BT 301 MIDSEM

Indian Institute of Technology Guwahati

(Supplementary Answer Sheet)

Name of Student :		Roll No.	
Course No.		Signature of the student :	

1- Absorption Spectroscopy

2. Circular Dichroism

3. Fluorescence Spectroscopy

4. $\sqrt{\langle r^2 \rangle} = 5 \times \sqrt{100} = 50 \text{Å}$

5. f) Val

6. α - helix

7. 50 nm

8. $\underset{\sim}{m} = \frac{e}{2mc} (\underset{\sim}{r} \times \underset{\sim}{p})$

e - charge of e^-

m - mass " "

9. D) $10^{10} M^{-1} s^{-1}$

10. a) CFD b) TAC

11. Electronic Absorption > Internal Conversion > Solvent Relaxation > Fluorescence > Phosphorescence.

12. $$[\theta] = \frac{100\,\theta}{cl} = \frac{100 \times 2.303 (A_L - A_R)}{4\pi \cdot c \cdot l}$$

$$= \frac{100 \times 2.303 \times \Delta\varepsilon \cdot c \cdot l \cdot 180}{4\pi \cdot c \cdot l}$$

$$= \frac{230.3 \times 180}{4\pi} \Delta\varepsilon = 3298.8\,\Delta\varepsilon$$

13. $$E = \frac{R_0^6}{R_0^6 + r^6} = \frac{1}{1 + \left(\frac{r}{R_0}\right)^6}$$

$$1 + \left(\frac{r}{R_0}\right)^6 = \frac{1}{E} = \frac{1}{0.2} = 5$$

$$\left(\frac{r}{R_0}\right)^6 = 4$$

$$\left(\frac{r}{R_0}\right) = (4)^{1/6} = 1.26$$

$$\therefore r = 25.2\,\text{Å}$$

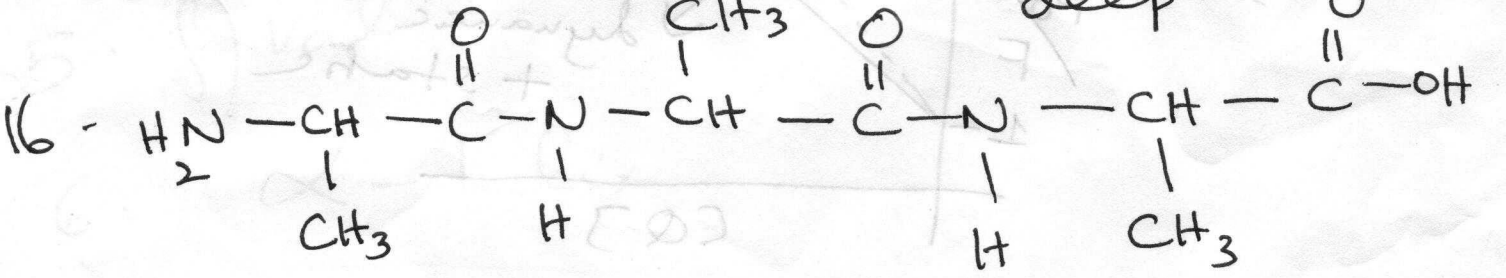
14.

Static	Dynamic
* Quenching occurs in ground state (F)	--- in excited s (F*
* Not mediated by DIFFUSION	Diffusion an Collision involv
* $\tau_0/\tau = 1$	* $\frac{\tau_0}{\tau} = \frac{F_0}{F}$

15.

B-DNA	A-DNA
— $dx, dy \approx 0$	$dx \sim 4\text{Å}$ $dy \sim$
— bp's stack ⊥ helix axis	
— small inclination (η)	η is large ~ 20°
— 10 – 10.5 bp / turn	11 b.p / turn
—deoxyribose C2′-endo	—C3′ endo
— minor groove narrow and deep	— minor groove not deep wide & shall

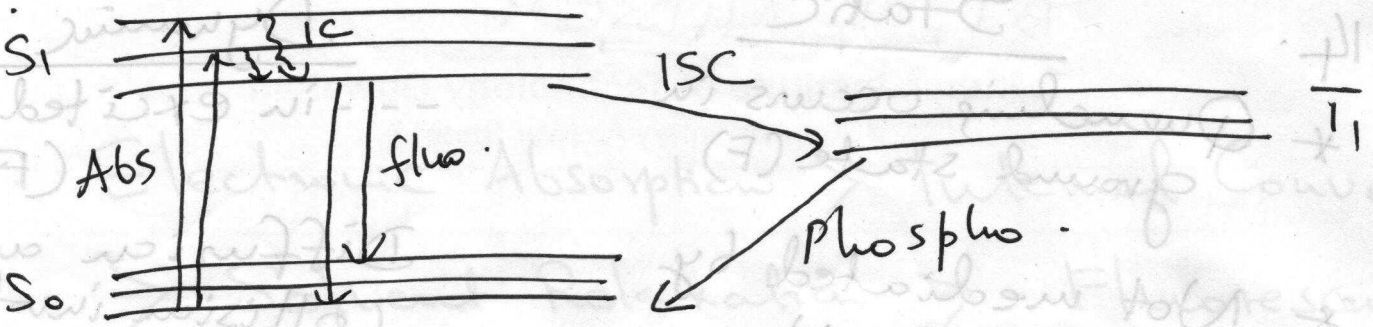
16.



17. Achieving tight compaction of double stranded DNA is called DNA condensation. Free DNA in solution has high bending rigidity owing to electrostatic repulsion between segments of DNA helix.

Condensation is promoted by high salt concentrations, cationic peptides like poly-L-Lysine histones H1, H5 etc.

18.



19. a) It is likely that DNA binds to protein and reduces accessibility of Trp indole ring to the quencher

b) DNA binding to protein triggers a conformational change in protein causing solvent exposed Trp to get buried.

20. a)