

جامعة سوهاج كلية العلوم

**Midterm exam. Superconductivity (2018 )**

**4th Year physics Students of Faculty of Science**

**20 marks (1/point) الاسم:**

**Complete the sentences:- choose 10 point**

1. **The BCS theory of Superconductivity states that bound photons have slightly lower energy, which prevents lattice …..…..and thus ……….. resistance**
2. **The order parameter is usually normalized such that |ψ(r)|2 gives the number density of ……………… at a point.**
3. **a vortex state with normal cores surrounded by superconducting regions are exist in**[**…………**](http://hyperphysics.phy-astr.gsu.edu/hbase/Solids/scond.html)**superconductors.**
4. **In the absence of magnetic field, ψ = ……at T< Tc ψ= ….. at T ≥ Tc**
5. **In momentum space, the variations of | ψ| are ………..to variations of the energy gap Δ.**
6. **The order parameter considered as the …………. of a single Cooper pair in conventional superconductor but in unconventional superconductors is ………. with the wave function of a single.**
7. **The coherence length ζGL (T) defines variations of …………. of the superconducting condensate whilst the pair size ζ is related to the …………. of a Cooper pair.**
8. **In conventional superconductors, at T = 0 ζGL (T) ….. ζ but at**
9. **< T < Tc ζGL (T) ….. ζ.**
10. **The superconducting state can be destroyed by a ………., …………, and by ………….**
11. **The phase stiffness Ωph, is the energy measuring the ability of the superconducting state to carry ………...**
12. **Josephson measured ……….. flow during tunneling of Cooper pairs through a thin insulating barrier at ……… Voltage.**



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**Complete the sentences:- choose 10 point**

1. **The BCS theory of Superconductivity states that bound photons have slightly lower energy, which prevents lattice collisions and thus eliminates resistance**
2. **The order parameter is usually normalized such that |ψ(r)|2 gives the number density of Cooper pairs at a point.**
3. **a vortex state with normal cores surrounded by superconducting regions are exist in**[**Type II**](http://hyperphysics.phy-astr.gsu.edu/hbase/Solids/scond.html)**superconductors.**
4. **In the absence of magnetic field, ψ = ……at T< Tc ψ= ….. at**

**T ≥ Tc**

1. **In momentum space, the variations of | ψ| are proportional**

**to variations of the energy gap Δ.**

1. **The order parameter considered as the wave-function of a single Cooper pair in conventional superconductor but in unconventional superconductors are independent with the wave function of a single.**
2. **The coherence length ζGL (T) defines variations of the order parameter of the superconducting condensate whilst the pair size ζ is related to the wavefunction of a Cooper pair.**
3. **In conventional superconductors, at T = 0 ζGL (T) ….. ζ but at**
4. **< T < Tc ζGL (T) ….. ζ.**
5. **The superconducting state can be destroyed by a magnetic field, dc electrical current, and by temperature.**
6. **The phase stiffness Ωph, is the energy measuring the ability of the superconducting state to carry supercurrent.**
7. **Josephson measured the current flow during tunneling of Cooper pairs through a thin insulating barrier at zero Voltage.**