Comprehension XIV
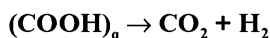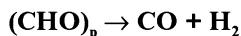
Gaseous substances $(CHO)_p$ and $(COOH)_q$, when heated, decompose according to the reactions

$$(CHO)_p \rightarrow CO + H_2$$

$$(COOH)_q \rightarrow CO_2 + H_2$$

A volume of 10 ml of mixture containing $(CHO)_p$ and $(COOH)_q$ in 1:4 mole ratio was heated for complete decomposition. Resulting gases when passed through KOH, volume decrease to $9/17^{th}$ of the volume of gaseous mixture passed. Remaining gases on complete combustion showed a contraction of 61 ml.

40. The values of p and q are
 (a) $p = 10$, $q = 6$
 (b) $p = 6$, $q = 10$
 (c) $p = 3$, $q = 5$
 (d) $p = 5$, $q = 3$

41. The volume of O_2 used for combustion is
 (a) 27 ml　　　　　(b) 20 ml
 (c) 36 ml　　　　　(d) 60 ml

42. The increase in volume on decomposition of original mixture was
 (a) 20 ml
 (b) 46 ml
 (c) 92 ml
 (d) 61 ml

Comprehension XV

Once Tom and Jerry entered into a chemistry lab in which a chemist was preparing a solution of H_2SO_4 in a two litre container. He labelled the solution as 'density = 5.96 g/ml, 5m' which occupied half of the volume of the container. Tom saw the solution and a mischief came in his mind. As the chemist left the lab, Tom tried to throw the solution on Jerry. In doing so, some of the solution fell on the floor. Tom added water in the container to fill it up to the original level. The chemist returned back and got astonished to see the result of analysis that showed 'density = 0.4 g/ml and %w/w = 49'.

43. What was the molarity of H_2SO_4 solution present initially in the container?
 (a) 5 M
 (b) 1.92 M
 (c) 20 M
 (d) 10 M

44. How many moles of H_2SO_4 had fallen down on the floor?
 (a) 2
 (b) 20
 (c) 18
 (d) 16

45. What volume of water was added to the solution by Tom?
 (a) 1000 ml
 (b) 900 ml
 (c) 200 ml
 (d) 100 ml