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NPTEL

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Unit 3 - Week 2

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Course outline

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Week 1

Week 2

- Weldability of Work Hardenable & Precipitation Strengthened Metals

- Weldability of Precipitation Strengthened Metals

- Weldability of Metals Strengthened by Grain Refinement, dispersion Hardening and Transformation Hardening

- Weldability of Transformation Hardening Metals

- Weldability of Metals: Combination of Strengthening Mechanisms

Assignment 2

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.   **Due on 2019-03-13, 23:59 IST.**

1) According to Hall-Petch equation (where σy is yield strength and d is grain size)   *1 point*

- ○ $\sigma y \propto 1/d$
- ○ $\sigma y \propto 1/\sqrt{d}$
- ○ $\sigma y \propto \sqrt[3]{(1/d)}$
- ○ $\sigma y \propto d$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\sigma y \propto 1/\sqrt{d}$

2) Weld thermal cycle shows relationship between   *1 point*

- ○ Temperature and location
- ○ Temperature and time
- ○ Temperature and distance
- ○ Temperature and heat input

No, the answer is incorrect.
Score: 0

Accepted Answers:
Temperature and time

3) Main cause of increase in strength by precipitation hardening is   *1 point*

- ○ Barrier to dislocation movement
- ○ Increase in number of dislocation
- ○ Easy dislocation movement
- ○ Few number of dislocations

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○ Ageing, solutionizing then quenching

○ Solutionizing, quenching then ageing

○ Ageing, quenching then solutionizing

○ Solutionizing, ageing then quenching

No, the answer is incorrect.
Score: 0

Accepted Answers:
Solutionizing, quenching then ageing

5) Dispersion strengthened metals if welded by fusion welding then commonly encountered   **1 point**
problems include
(i) Thermal damage of reinforcing agent
(ii) Wetting issue
(iii) Absence of metallurgical bonding

○ I only

○ I and II

○ II and III

○ All of above

No, the answer is incorrect.
Score: 0

Accepted Answers:
All of above

6) Decreases in hardness and strength in weld and heat affected zone of precipitate hardened **1 point**
metals is attributed to

○ Dissolution of the precipitates

○ Recombining of precipitates

○ Growth of the precipitates

○ Softening of precipitates

No, the answer is incorrect.
Score: 0

Accepted Answers:
Dissolution of the precipitates

7) Characteristic difference of weld thermal cycle over heat treatment cycle is   **1 point**
(i) High peak temperature
(ii) Slow heating and cooling rate
(iii) High heating and cooling rate
(iv) Shorter high temperature retention period

○ I and II

○ I, II and IV

○ I,III and IV

○ All of above

No, the answer is incorrect.
Score: 0

Accepted Answers:
I,III and IV

8) Austenitic and Hadfield steels are used in cavitation prone region because of   **1 point**

○ Low cost

○ High corrosion resistance

○ Conversion of Austenite into Martensite due to deformation induced transformations

○ High strength

No, the answer is incorrect.
Score: 0

Accepted Answers:
Conversion of Austenite into Martensite due to deformation induced transformations

9) Among all metal strengthening approaches, higher yield strength will be realized in case of **1 point**

○ Solid solution strengthening Al alloy

○ Work strengthening Al alloy

○ Precipitation strengthening Al alloy

○ All of above

No, the answer is incorrect.
Score: 0

Accepted Answers:
Precipitation strengthening Al alloy

10) Loss of toughness in weld and heat affected zone called as   **1 point**

○ Reheat cracking

○ Weld distortion

○ Weld decay

○ Embrittlement

No, the answer is incorrect.
Score: 0

Accepted Answers:
Embrittlement

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