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NPTEL

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Courses » Creep deformation of materials

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Unit 3 - Week 1

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Course outline

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Week 1

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Assignment 1

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment. **Due on 2019-02-13, 23:59 IS**

1) What is the flow stress value at plastic strain of 0.2 if the flow stress at 0.1 and 0.15 plastic strains is 100 and 110 MPa respectively? **1 point**

- 132 MPa
- 118 MPa
- 122 MPa
- 147 MPa

No, the answer is incorrect.

Score: 0

Accepted Answers:

118 MPa

2) An example of a short range and a long range barrier is **1 point**

- Solute atoms are long range barriers and stress fields of coherent precipitates are short range barriers
- Stress fields of coherent precipitates are long range barriers and stress fields of other dislocations are short range barriers
- Stress fields of other dislocations are long range barriers and large incoherent precipitates are short range barriers
- Large incoherent precipitates are long range barriers and stress fields of coherent precipitates are short range barriers

No, the answer is incorrect.

Score: 0

Accepted Answers:

Large incoherent precipitates are long range barriers and stress fields of coherent precipitates are short range barriers

3) Edge dislocations have their Burgers vector perpendicular to the dislocation line **1 point**

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Funded by

deformation - Part 2

Creep and different factors that influence creep deformation - Part 3

Creep and different factors that influence creep deformation - Part 4

Creep and different factors that influence creep deformation - Part 5

Creep and different factors that influence creep deformation - Part 6

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ce De

True

4) The Burgers vector of Copper which has a FCC lattice structure, if the atomic radius of copper is 1.28 Angstroms, is **1 point**

3.62 Angstroms

6.27 Angstroms

2.56 Angstroms

5.12 Angstroms

No, the answer is incorrect.
Score: 0

Accepted Answers:
2.56 Angstroms

5) Point defects generally interact with screw dislocation because screw dislocations do not have a hydrostatic component of stress field. **1 point**

True

False

No, the answer is incorrect.
Score: 0

Accepted Answers:
False

6) Irradiation with neutrons generally leads to increase in the creep rate of deformation. **1 point**

True

False

No, the answer is incorrect.
Score: 0

Accepted Answers:
True

7) Dislocations of opposite sign attract each other. **1 point**

True

False

No, the answer is incorrect.
Score: 0

Accepted Answers:
True

8) A steel sample was being tested in tension at a strain rate of $10^{-3}/s$. How much time would it take approximately to introduce a plastic strain of 0.3? **1 point**

300 minutes

500 seconds


5 minutes


0.3 minutes


No, the answer is incorrect.
Score: 0


Accepted Answers:
5 minutes


9) The difference between jogs and kinks in dislocations is that **1 point**











- Jogs are breaks that take the dislocation out of the slip plane and Kinks are breaks that exist within the slip plane
- Jogs are breaks which are larger in size than Kinks
- Jogs are breaks in dislocations while Kinks are not.
- Jogs are disconnected with the dislocation whereas Kinks are not.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Jogs are breaks that take the dislocation out of the slip plane and Kinks are breaks that exist within the slip plane



10) If the force per unit length existing between two screw dislocations is given by

1 point

$$F = \frac{Gb^2}{2\pi r}$$

Where G is the shear modulus, b is the Burgers vector and r is the spacing between the dislocations then determine the force existing between two screw dislocations of opposite sign in copper if both the dislocations are 40 μm long and separated by a distance of 120 nm. The shear modulus of copper is 40 GPa and the atomic radius of the FCC copper is 0.128 nm.

- 3.47 x 10⁻¹² N
- 1.4 x 10⁻¹⁶ N
- 1.4 x 10⁻⁷ N
- 3.47 x 10⁻²⁵ N

No, the answer is incorrect.

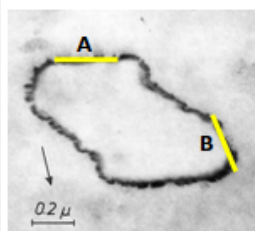
Score: 0

Accepted Answers:

1.4 x 10⁻⁷ N

11) Below is the TEM micrograph of a dislocation loop. If the arrow shows the direction of the Burgers vector, then please describe the nature of the dislocation segments A and B

1 point



- A has an edge character and B has a screw character
- A has a screw character and B has an edge character
- None of the above

No, the answer is incorrect.

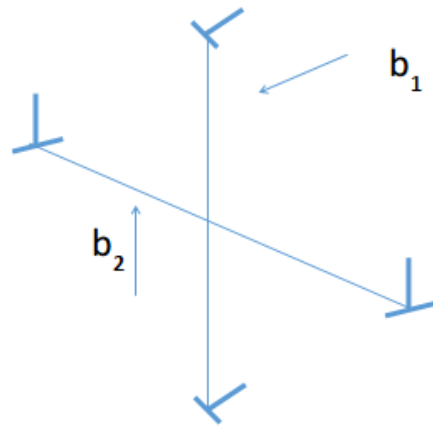
Score: 0

Accepted Answers:

A has an edge character and B has a screw character

12) In the figure below are shown two dislocations "1" and "2" with Burgers vectors b1 and b2

respectively. Between dislocation 1 and dislocation 2 which one will form a break?



No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 2

1 point



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