

12. The results given in the below table were obtained during kinetic studies of the following reaction:



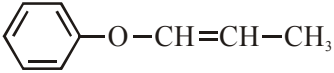
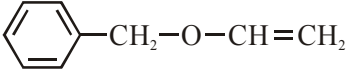
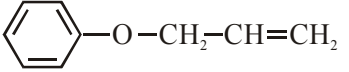
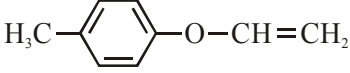
Experiment	[A]/molL ⁻¹	[B]/molL ⁻¹	Initial rate/molL ⁻¹ min ⁻¹
I	0.1	0.1	6.00×10^{-3}
II	0.1	0.2	2.40×10^{-2}
III	0.2	0.1	1.20×10^{-2}
IV	X	0.2	7.20×10^{-2}
V	0.3	Y	2.88×10^{-1}

X and Y in the given table are respectively :

- (1) 0.3, 0.4
- (2) 0.4, 0.3
- (3) 0.4, 0.4
- (4) 0.3, 0.3

Official Ans. by NTA (1)

13. An organic compound 'A' (C₉H₁₀O) when treated with conc. HI undergoes cleavage to yield compounds 'B' and 'C'. 'B' gives yellow precipitate with AgNO₃ where as 'C' tautomerizes to 'D'. 'D' gives positive iodoform test. 'A' could be :

- (1) 
- (2) 
- (3) 
- (4) 

Official Ans. by NTA (2)

14. The size of a raw mango shrinks to a much smaller size when kept in a concentrated salt solution. Which one of the following processes can explain this ?

- (1) Diffusion
- (2) Dialysis
- (3) Osmosis
- (4) Reverse osmosis

Official Ans. by NTA (3)

15. Two elements A and B have similar chemical properties. They don't form solid hydrogencarbonates, but react with nitrogen to form nitrides. A and B, respectively, are :

- (1) Na and C
- (2) Li and Mg
- (3) Cs and Ba
- (4) Na and Rb

Official Ans. by NTA (2)

16. The one that is not expected to show isomerism is :

- (1) [Ni(NH₃)₄(H₂O)₂]²⁺
- (2) [Ni(NH₃)₂Cl₂]
- (3) [Pt(NH₃)₂Cl₂]
- (4) [Ni(en)₃]²⁺

Official Ans. by NTA (2)

17. Amongst the following statements regarding adsorption, those that are valid are :

- (a) ΔH becomes less negative as adsorption proceeds.
- (b) On a given adsorbent, ammonia is adsorbed more than nitrogen gas.
- (c) On adsorption, the residual force acting along the surface of the adsorbent increases.
- (d) With increase in temperature, the equilibrium concentration of adsorbate increases.

- (1) (b) and (c)
- (2) (a) and (b)
- (3) (d) and (a)
- (4) (c) and (d)

Official Ans. by NTA (2)

18. Match the type of interaction in Column A with the distance dependence of their interaction energy in Column B :

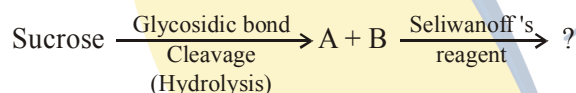
A	B
(I) iron - ion	(a) $\frac{1}{r}$
(II) dipole - dipole	(b) $\frac{1}{r^2}$
(III) London dispersion	(c) $\frac{1}{r^3}$
	(d) $\frac{1}{r^6}$

- (1) (I)-(a), (II)-(b), (III)-(c)
 (2) (I)-(a), (II)-(c), (III)-(d)
 (3) (I)-(a), (II)-(b), (III)-(d)
 (4) (I)-(b), (II)-(d), (III)-(c)

Official Ans. by NTA (3)

Official Ans. by ALLEN (2)

19. The correct observation in the following reactions is :



- (1) Formation of blue colour
 (2) Formation of violet colour
 (3) Formation of red colour
 (4) Gives no colour

Official Ans. by NTA (3)

20. The molecular geometry of SF₆ is octahedral. What is the geometry of SF₄ (including lone pair(s) of electrons, if any) ?

- (1) Trigonal bipyramidal
 (2) Square planar
 (3) Tetrahedral
 (4) Pyramidal

Official Ans. by NTA (1)

21. The heat of combustion of ethanol into carbon dioxides and water is -327 kcal at constant pressure. The heat evolved (in cal) at constant volume and 27°C (if all gases behave ideally) is (R = 2 cal mol⁻¹ K⁻¹)

Official Ans. by NTA (-326400.00)

Official Ans. by ALLEN (326400.00)

22. For the disproportionation reaction
 $2\text{Cu}^+(\text{aq}) \rightleftharpoons \text{Cu}(\text{s}) + \text{Cu}^{2+}(\text{aq})$ at 298 K,
 ln K (where K is the equilibrium constant) is _____ × 10⁻¹ .

Given

$$E_{\text{Cu}^{2+}/\text{Cu}^+}^0 = 0.16\text{V}$$

$$E_{\text{Cu}^+/\text{Cu}}^0 = 0.52\text{V}$$

$$\frac{RT}{F} = 0.025$$

Official Ans. by NTA (144.00)

23. The oxidation states of transition metal atoms in K₂Cr₂O₇, KMnO₄ and K₂FeO₄, respectively, are x, y and z. The sum of x, y and z is _____.

Official Ans. by NTA (19.00)

24. The ratio of the mass percentages of 'C & H' and 'C & O' of a saturated acyclic organic compound 'X' are 4 : 1 and 3 : 4 respectively. Then, the moles of oxygen gas required for complete combustion of two moles of organic compound 'X' is _____.

Official Ans. by NTA (5.00)

25. The work function of sodium metal is 4.41 × 10⁻¹⁹ J. If the photons of wavelength 300 nm are incident on the metal, the kinetic energy of the ejected electrons will be (h = 6.63 × 10⁻³⁴ Js; c = 3 × 10⁸ m/s) _____ × 10⁻²¹ J.

Official Ans. by NTA (222.00)