

TEST PAPER OF JEE(MAIN) EXAMINATION – 2019
(Held On Thursday 10th JANUARY, 2019) TIME : 02 : 30 PM To 05 : 30 PM
CHEMISTRY

1. An ideal gas undergoes isothermal compression from 5 m³ to 1 m³ against a constant external pressure of 4 Nm⁻². Heat released in this process is used to increase the temperature of 1 mole of Al. If molar heat capacity of Al is 24 J mol⁻¹ K⁻¹, the temperature of Al increases by :

- (1) $\frac{3}{2}$ K (2) $\frac{2}{3}$ K (3) 1 K (4) 2 K

Ans. (2)

2. The 71st electron of an element X with an atomic number of 71 enters into the orbital :

- (1) 4f (2) 6p (3) 6s (4) 5d

Ans. (1)

3. The number of 2-centre-2-electron and 3-centre-2-electron bonds in B₂H₆, respectively, are :

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

Ans. (4)

4. The amount of sugar (C₁₂H₂₂O₁₁) required to prepare 2 L of its 0.1 M aqueous solution is :

- (1) 68.4 g (2) 17.1 g (3) 34.2 g (4) 136.8 g

Ans. (1)

5. Among the following reactions of hydrogen with halogens, the one that requires a catalyst is :

- (1) H₂ + I₂ → 2HI (2) H₂ + F₂ → 2HF
 (3) H₂ + Cl₂ → 2HCl (4) H₂ + Br₂ → 2HBr

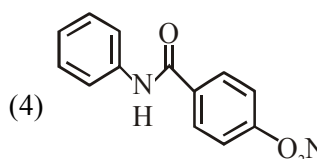
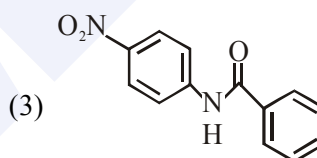
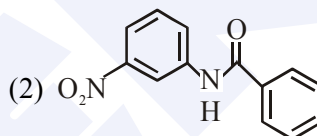
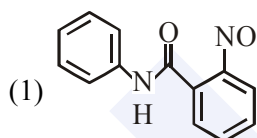
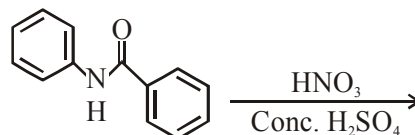
Ans. (1)

6. Sodium metal on dissolution in liquid ammonia gives a deep blue solution due to the formation of:

- (1) sodium ion-ammonia complex
 (2) sodamide
 (3) sodium-ammonia complex
 (4) ammoniated electrons

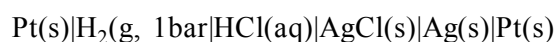
Ans. (4)

7. What will be the major product in the following mononitration reaction ?



Ans. (3)

8. In the cell :



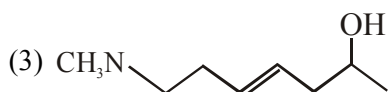
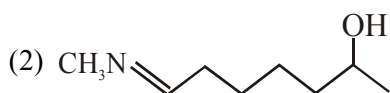
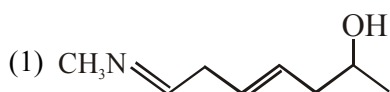
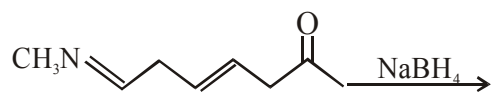
the cell potential is 0.92V when a 10⁻⁶ molal HCl solution is used. The standard electrode potential of (AgCl/Ag, Cl⁻) electrode is :

{ given, $\frac{2.303RT}{F} = 0.06V \text{ at } 298K$ }

- (1) 0.20 V (2) 0.76 V (3) 0.40 V (4) 0.94 V

Ans. (1)

9. The major product of the following reaction is:



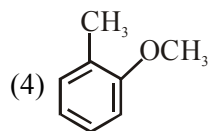
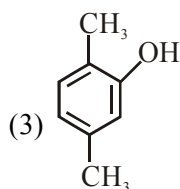
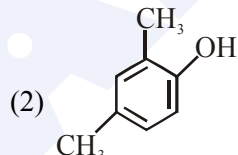
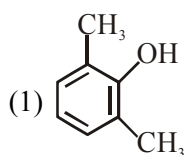
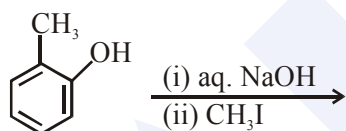
Ans. (3)

10. The pair that contains two P-H bonds in each of the oxoacids is :

- (1) H_3PO_2 and $\text{H}_4\text{P}_2\text{O}_5$
- (2) $\text{H}_4\text{P}_2\text{O}_5$ and $\text{H}_4\text{P}_2\text{O}_6$
- (3) H_3PO_3 and H_3PO_2
- (4) $\text{H}_4\text{P}_2\text{O}_5$ and H_3PO_3

Ans. (1)

11. The major product of the following reaction is:



Ans. (4)

12. The difference in the number of unpaired electrons of a metal ion in its high-spin and low-spin octahedral complexes is two. The metal ion is :

- (1) Fe^{2+}
- (2) Co^{2+}
- (3) Mn^{2+}
- (4) Ni^{2+}

Ans. (2)

13. A compound of formula A_2B_3 has the hcp lattice. Which atom forms the hcp lattice and what fraction of tetrahedral voids is occupied by the other atoms :

- (1) hcp lattice-A, $\frac{2}{3}$ Tetrahedral voids-B

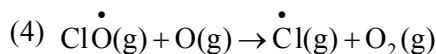
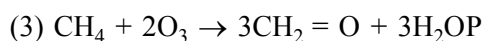
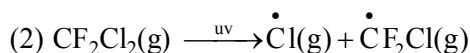
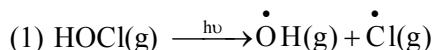
- (2) hcp lattice-B, $\frac{1}{3}$ Tetrahedral voids-A

- (3) hcp lattice-B, $\frac{2}{3}$ Tetrahedral voids-A

- (4) hcp lattice-A, $\frac{1}{3}$ Tetrahedral voids-B

Ans. (2)

14. The reaction that is NOT involved in the ozone layer depletion mechanism in the stratosphere is:



Ans. (3)

15. The process with negative entropy change is :

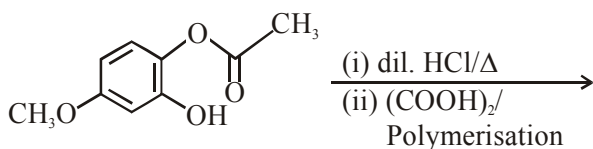
- (1) Dissolution of iodine in water
- (2) Synthesis of ammonia from N_2 and H_2
- (3) Dissolution of $\text{CaSO}_4\text{(s)}$ to CaO(s) and $\text{SO}_3\text{(g)}$
- (4) Sublimation of dry ice

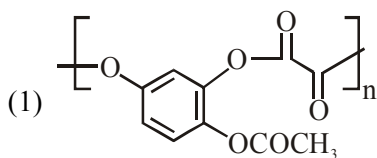
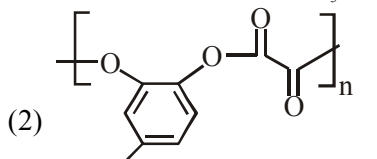
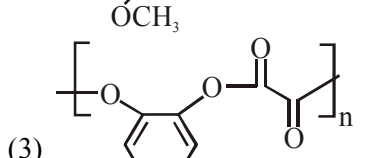
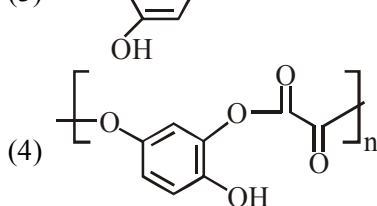
Ans. (2)

MAJOR COMPUTER BASED TEST (CBT) SERIES

JEE (Advanced)- Target 2019

16. The major product of the following reaction is:



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

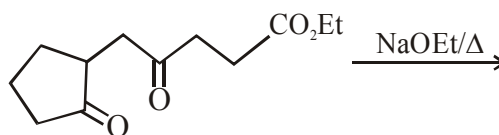
Ans. (2)

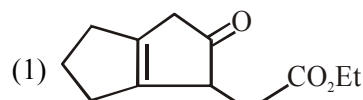
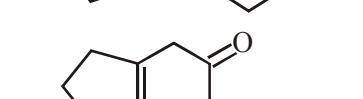
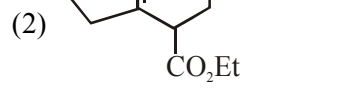
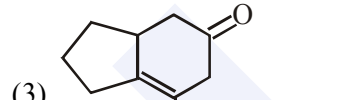
17. A reaction of cobalt(III) chloride and ethylenediamine in a 1 : 2 mole ratio generates two isomeric products A (violet coloured) B (green coloured). A can show optical activity, B is optically inactive. What type of isomers does A and B represent ?

- (1) Geometrical isomers
 (2) Ionisation isomers
 (3) Coordination isomers
 (4) Linkage isomers

Ans. (1)

18. The major product obtained in the following reaction is :



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

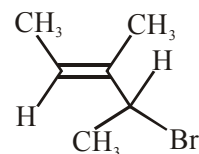
Ans. (4)

19. Which of the following tests cannot be used for identifying amino acids ?

- (1) Biuret test (2) Xanthoproteic test
 (3) Barfoed test (4) Ninhydrin test

Ans. (3)

20. What is the IUPAC name of the following compound ?



- (1) 3-Bromo-1, 2-dimethylbut-1-ene]
 (2) 4-Bromo-3-methylpent-2-ene
 (3) 2-Bromo-3-methylpent-3-ene
 (4) 3-Bromo-3-methyl-1, 2-dimethylprop-1-ene

Ans. (2)

MAJOR COMPUTER BASED TEST (CBT) SERIES

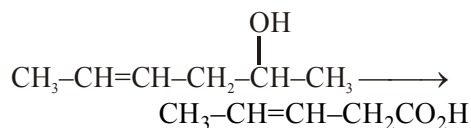
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Test Dates: 24th & 31st March

0744-2750275

21. Which is the most suitable reagent for the following transformation ?



- (1) alkaline KMnO_4 (2) I_2/NaOH
(3) Tollen's reagent (4) CrO_2/CS_2

Ans. (2)

22. The correct match between item 'I' and item 'II' is :

Item 'I' (compound)	Item 'II' (reagent)
(A) Lysine	(P) 1-naphthol
(B) Furfural	(Q) ninhydrin
(C) Benzyl alcohol	(R) KMnO_4
(D) Styrene	(S) Ceric ammonium nitrate

- (1) (A)→(Q), (B)→(P), (C)→(S), (D)→(R)
(2) (A)→(Q), (B)→(R), (C)→(S), (D)→(P)
(3) (A)→(Q), (B)→(P), (C)→(R), (D)→(S)
(4) (A)→(R), (B)→(P), (C)→(Q), (D)→(S)

Ans. (1)

23. In the reaction of oxalate with permanganate in acidic medium, the number of electrons involved in producing one molecule of CO_2 is :

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

Ans. (3)

24. 5.1g NH_4SH is introduced in 3.0 L evacuated flask at 327°C . 30% of the solid NH_4SH decomposed to NH_3 and H_2S as gases. The K_p of the reaction at 327°C is ($R = 0.082 \text{ L atm mol}^{-1}\text{K}^{-1}$, Molar mass of S = 32 g mol^{-1} , molar mass of N = 14 g mol^{-1})

- (1) $1 \times 10^{-4} \text{ atm}^2$ (2) $4.9 \times 10^{-3} \text{ atm}^2$
(3) 0.242 atm^2 (4) $0.242 \times 10^{-4} \text{ atm}^2$

Ans. (3)

25. The electrolytes usually used in the electroplating of gold and silver, respectively, are :

- (1) $[\text{Au}(\text{OH})_4]^-$ and $[\text{Ag}(\text{OH})_2]^-$
(2) $[\text{Au}(\text{CN})_2]^-$ and $[\text{Ag} \text{Cl}_2]^-$
(3) $[\text{Au}(\text{NH}_3)_2]^+$ and $[\text{Ag}(\text{CN})_2]^-$
(4) $[\text{Au}(\text{CN})_2]^-$ and $[\text{Ag}(\text{CN})_2]^-$

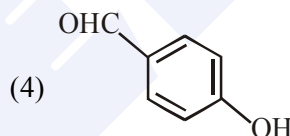
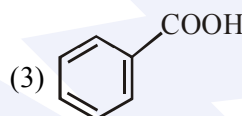
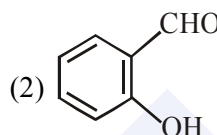
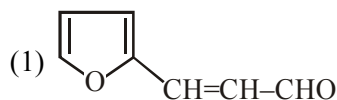
Ans. (4)

26. Elevation in the boiling point for 1 molal solution of glucose is 2 K. The depression in the freezing point of 2 molal solutions of glucose in the same solvent is 2 K. The relation between K_b and K_f is:

- (1) $K_b = 0.5 K_f$ (2) $K_b = 2 K_f$
(3) $K_b = 1.5 K_f$ (4) $K_b = K_f$

Ans. (2)

27. An aromatic compound 'A' having molecular formula $\text{C}_7\text{H}_6\text{O}_2$ on treating with aqueous ammonia and heating forms compound 'B'. The compound 'B' on reaction with molecular bromine and potassium hydroxide provides compound 'C' having molecular formula $\text{C}_6\text{H}_7\text{N}$. The structure of 'A' is :



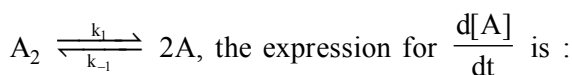
Ans. (3)

28. The ground state energy of hydrogen atom is -13.6 eV . The energy of second excited state He^+ ion in eV is :

- (1) -6.04 (2) -27.2 (3) -54.4 (4) -3.4

Ans. (1)

29. For an elementary chemical reaction,



- (1) $2k_1[\text{A}_2]-k_{-1}[\text{A}]^2$ (2) $k_1[\text{A}_2]-k_{-1}[\text{A}]^2$
(3) $2k_1[\text{A}_2]-2k_{-1}[\text{A}]^2$ (4) $k_1[\text{A}_2]+k_{-1}[\text{A}]^2$

Ans. (3)

30. Haemoglobin and gold sol are examples of :

- (1) negatively charged sols
(2) positively charged sols
(3) negatively and positively charged sols, respectively
(4) positively and negatively charged sols, respectively

Ans. (4)