

DPP # 10

M.M. : 38

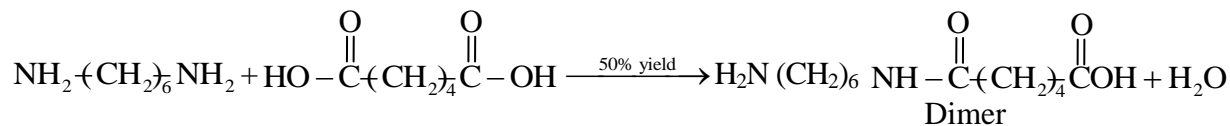
MAX. TIME : 20 Min.

ONLY ONE OPTION CORRECT TYPE

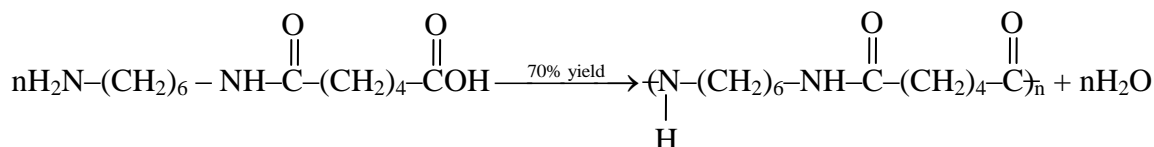
1. A mixture of gas "X" (mol. wt. 16) and gas Y (mol. wt. 28) in the mole ratio a : b has a mean molecular weight 20. What would be mean molecular weight if the gases are mixed in the ratio b : a under identical conditions (gases are non reacting). [3]
(A) 24 (B) 20 (C) 26 (D) 40
2. How many moles of P_4O_6 and P_4O_{10} will be produced by the combustion of 12.4 gm of phosphorus in 12.8 gm of O_2 , leaving no P_4 or O_2 ? [Atomic wt. P = 31] [3]
(A) 0.11 mol and 0.3 mol (B) 0.15 mol and 0.25 mol
(C) 0.05 mol each (D) 0.1 mol each
3. The density of a liquid is 1.2 g/mL. There are 35 drops in 2 mL. The number of molecules in 1 drop is (molecular weight of liquid = 70) : [3]
(A) $\frac{1.2}{35} N_0$ (B) $\left(\frac{1}{35}\right)^2 N_0$ (C) $\frac{1.2}{(35)^2} N_0$ (D) $1.2 N_0$
4. An oxide of iron contains 30% of oxygen by mass simplest formula of oxide is - [3]
(A) Fe_2O_3 (B) FeO (C) Fe_2O (D) Fe_3O_4

ONE OR MORE THAN ONE OPTION CORRECT TYPE

5. Hexamethylenediamine [$H_2N-(CH_2)_6-NH_2$] reacts with adipic acid [$HOOC-(CH_2)_4-COOH$] to form dimer as : [3]



The dimer polymerises to form Nylon 6,6 as per the reaction -



Select the correct statement -

- (A) 290 gm of Hexamethylenediamine is required to make 610 gm of dimer.
- (B) 730 gm of adipic acid is required to make 610 gm of dimer.
- (C) In order to obtain 1.13 kg of Nylon-6,6 at least 1220 gm of dimer is required.
- (D) In order to obtain 1.13 kg of Nylon-6,6 at least 1742.9 gm of dimer is required.

6. When $N_2(g)$ and $H_2(g)$ are mixed $N_2H_4(g)$, $NH_3(g)$ or both may form, depending upon the relative amount of N_2 and H_2 taken. If initial moles of N_2 , H_2 are x , y and final moles of N_2H_4 , NH_3 are z , v , then the correct options from the following in order of (x, y, z, v) is/are- [3]
(A) (2, 2, 1, 0) (B) (3, 8, 1, 4) (C) (4, 9, 4, 1) (D) (0.5, 3, 0, 1)

Comprehension :

7. $FeSO_4$ undergoes decomposition as [6]

$$2FeSO_4(s) \longrightarrow Fe_2O_3(s) + SO_2(g) + SO_3(g)$$
 At 1 atm 273K, if (7.6 gm) $FeSO_4$ is taken then
- (i) The volume occupied by the gases at 1 atm & 273 K.
 (A) 22.4 lit (B) 11.2 lit (C) 1.12 lit (D) 2.24 lit
- (ii) The average molar mass of the gaseous mixture.
 (A) 72 (B) 36 (C) 48 (D) 60

MATCH THE COLUMN

8. Match the column. [8]

Column-I

Atomic masses

	Isotope-I	Isotope-II	Avg
(A)	$(z - 1)$	$(z + 2)$	z
(B)	$(z + 1)$	$(z + 3)$	$(z + 2)$
(C)	z	$3z$	$2z$
(D)	$(z - 1)$	$(z + 1)$	z

Column-II

% composition of heavier isotope

(P)	33.33% by moles
(Q)	50% by moles
(R)	% by mass dependent on z
(S)	75% by mass

INTEGER/SUBJECTIVE TYPE

9. The abundance of three isotopes of oxygen are as follows [3]
 $\% \text{ of } O^{16} = 90\%$
 $\% \text{ of } O^{17} + \% \text{ of } O^{18} = 10\%$
 Assume at. mass same as mass no. Find out $\% \text{ of } O^{17}$ and O^{18} , if the avg. atomic mass is 16.12.
10. Assume isotope of chlorine present on the unknown planet are ^{34}Cl and ^{38}Cl . If average atomic weight of Cl is found to be 35. What is the sum of moles of proton and neutron in 7 gm of sample of chlorine [3]