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

Total Number of Pages : 02 **B.Tech**

PCMT4302

5th Semester Back Examination 2018-19

DEFORMATION BEHAVIOUR OF MATERIALS

BRANCH : METTA, MME

Time : 3 Hours

Max Marks : 70

Q. CODE : E617

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) Write down the expression for von Mises yield criterion?

b) Define super plasticity?

c) What do you understand by grain boundary strengthening?

d) What is Burgers vector in context of dislocations?

e) What is the importance of equations of compatibility?

f) Give an example of isotropic and an anisotropic property?

g) Why are kink bands formed?

h) Draw a stress-strain plot of a rigid ideal plastic material?

i) Define Poisons ratio?

j) Write down the expression for relation between engineering stress and true stress.

Q2 **a)** Explain how the origin of yield point phenomenon in mild steel? **(5)**

b) Why Luder bands are not formed in aluminium or titanium alloys? **(5)**

Q3 **a)** Derive the expression for Schmid's law? **(5)**

b) Explain Bauschinger effect with suitable diagram? **(5)**

Q4 **a)** How is deformation in polycrystalline metal different from a ceramic? **(5)**

b) Explain the super lattice dislocation in intermetallic. **(5)**

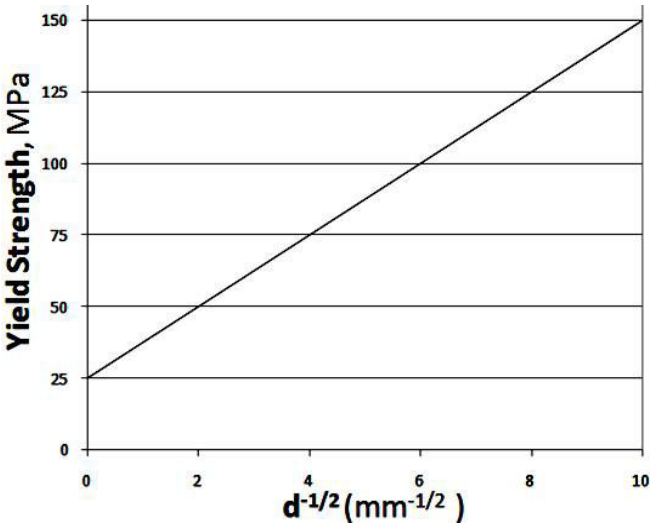
Q5 **a)** What are twins and explain the types of twins observed in metals? **(5)**

b) Explain the stress-strain behavior of metals with respect to their crystal structure? **(5)**

Q6 **a)** Explain Peierls stress and its implication? **(5)**

b) Explain isostress and isostrain analysis in materials? **(5)**

Q7 Name the strengthening mechanisms in metals and alloys? **(10)**
Using the diagram below, explain how can you develop a material having yield strength of at least 1 GPa? [5]



Q8 **Write short answer on any TWO :** **(5 x 2)**

a) Frank-Read source
b) Solid solution strengthening
c) Strain rate sensitivity
d) Viscoelastic deformation