# Material Science IAT 1 Sep 2020

Total points 50/50

MS IAT 1 Sep 2020

The respondent's email address (**shreyas.p@cmrit.ac.in**) was recorded on submission of this form.

✓ A unit cell is the _____ repitetive structure of a crystal structure * 2/2

- ○ biggest
- ○ highest
- ◉ smallest ✓
- ○ weakest

✓ Derive the value of Atomic Packing Factor for a Face Centered Cubic Crystal Structure. * 10/10

- ○ 68%
- ○ 62%
- ◉ 74% ✓
- ○ 72%

✓ Which among the following is not a point defect * 2/2

- (●) edge dislocation ✓
- ( ) vacancy
- ( ) self interstetial
- ( ) substitutional

✓ Fick's first law of diffusion defines a * 2/2

- ( ) non steady state process
- (●) steady state process ✓
- ( ) all of the above
- ( ) non of the above

✓ Which among the following is a line defect * 2/2

- ( ) Surface
- ( ) vacancy
- (●) screw dislocation ✓
- ( ) grain boundary

Name *

Shreyas

✓ A plate of iron is exposed to a carburizing atmosphere on one side and a decarburizing atmosphere on the other side at 700 degree celsius. If a condition of steady state is achieved, calculate the diffusion flux of carbon through the plate if the concentrations of carbon at positions of 5 and 10 mm beneath the carburizing surface are 1.2 and 0.8 kg/m^3 respectively. Assume a diffusion coefficient of 3X10^-11 m^2/s at this temperature. * 10/10

- (●) 2.4X10^-9 kg/m^2 s ✓
- ( ) 2.4X10^9 kg/m^2 s
- ( ) 3.2X10^9 kg/m^2 s
- ( ) 4.2X10^-9 kg/m^2 s

✓ Derive the value of Atomic Packing Factor for a Body Centered Cubic Crystal Structure. * 10/10

- (●) 68% ✓
- ( ) 62%
- ( ) 74%
- ( ) 72%

✓ A crystal lattice is a _____ array of atoms * 2/2

- ○ 2-D
- ◉ 3-D ✓
- ○ 1-D
- ○ 4-D

✓ Calculate the diffusion rate of carbon in iron at 700 degree celsius assuming Q = 153.2kJ/mol, Do = 4.9X10^-5 m^2/s and R = 8.314 J/mol.K * 10/10

- ○ 2.92X10^-16 m^2/s
- ○ 2.92X10^-14 m^2/s
- ◉ 2.92X10^-13 m^2/s ✓
- ○ 2.92X10^-17 m^2/s

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