TEST PAPER OF JEE(MAIN) EXAMINATION – 2019

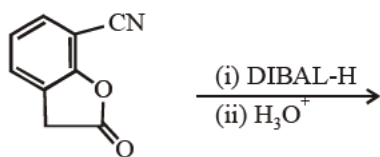## (Held On Saturday 12th JANUARY, 2019)   TIME : 9 : 30 AM To 12 : 30 PM

CHEMISTRY

1. Iodine reacts with concentrated HNO_3 to yield Y along with other products. The oxidation state of iodine in Y, is :-

(1) 5   (2) 3   (3) 1   (4) 7

Ans. (1)

2. The major product of the following reaction is:

(i) DIBAL-H
(ii) H_3O^+

(1)   (2)

(3)   (4)

Ans. (3)

3. In a chemical reaction, $A + 2B \underset{}{\overset{K}{\rightleftharpoons}} 2C + D$, the initial concentration of B was 1.5 times of the concentration of A, but the equilibrium concentrations of A and B were found to be equal. The equilibrium constant(K) for the aforesaid chemical reaction is :

(1) 16   (2) 4   (3) 1   (4) $\dfrac{1}{4}$

Ans. (2)

4. Two solids dissociate as follows

$A(s) \rightleftharpoons B(g) + C(g) \; ; \; K_{p_1} = x \; atm^2$

$D(s) \rightleftharpoons C(g) + E(g) \; ; \; K_{p_2} = y \; atm^2$

The total pressure when both the solids dissociate simultaneously is :-

(1) $x^2 + y^2$ atm   (2) $x^2 + y^2$ atm

(3) $2\left(\sqrt{x+y}\right)$ atm   (4) $\sqrt{x+y}$ atm

Ans. (3)

5. Freezing point of a 4% aqueous solution of X is equal to freezing point of 12% aqueous solution of Y. If molecular weight of X is A, then molecular weight of Y is :-
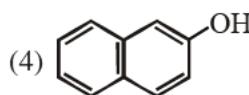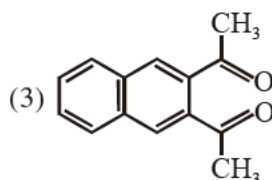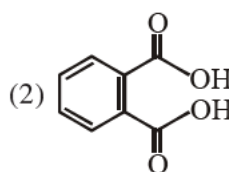
(1) A

(2) 3A

(3) 4A

(4) 2A
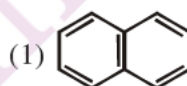
Ans. (2)

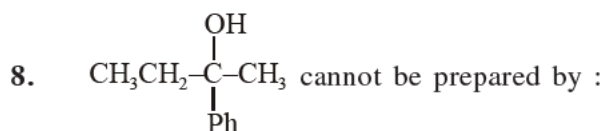**6.** Poly-β-hydroxybutyrate-co-β-hydroxyvalerate(PHBV) is a copolymer of___.

(1) 3-hydroxybutanoic acid and 4-hydroxypentanoic acid

(2) 2-hydroxybutanoic acid and 3-hydroxypentanoic acid

(3) 3-hydroxybutanoic acid and 2-hydroxypentanoic acid

(4) 3-hydroxybutanoic acid and 3-hydroxypentanoic acid

Ans.. (4)

7. Among the following four aromatic compounds, which one will have the lowest melting point ?

(1)

(2)

(3)

(4)

Ans. (1)

8. $CH_3CH_2-\overset{\overset{\displaystyle OH}{|}}{\underset{\underset{\displaystyle Ph}{|}}{C}}-CH_3$ cannot be prepared by :

   (1) $HCHO + PhCH(CH_3)CH_2MgX$
   (2) $PhCOCH_2CH_3 + CH_3MgX$
   (3) $PhCOCH_3 + CH_3CH_2MgX$
   (4) $CH_3CH_2COCH_3 + PhMgX$

Ans. (1)

9. The volume of gas A is twice than that of gas B. The compressibility factor of gas A is thrice than that of gas B at same temperature. The pressures of the gases for equal number of moles are :

   (1) $2P_A = 3P_B$
   (2) $P_A = 3P_B$
   (3) $P_A = 2P_B$
   (4) $3P_A = 2P_B$

Ans. (1)

10. The element with Z = 120 (not yet discovered) will be an/a :

    (1) transition metal
    (2) inner-transition metal
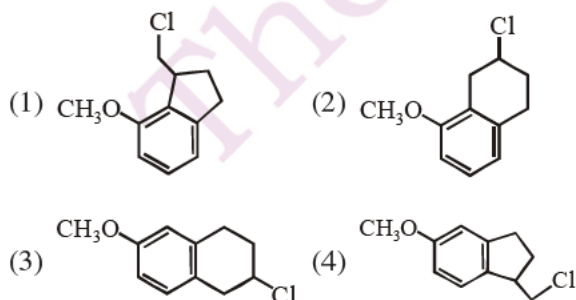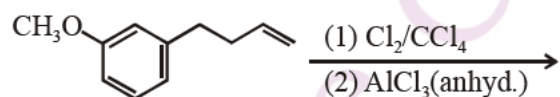   (3) alkaline earth metal
    (4) alkali metal

Ans. (3)

11. Decomposition of X exhibits a rate constant of 0.05 µg/year. How many years are required for the decomposition of 5 µg of X into 2.5 µg ?

    (1) 50   (2) 25
    (3) 20   (4) 40

Ans.(1)

12. The major product of the following reaction is :

    $\xrightarrow{\substack{(1)\ Cl_2/CCl_4 \\ (2)\ AlCl_3(anhyd.)}}$

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

Ans. (4)

13. Given

Gas	H_2	CH_3	CO_2	SO_2
Critical Temperature/K	33	190	304	630

On the basis of data given above, predict which of the following gases shows least adsorption on a definite amount of charcoal ?

    (1) H_2 (2) CH_4
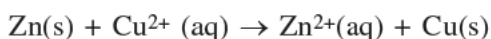   (3) SO_2 (4) CO_2

Ans. (1)

14. For diatomic ideal gas in a closed system, which of the following plots does not correctly describe the relation between various thermodynamic quantities ?

    (1)
    (2)
    (3)
    (4)
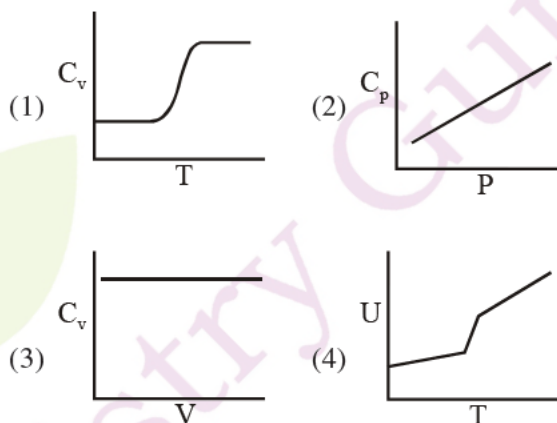
Ans. (2)

15. The standard electrode potential $E^\ominus$ and its temperature coefficient $\left(\dfrac{dE^\ominus}{dT}\right)$ for a cell are 2V and -5×10^{-4} VK^{-1} at 300 K respectively. The cell reaction is

    $Zn(s) + Cu^{2+}\ (aq) \rightarrow Zn^{2+}(aq) + Cu(s)$

    The standard reaction enthalpy $\left(\Delta_r H^\ominus\right)$ at 300 K in kJ mol^{-1} is,

    [Use R = 8jK^{-1} mol^{-1} and F = 96,000 Cmol^{-1}]

    (1) -412.8 (2) -384.0
    (3) 206.4 (4) 192.0

Ans. (1)

16. The molecule that has minimum/no role in the formation of photochemical smog, is :

    (1) $CH_2 = O$ (2) N_2
    (3) O_3 (4) NO

Ans. (2)

2

17. In the Hall-Heroult process, aluminium is formed at the cathode. The cathode is made out of :
    (1) Platinum
    (2) Carbon
    (3) Pure aluminium
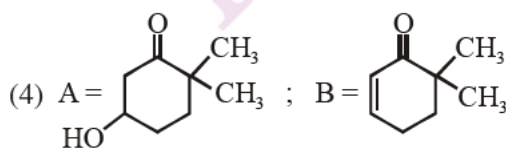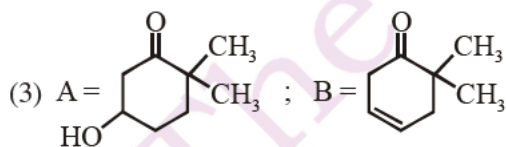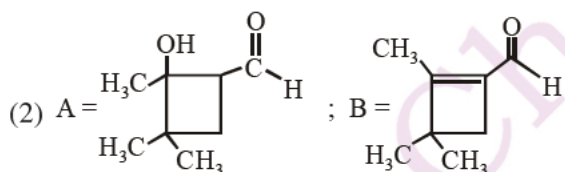   (4) Copper

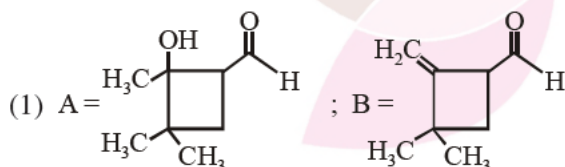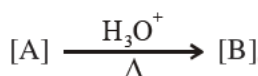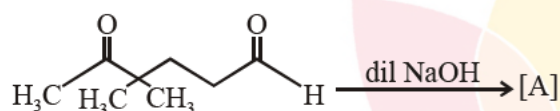**Ans. (2)**

18. Water samples with BOD values of 4 ppm and 18 ppm, respectively, are :
    (1) Highly polluted and Clean
    (2) Highly polluted and Highly polluted
    (3) Clean and Highly polluted
    (4) Clean and Clean

Ans. (3)

19. In the following reactions, products A and B are :

Ans. (4)

20. What is the work function of the metal if the light of wavelength 4000 Å generates photoelectrons of velocity 6×10^5 ms^{-1} form it ?
    (Mass of electron = 9×10^{-31} kg
    Velocity of light = 3×10^8 ms^{-1}
    Planck's constant = 6.626×10^{-34} Js
    Charge of electron = 1.6×10^{-19} JeV^{-1})
    (1) 0.9 eV
    (2) 4.0 eV
    (3) 2.1 eV
    (4) 3.1 eV

Ans. (3)

21. Among the following compounds most basic amino acid is :
    (1) Lysine
    (2) Asparagine
    (3) Serine
    (4) Histidine

Ans. (4)

22. The metal d-orbitals that are directly facing the ligands in $K_3[Co(CN)_6]$ are :
    (1) d_{xz}, d_{yz} and d_{z^2}
    (2) d_{xy}, d_{xz} and d_{yz}
    (3) d_{xy} and $d_{x^2-y^2}$
    (4) $d_{x^2-y^2}$ and d_{z^2}

Ans. (4)

23. The hardness of a water sample (in terms of equivalents of $CaCO_3$) containing 10^{-3} M $CaSO_4$ is :
    (molar mass of $CaSO_4$ = 136 g mol^{-1})
    (1) 100 ppm
    (2) 50 ppm
    (3) 10 ppm
    (4) 90 ppm

Ans. (1)

24. The correct order for acid strength of compounds
    $CH \equiv CH$, $CH_3 - C \equiv CH$ and $CH_2 = CH_2$
    is as follows :
    (1) $CH \equiv CH > CH_2 = CH_2 > CH_3 - C \equiv CH$
    (2) $HC \equiv CH > CH_3 - C \equiv CH > CH_2 = CH_2$
    (3) $CH_3 - C \equiv CH > CH_2 = CH_2 > HC \equiv CH$
    (4) $CH_3 - C \equiv CH > CH \equiv CH > CH_2 = CH_2$

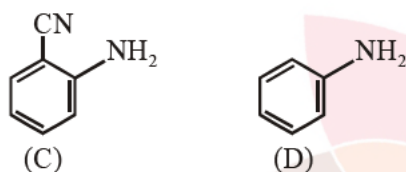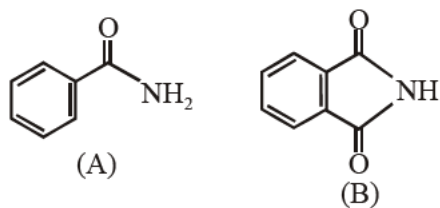**Ans. (2)**

25. $Mn_2(CO)_{10}$ is an organometallic compound due to the presence of :

(1) Mn – Mn bond

(2) Mn – C bond

(3) Mn – O bond

(4) C – O bond

Ans. (2)

26. The increasing order of reactivity of the following compounds towards reaction with alkyl halides directly is :

(1) (B) < (A) < (D) < (C)

(2) (B) < (A) < (C) < (D)
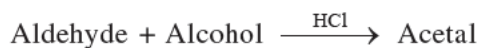
(3) (A) < (C) < (D) < (B)

(4) (A) < (B) < (C) < (D)

Ans. (2)

27. The pair of metal ions that can give a spinonly magnetic moment of 3.9 BM for the complex $[M(H_2O)_6]Cl_2$, is :

(1) Cr^{2+} and Mn^{2+} (2) V^{2+} and Co^{2+}

(3) V^{2+} and Fe^{2+} (4) Co^{2+} and Fe^{2+}

Ans. (2)

28. In the following reaction

Aldehyde + Alcohol $\xrightarrow{\text{HCl}}$ Acetal

Aldehyde	Alcohol
HCHO	ᵗBuOH
CH₃CHO	MeOH

Aldehyde   Alcohol

HCHO ^{t}BuOH

CH_3CHO MeOH

The best combinations is :

(1) HCHO and MeOH

(2) HCHO and ^{t}BuOH

(3) CH_3CHO and MeOH

(4) CH_3CHO and ^{t}BuOH

Ans. (1)

29. 50 mL of 0.5 M oxalic acid is needed to neutralize 25 mL of sodium hydroxide solution. The amount of NaOH in 50 mL of the given sodium hydroxide solution is :

(1) 40 g   (2) 20 g   (3) 80 g   (4) 10 g

Bonus

30. A metal on combustion in excess air forms X, X upon hydrolysis with water yields H_2O_2 and O_2 along with another product. The metal is :

(1) Rb   (2) Na   (3) Mg   (4) Li

Ans. (1)