Unit 7 - Week 6

Assignment 6

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-09-11, 23:59 IST.

Note: More than one answer may be right. Partial marks awarded if only some of the correct answers are selected. No marks awarded if even one of the wrong answers is selected:

1) If the system is under thermal equilibrium in case of Fermi-Dirac distribution statistics, it assumes *1 point*

- [ ] System has constant total energy.
- [ ] System has constant number of particles.
- [ ] Change in total energy and total number of particles remains zero.
- [ ] System has varying energy but constant temperature.

No, the answer is incorrect.
Score: 0
Accepted Answers:
System has constant total energy.
System has constant number of particles.
Change in total energy and total number of particles remains zero.

2) If total energy of a closed system is constant that means *1 point*

- ( ) Number of particles keeps on increasing.
- ( ) Product of total number of particles at each energy level remains constant.
- ( ) Change in energy will be zero.
- ( ) System is being heated steadily.

No, the answer is incorrect.
Score: 0
Accepted Answers:
Change in energy will be zero.

3) Fermi-Dirac distribution expression is $f(E_i) =$ *1 point*

- ( ) $\frac{1}{1 - e^{(E - E_f/k_BT)}}$
- ( ) $\frac{1}{1 - e^{(E + E_f/k_BT)}}$
- ( ) $\frac{1}{1 + e^{(E - E_f/k_BT)}}$
- ( ) $\frac{1}{1 + e^{(E + E_f/k_BT)}}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\frac{1}{1 + e^{(E - E_f/k_BT)}}$

4) In Fermi-Dirac distribution function, $f(E_i) = 1$, when *1 point*

- [ ] $E << E_f$ and $T \to 0$
- [ ] $E >> E_f$ and $T \to 0$
- [ ] $E < E_f$ and $T = 0\ K$
- [ ] $E > E_f$ and $T = 0\ K$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$E << E_f$ and $T \to 0$
$E < E_f$ and $T = 0\ K$

5) In Fermi-Dirac distribution function, $f(E_i) = 0$, when *1 point*

- [ ] $E << E_f$ and $T \to 0$
- [ ] $E >> E_f$ and $T \to 0$
- [ ] $E < E_f$ and $T = 0\ K$
- [ ] $E > E_f$ and $T = 0\ K$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$E >> E_f$ and $T \to 0$
$E > E_f$ and $T = 0\ K$

6) Fermi-Dirac distribution function shows *1 point*

- [ ] Abrupt change at 0 K.
- [ ] No abrupt change at 0 K.
- [ ] More gradual change at higher and higher temperatures.
- [ ] Monotonic increase irrespective of temperatures.

No, the answer is incorrect.
Score: 0
Accepted Answers:
Abrupt change at 0 K.
More gradual change at higher and higher temperatures.

7) The highest energy level in Fermi-Dirac distribution is *1 point*

- [ ] Occupied by a collection of fermion at 0 K.
- [ ] Fully occupied at 0 K.
- [ ] Known as Fermi energy.
- [ ] Is not fully occupied at T > 0 K

No, the answer is incorrect.
Score: 0
Accepted Answers:
Occupied by a collection of fermion at 0 K.
Fully occupied at 0 K.
Known as Fermi energy.
Is not fully occupied at T > 0 K

8) The probability of the occupancy of the states by fermions in a solid at a temperature greater than absolute zero is *1 point*

- ( ) $f(E_i) = 1$ always
- ( ) $f(E_i) = 0$ always
- ( ) $f(E_i) < 1$; $E_i < E_f$ for some values of energy
  $f(E_i) > 0$; $E_i > E_f$ for some values of energy
- ( ) $f(E_i) > 1$; $E_i < E_f$
  $f(E_i) < 0$; $E_i > E_f$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$f(E_i) < 1$; $E_i < E_f$ *for some values of energy*
$f(E_i) > 0$; $E_i > E_f$ *for some values of energy*

9) Fermi-Dirac function $f(E_i)$ become 1/2 when *1 point*

- ( ) $T \to 0\ K$.
- ( ) $E_i = E_f$ *at* $0\ K$
- ( ) $T > 0\ K$ *and* $E_i = E_f$
- ( ) $T > 0\ K$ *and* $E_i \neq E_f$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$T > 0\ K$ *and* $E_i = E_f$

10) Undetermined multiplier **α** and **β** in the Fermi-Dirac distribution are the function of _____ and _____ respectively. *1 point*

- ( ) Fermi energy, Temperature; Temperature
- ( ) Temperature and Fermi energy; Fermi energy
- ( ) Fermi energy; Temperature
- ( ) Temperature; Fermi energy

No, the answer is incorrect.
Score: 0
Accepted Answers:
Fermi energy, Temperature; Temperature