +scale" method?
g) What are multiple constraints in material selection?
h) How would you find out were rate of a material?
i) State different electrical properties of a material.
j) A heat exchanger has an exchange area of $A=0.5m^2$. It passes heat from a fluid at temperature at $T_1=100^o$ c to a second fluid at $T_2=20^o$ c.The exchange wall is made of copper sheet of thermal conductivity 350W/m.k with thickness 2mm.How much energy flows from one fluid to the other in one hour.

Q2 What do you mean by mechanical design? Draw the design flow chart and give brief description about each stage. (10)

Q3 a) Discuss mechanical properties of materials with necessary diagrams and graphs. (4)
b) Do the case study of pressure vessel. (6)

Q4 a) Draw the stress-strain curve for ceramic material and explain how it is differ from Mild steel. (5)
b) What do you mean by hardness? Write short notes on Rockwell and Brinell hardness. (5)

Q5 Classify different manufacturing process and write short notes on each process with suitable diagrams. (10)

Q6 a) Give brief description about finishing processes. (5)
b) Explain different type of heat treatment processes to improve the property of materials. (5)

Q7 a) What are the design requirements for manufacturing a con-rod for an engine? (5)
b) Write the function and design requirements of a heat exchanger with neat diagram (5)

Q8 What is the use of material property chart? Give brief description about the modulus-density chart, strength- density chart and fracture toughness-modulus chart. (10)