Year 12 Chemistry Cleaning Agents Assignment NAME_____

1. Explain in terms of secondary bonding why a non-polar solvent would be used to clean a non-polar stain rather than a polar solvent. /3

2. Soaps and synthetic sulfonate detergents can be used to clean grease from objects.
   (a) With the aid of a diagram, show how they do this. /3
   (b) Write an example equation showing the effect of hard water on soaps. /1
   (c) Explain the difference in effectiveness in hard water between soaps and detergents. /2

3. Explain with an example equation how soaps can be made. /3

4.
   (a) Draw the structural formula of the PO_4^{3-} ion. /1
   (b) Draw the structural formula of the linear tripolyphosphate ion $P_3O_{10}^{5-}$. /2
   (c) Draw the structural formula of the cyclic tripolyphosphate ion $P_3O_9^{3-}$. /2

5.
   (a) Describe three advantages of the addition of tripolyphosphates to detergents. /3
   (b) State why phosphate is a fertiliser. /1
   (c) Describe the disadvantages associated with the use of phosphate and tripolyphosphates. /2

6.
   (a) Explain why hypochlorites are added to some detergent formulations. /2
   (b) With the aid of an equation, explain the effect of lowering pH on the equilibrium between hypochlorites and chlorine. /3

7.
   (a) Describe three advantages of the addition of enzymes to detergent formulations. /3
   (b) Explain why enzymes are sensitive to changes in pH and temperature. /2

8.
   (a) Using equations and oxidation numbers, explain how solid oxygen bleaches work. /5
   (b) Explain the relationship between temperature and the action of solid oxygen bleaches. /2

TOTAL /40