

**FINAL JEE-MAIN EXAMINATION – APRIL, 2019**
**(Held On Wednesday 10<sup>th</sup> APRIL, 2019) TIME : 2 : 30 PM To 5 : 30 PM**
**CHEMISTRY**
**TEST PAPER WITH ANSWER**

1. The correct match between Item-I and Item-II is:

	Item-I		Item-II
(a)	High density polythene	(I)	Peroxide catalyst
(b)	Polyacrylonitrile	(II)	Condensation at high temperature & pressure
(c)	Novolac	(III)	Ziegler-Natta Catalyst
(d)	Nylon 6	(IV)	Acid or base catalyst

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

**Official Ans. by NTA (4)**

2. Which of the following is NOT a correct method of the preparation of benzylamine from cyanobenzene ?

- (1) (i) HCl/H<sub>2</sub>O                      (ii) NaBH<sub>4</sub>  
 (2) (i) LiAlH<sub>4</sub>                        (ii) H<sub>3</sub>O<sup>+</sup>  
 (3) (i) SnCl<sub>2</sub>+HCl(gas)            (ii) NaBH<sub>4</sub>  
 (4) H<sub>2</sub>/Ni

**Official Ans. by NTA (1)**

3. Which of these factors does not govern the stability of a conformation in acyclic compounds ?

- (1) Torsional strain  
 (2) Angle strain  
 (3) Steric interactions  
 (4) Electrostatic forces of interaction

**Official Ans. by NTA (2)**

4. The difference between ΔH and ΔU (ΔH–ΔU), when the combustion of one mole of heptane

(1) is carried out at a temperature T, is equal to:

- (1) 3RT                                      (2) –3RT  
 (3) –4RT                                    (4) 4RT

**Official Ans. by NTA (3)**

5. For the reaction of H<sub>2</sub> with I<sub>2</sub>, the rate constant is 2.5×10<sup>-4</sup>dm<sup>3</sup> mol<sup>-1</sup> s<sup>-1</sup> at 327°C and 1.0 dm<sup>3</sup> mol<sup>-1</sup> s<sup>-1</sup> at 527°C. The activation energy for the reaction, in kJ mol<sup>-1</sup> is:

$$(R=8.314\text{J K}^{-1}\text{ mol}^{-1})$$

- (1) 72                                        (2) 166  
 (3) 150                                      (4) 59

**Official Ans. by NTA (2)**

6. The correct statements among (a) to (b) are:

(a) saline hydrides produce H<sub>2</sub> gas when reacted with H<sub>2</sub>O.

(b) reaction of LiAlH<sub>4</sub> with BF<sub>3</sub> leads to B<sub>2</sub>H<sub>6</sub>.

(c) PH<sub>3</sub> and CH<sub>4</sub> are electron - rich and electron-precise hydrides, respectively.

(d) HF and CH<sub>4</sub> are called as molecular hydrides.

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

**Official Ans. by NTA (3)**

7. The increasing order of nucleophilicity of the following nucleophiles is :

(a) CH<sub>3</sub>CO<sub>2</sub><sup>⊖</sup>                              (b) H<sub>2</sub>O

(c) CH<sub>3</sub>SO<sub>3</sub><sup>⊖</sup>                              (d)  $\overset{\ominus}{\text{O}}\text{H}$

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

**Official Ans. by NTA (1)**

8. Number of stereo centers present in linear and cyclic structures of glucose are respectively :

- (1) 4 & 5                                      (2) 5 & 5  
 (3) 4 & 4                                      (4) 5 & 4

**Official Ans. by NTA (1)**

9. A hydrated solid X on heating initially gives a monohydrated compound Y. Y upon heating above 373K leads to an anhydrous white powder Z. X and Z, respectively, are:

- (1) Washing soda and soda ash.
- (2) Washing soda and dead burnt plaster.
- (3) Baking soda and dead burnt plaster.
- (4) Baking soda and soda ash.

**Official Ans. by NTA (1)**

10. The number of pentagons in  $C_{60}$  and trigons (triangles) in white phosphorus, respectively, are:

- (1) 12 and 3
- (2) 20 and 4
- (3) 12 and 4
- (4) 20 and 3

**Official Ans. by NTA (3)**

11. The correct order of the first ionization enthalpies is:

- (1)  $Mn < Ti < Zn < Ni$
- (2)  $Ti < Mn < Ni < Zn$
- (3)  $Zn < Ni < Mn < Ti$
- (4)  $Ti < Mn < Zn < Ni$

**Official Ans. by NTA (2)**

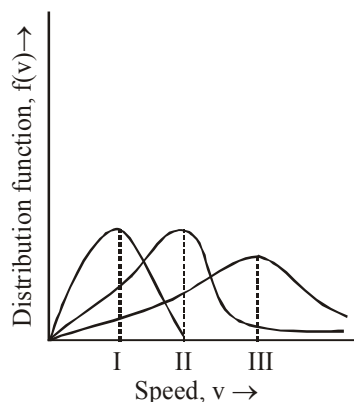
12. The correct option among the following is :

- (1) Colloidal particles in lyophobic sols can be precipitated by electrophoresis.
- (2) Brownian motion in colloidal solution is faster the viscosity of the solution is very high.
- (3) Colloidal medicines are more effective because they have small surface area.
- (4) Addition of alum to water makes it unfit for drinking.

**Official Ans. by NTA (1)**

13. Points I, II and III in the following plot respectively correspond to

( $V_{mp}$  : most probable velocity)



- (1)  $V_{mp}$  of  $N_2$  (300K);  $V_{mp}$  of  $H_2$ (300K);  $V_{mp}$  of  $O_2$ (400K)
- (2)  $V_{mp}$  of  $H_2$  (300K);  $V_{mp}$  of  $N_2$ (300K);  $V_{mp}$  of  $O_2$ (400K)
- (3)  $V_{mp}$  of  $O_2$  (400K);  $V_{mp}$  of  $N_2$ (300K);  $V_{mp}$  of  $H_2$ (300K)
- (4)  $V_{mp}$  of  $N_2$  (300K);  $V_{mp}$  of  $O_2$ (400K);  $V_{mp}$  of  $H_2$ (300K)

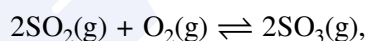
**Official Ans. by NTA (4)**

14. The INCORRECT statement is :

- (1) the spin-only magnetic moments of  $[Fe(H_2O)_6]^{2+}$  and  $[Cr(H_2O)_6]^{2+}$  are nearly similar.
- (2) the spin-only magnetic moment of  $[Ni(NH_3)_4(H_2O)_2]^{2+}$  is 2.83BM.
- (3) the gemstone, ruby, has  $Cr^{3+}$  ions occupying the octahedral sites of beryl.
- (4) the color of  $[CoCl(NH_3)_5]^{2+}$  is violet as it absorbs the yellow light.

**Official Ans. by NTA (3)**

15. For the reaction,



$$\Delta H = -57.2 \text{ kJ mol}^{-1} \text{ and}$$

$$K_c = 1.7 \times 10^{16}.$$

Which of the following statement is INCORRECT?

- (1) The equilibrium constant is large suggestive of reaction going to completion and so no catalyst is required.
- (2) The equilibrium will shift in forward direction as the pressure increase.
- (3) The equilibrium constant decreases as the temperature increases.
- (4) The addition of inert gas at constant volume will not affect the equilibrium constant.

**Official Ans. by NTA (1)**

16. The pH of a 0.02M  $NH_4Cl$  solution will be

[given  $K_b(NH_4OH) = 10^{-5}$  and  $\log 2 = 0.301$ ]

- (1) 4.65
- (2) 5.35
- (3) 4.35
- (4) 2.65

**Official Ans. by NTA (2)**

17. The noble gas that does NOT occur in the atmosphere is:

- (1) He
- (2) Ra
- (3) Ne
- (4) Kr

**Official Ans. by NTA (2)**

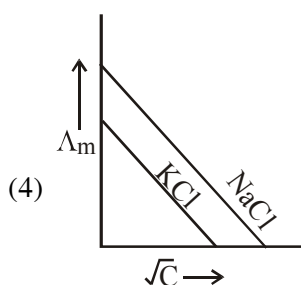
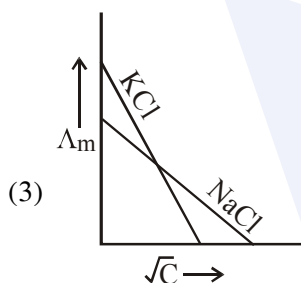
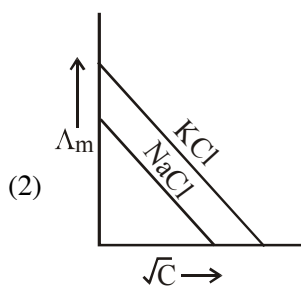
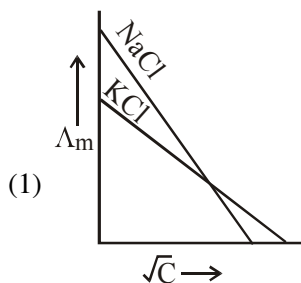
18. 1 g of non-volatile non-electrolyte solute is dissolved in 100g of two different solvents A and B whose ebullioscopic constants are in the ratio of 1 : 5. The ratio of the elevation in their

boiling points,  $\frac{\Delta T_b(A)}{\Delta T_b(B)}$ , is :

- (1) 5 : 1                      (2) 10 : 1  
 (3) 1 : 5                      (4) 1 : 0.2

**Official Ans. by NTA (3)**

19. Which one of the following graphs between molar conductivity ( $\Lambda_m$ ) versus  $\sqrt{C}$  is correct?



**Official Ans. by NTA (2)**

20. The correct statement is :

- (1) zincite is a carbonate ore  
 (2) aniline is a froth stabilizer  
 (3) zone refining process is used for the refining of titanium  
 (4) sodium cyanide cannot be used in the metallurgy of silver

**Official Ans. by NTA (2)**

21. The minimum amount of  $O_2(g)$  consumed per gram of reactant is for the reaction :

(Given atomic mass : Fe = 56, O = 16, Mg = 24, P = 31, C = 12, H = 1)

- (1)  $C_3H_8(g) + 5 O_2(g) \rightarrow 3 CO_2(g) + 4 H_2O(l)$   
 (2)  $P_4(s) + 5 O_2(g) \rightarrow P_4O_{10}(s)$   
 (3)  $4 Fe(s) + 3 O_2(g) \rightarrow 2 Fe_2O_3(s)$   
 (4)  $2 Mg(s) + O_2(g) \rightarrow 2 MgO(s)$

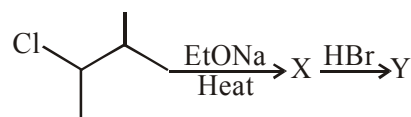
**Official Ans. by NTA (3)**

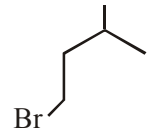
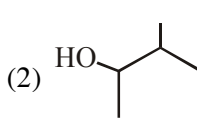
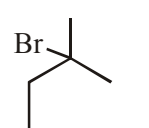
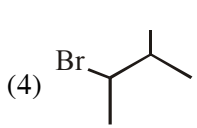
22. Air pollution that occurs in sunlight is :

- (1) oxidising smog  
 (2) acid rain  
 (3) reducing smog  
 (4) fog

**Official Ans. by NTA (1)**

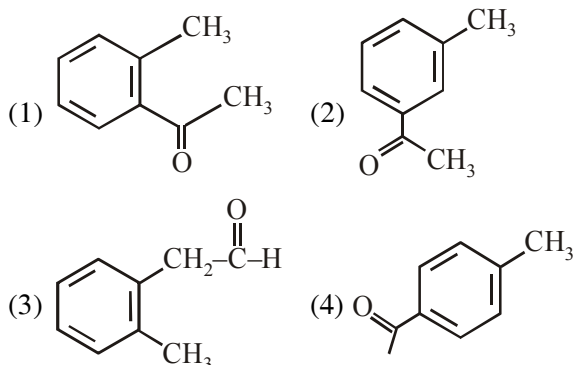
23. The major product 'Y' in the following reaction is:



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

**Official Ans. by NTA (3)**

24. Compound A ( $C_9H_{10}O$ ) shows positive iodoform test. Oxidation of A with  $KMnO_4/KOH$  gives acid B ( $C_8H_6O_4$ ). Anhydride of B is used for the preparation of phenolphthalein. Compound A is :-



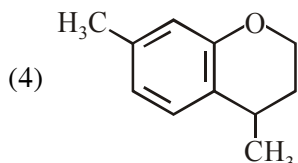
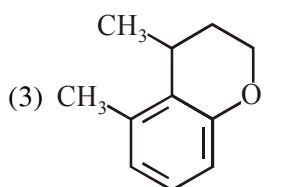
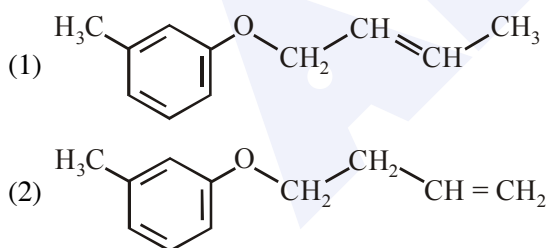
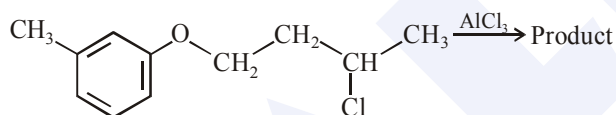
Official Ans. by NTA (1)

25. The crystal field stabilization energy (CFSE) of  $[Fe(H_2O)_6]Cl_2$  and  $K_2[NiCl_4]$ , respectively, are :-

- (1)  $-0.4\Delta_o$  and  $-0.8\Delta_t$   
 (2)  $-0.4\Delta_o$  and  $-1.2\Delta_t$   
 (3)  $-2.4\Delta_o$  and  $-1.2\Delta_t$   
 (4)  $-0.6\Delta_o$  and  $-0.8\Delta_t$

Official Ans. by NTA (1)

26. The major product obtained in the given reaction is :-



Official Ans. by NTA (4)

27. The highest possible oxidation states of uranium and plutonium, respectively, are :-

- (1) 6 and 4 (2) 7 and 6  
 (3) 4 and 6 (4) 6 and 7

Official Ans. by NTA (4)

28. In chromatography, which of the following statements is INCORRECT for  $R_f$ ?

- (1)  $R_f$  value depends on the type of chromatography.

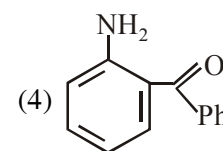
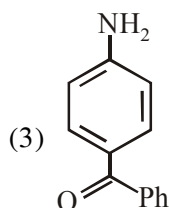
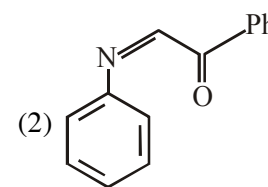
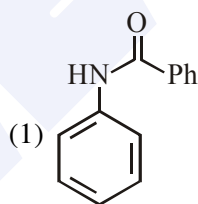
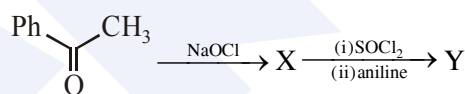
- (2) The value of  $R_f$  can not be more than one.

- (3) Higher  $R_f$  value means higher adsorption.

- (4)  $R_f$  value is dependent on the mobile phase.

Official Ans. by NTA (3)

29. The major product 'Y' in the following reaction is:-



Official Ans. by NTA (1)

30. The ratio of the shortest wavelength of two spectral series of hydrogen spectrum is found to be about 9. The spectral series are:

- (1) Paschen and P fund

- (2) Lyman and Paschen

- (3) Brackett and Piund

- (4) Balmer and Brackett

Official Ans. by NTA (2)