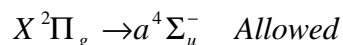
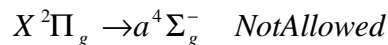
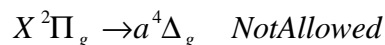
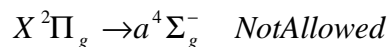
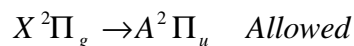
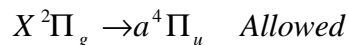


SOLUTION MANUAL FOR HOMEWORK # 11

Q. 15.4)



Q.15.5) a) H_2 : B.O. = $2/2 = 1$

b) O_2 : B.O. = $(10-6)/2 = 2$

c) F_2 : B.O. = $(10-8)/2 = 1$

d) NO : B.O. = $(10-5)/2 = 2.5$

NO will have a higher intensity for vibrational peak for $n=0$? $n'=1$ than that of $n=0$? $n'=0$.

P. 17.3) $H_2C=C=CH_2$: Allene

1) Linear : No

2) C_n axis: Yes (C_2)

3) More than one rotation axis: Yes (2)

4) More than one C_2 axis, $n > 2$: No

5) Mirror Plane : Yes

6) Mirror plane perpendicular to C_2 axis : No ? D_{2d}

P.17. 16)

C_{3v}	E	$2C_3$	$3\sigma_v$
A_1	1	1	1
A_2	1	1	-1
E	2	-1	0

E	$2C_3$	$3\sigma_v$
5	2	-1

$$n_{A_1} = \frac{(5*1*1) + (2*(-1)*1) + (1*1*1)}{4} = 1$$

$$n_{A_2} = \frac{(5*1*1) + (2*(-1)*(-1)) + (1*1*1)}{4} = 2 ? \quad \mathbf{G_{reducible} = A_1 + 2A_2 + E}$$

$$n_E = \frac{(5*2*1) + (2*(-1)*3) + (1*1*0)}{4} = 1$$

P.17.19)

- a) # of vibrational modes = $3 \times 4 - 6 = 6$
- b) A_1 & E are IR active, all of them
- c) E modes are degenerate
- d) All of them Raman active
- e) E modes are degenerate in energy
- f) all of them, 6.