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

Total Number of Pages: 01 **M.TECH**

P2MDCC09

2nd Semester Regular Examination- 2017

Material Selection in Mechanical Design

BRANCH: MACHINE DESIGN, MECH. SYSTEM DESIGN, SYSTEM DESIGN

Time: 3 Hours

Max Marks: 100

Q.CODE:Z827

Answer Question No.1 which is compulsory and any FOUR from the rest.

The figures in the right hand margin indicate marks.

Q1 Answer the following questions: ***Short answer type*** **(2 x 10)**

a) What do you mean by toughness? Differentiate between charpy and izod test.

b) What do you mean by fixed parameters and free parameters in mechanical design? Explain with an example.

c) Young's modulus for cupper is 124 Gpa and Poisson's ratio is 0.345.What is its shear modulus?

d) What are the different joining processes?

e) what is "A+B+configuration +scale" method?

f) What is a sandwich structure?

g) What is metal matrix composite? What are their advantages?

h) Define the shape factor for elastic bending of beams.

i) State the application of leaf spring and how it is differ from helical spring?

j) What are the advantages of CES software?

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

b) What are the design requirements for a light pressure vessel? **(10)**

Q3 **a)** Classify different manufacturing process and write short notes on each process with suitable diagrams. **(10)**

b) Explain different type of heat treatment processes to improve the property of materials. **(10)**

Q4 **a)** Discuss mechanical properties of materials with necessary diagrams and graphs. **(10)**

b) Do the Case study of flywheel. **(10)**

Q5 **a)** Write the function and design requirements of a heat exchanger with neat diagram. **(10)**

b) Do the case study for forming a fan. **(10)**

Q6 **a)** Describe briefly the failure of a beam and shaft. How would you design a shaft? **(10)**

b) Give brief description about finishing processes. **(10)**

Q7 **a)** Write short notes on the followings: **(10)**
Strength and Density chart
Fracture toughness and modulus chart

b) What are the design requirements of connecting rod of IC engine? With suitable example give brief description. **(10)**