Week-09: Assignment-09

The due date for submitting this assignment has passed.

Due on 2021-09-29, 23:59 IST.

As per our records you have not submitted this assignment.

1) For nanomaterials (grain size< 10-50 nm), which of the following is true *1 point*

- Frank–Reed sources for dislocation generation is impossible
- Frank–Reed sources for dislocation generation is easier
- The grain diameter is greater than Burger's vector of the dislocation
- None of above

No, the answer is incorrect.
Score: 0
Accepted Answers:
Frank–Reed sources for dislocation generation is impossible

2) For inverse Hall-Petch relationship, which of the following is true *1 point*

- Hardness increases with the decrease of grain size (below~ 10 nm)
- Hardness decreases with the increase of grain size (above~ 100 nm)
- Hardness decreases with the decrease of grain size (below~ 10 nm)
- Independent on grain size

No, the answer is incorrect.
Score: 0
Accepted Answers:
Hardness decreases with the decrease of grain size (below~ 10 nm)

3) The melting temperature of embedded nanoparticles should have higher than bulk melting temperature when interfacial energy (γ) (S= Solid, L= Liquid, M= Matrix) *1 point*

- $\gamma_{SM} < \gamma_{LM}$
- $\gamma_{SM} > \gamma_{LM}$
- $\gamma_{SM} = \gamma_{LM}$
- None of above

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\gamma_{SM} < \gamma_{LM}$

4) In the case of the super-hydrophobic surface of nanomaterials, contact angle (θ) *1 point*

- $0<\theta<90°$
- $\theta>120°$
- $\theta<120°$
- $\theta=0°$

No, the answer is incorrect.
Score: 0
Accepted Answers:
θ>120°

5) Thermal conduction in Diamond occurs *1 point*

- Only through free electrons
- Only through lattice vibrations
- Both free electrons and lattice vibrations
- Neither free electrons nor lattice vibrations

No, the answer is incorrect.
Score: 0
Accepted Answers:
Only through lattice vibrations

6) Which one is the wrong statement: Specific heat of a material_____ *1 point*

- Constant for a material
- Heat capacity per unit mass
- Extrinsic property
- Has units as J/kg-K.

No, the answer is incorrect.
Score: 0
Accepted Answers:
Heat capacity per unit mass

7) What is energy at the given level nx = ny = nz = 1 for free electrons in a solid cube of 10 mm×10 mm ×10 mm? *1 point*

- 1.81× 10–33 J
- 2.1× 10–33 J
- 6.6× 10–33 J
- 5.3× 10–33 J

No, the answer is incorrect.
Score: 0
Accepted Answers:
1.81× 10–33 J

8) Based on Fermi-Dirac statistics, at temperatures more than 0 K, the probability of occupation at Fermi energy (Ef) is: *1 point*

- 0.5
- 0
- 0.75
- 1

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.5

9) At 0 K, the probability of finding an electron at energy level E is unity, when_____ *1 point*

- E= Ef
- E < Ef
- E > Ef
- None of above

No, the answer is incorrect.
Score: 0
Accepted Answers:
E < Ef

10) Forbidden energy band gap of semiconductor material measured on E-k diagram is the difference between: *1 point*

- Global minimum of conduction band and global maximum of valence band
- Maximum of conduction energy band and minimum of valence energy band
- Minimum of conduction energy band and maximum of valence energy band for given 'k'
- Maximum of conduction energy band and minimum of valence energy band for given 'E'

No, the answer is incorrect.
Score: 0
Accepted Answers:
Global minimum of conduction band and global maximum of valence band