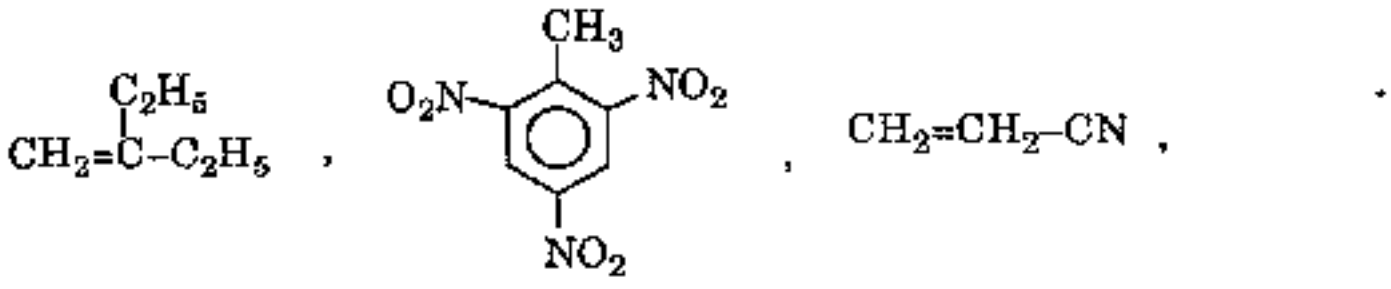
5. The ground-state electron configuration of oxygen atom is _____ and the ground state electron configuration of O_2 molecule is _____ .

6. Sketch the shape of 2p atomic orbital and π^*_{2p} molecular orbital.

7. Name the following compounds:



$CH_2{=}CH{-}CN$,

$CuBr$, $NaHSO_3$

8. Write the chemical formular for the following compound:
styrene, Ribose, tetraethyllead, perchloric acid, Nitric oxide.

9. A catalyst is a _____ that can increase the _____ of a reaction by decrease its _____ energy _____ being itself consumed.

10. Among all elements, _____ atom has the largest atomic radius and _____ atom has the smallest radius. Among all atomic ions _____ ion has the largest radius while _____ ion has the smallest radius.

每題10分，僅量以英文作答

1. Schrodinger equation for an electron has a form of _____ . In this equation ψ is _____ , E is _____ . And ψ^2 has a physical meaning of _____ .

2. The radioactive carbon-14 isotope decays according to the equation $^{14}_{6}C \longrightarrow {}^{14}_{7}F +$ _____ . This decay obeys _____ -order kinetics with a half-life of 5730 Yr. The rate constant of this decay is _____ . The activity of ^{14}C in live bones is 15.3 dpm/g of carbon. A fossil bone with an activity of 3.8 dpm/g should belong to an animal died _____ years ago.

3. A sample has a reversible phase transition of $P_A \rightarrow P_B$ on raising the temperature to T_t with an endothermic change ΔH. ΔS_{surr} and ΔS_{sys} of this transition at T_t may be estimated as _____ and _____ respectively. ΔS_{univ} has a _____ value for the phase transition at $T > T_t$ a _____ value at $T = T_t$ and a _____ value at $T<T_t$.

4. According to the Table below, ΔH°, ΔS° and ΔG° of the reaction $CaCO_3 \rightleftharpoons CaO + CO_2$ are _____ , _____ and _____ respectively. The vapor pressure of CO_2 (P_{CO_2}) at 298 K should be _____ . On assuming ΔH° and ΔS° do not alter with T, then P_{CO_2} will become 1 atm at T = _____ K.

Compound	$CaCO_3$	CaO	CO_2
ΔH_f°/kJ mol^{-1}	-1207	-636	-394
S°/J·K^{-1}mol^{-1}	93	40	214