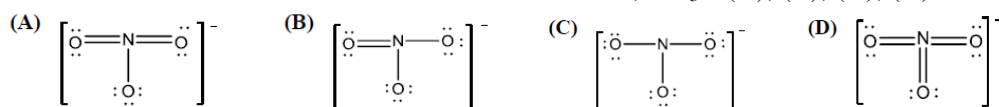
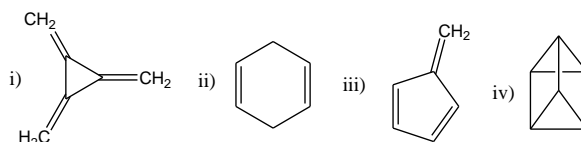


**UG Admission Test**  
**Subject: Chemistry: Model questions**  
**Department of Chemistry, Presidency University, Kolkata 700073**

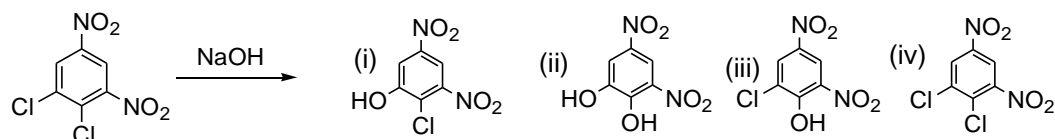
- Time required in which a radioactive element will reach its  $1/20^{\text{th}}$  of its amount will be ( $t_{1/2} = 3.80$  days): (A) 16.45 days; (B) 30 days; (C) 12.5 days; (D) 22.5 days.
- The correct order of 2<sup>nd</sup> ionization energy of C, N, O & F is:  
 (A) C > N > O > F; (B) O > N > F > C; (C) O > F > N > C; (D) F > O > N > C.
- Which of the following reaction is neither oxidation nor reduction?  
 (A)  $\text{CrO}_4^{2-} \rightarrow \text{Cr}^{3+}$  (B)  $\text{Cr}_2\text{O}_7^{2-} \rightarrow \text{CrO}_5$  (C)  $2\text{S}_2\text{O}_3^{2-} \rightarrow \text{S}_4\text{O}_6^{2-}$  (D)  $\text{MnO}_4^- \rightarrow \text{MnO}_2$
- Number of P-O bonds in  $\text{P}_4\text{O}_6$  is (A) 6; (B) 4; (C) 12; (D) 10.
- A compound 'X' on heating gives a colourless gas. The residue is dissolved in water to obtain Y. Excess  $\text{CO}_2$  is passed through aqueous solution of Y when Z is formed; Z on gentle heating gives back X. The compound X is; (A)  $\text{NaHCO}_3$ ; (B)  $\text{Na}_2\text{CO}_3$ ; (C)  $\text{Ca}(\text{HCO}_3)_2$ ; (D)  $\text{CaCO}_3$ .
- The ionization isomer of  $[\text{Cr}(\text{H}_2\text{O})_4\text{Cl}(\text{NO}_2)]\text{Cl}$  is; (A)  $[\text{Cr}(\text{H}_2\text{O})_4(\text{NO}_2)]\text{Cl}_2$ ; (B)  $[\text{Cr}(\text{H}_2\text{O})_4\text{Cl}_2](\text{NO}_2)$ ; (C)  $[\text{Cr}(\text{H}_2\text{O})_4\text{Cl}(\text{ONO})]\text{Cl}$ ; (D)  $[\text{Cr}(\text{H}_2\text{O})_4\text{Cl}_2(\text{NO}_2)] \cdot \text{H}_2\text{O}$ .
- If a species has 24 electrons, 26 protons and 30 neutrons, find the species and its charge  
 (A)  $\text{Fe}^{3+}$ ; (B)  $\text{Co}^{2+}$ ; (C)  $\text{Co}^{3+}$ ; (D)  $\text{Fe}^{2+}$ .
- When a chromium salt is fused with fusion mixture ( $\text{KNO}_3$  and solid  $\text{NaOH}$ ) the oxidation number of Cr changes from +3 to; (A) +4; (B) +2; (C) +6; (D) +7.
- The bond order of superoxide is; (A) 0.5; (B) 1.0; (C) 1.5; (D) 2.5.
- Of the following acids the one which has the capability to form complex compound and also possesses oxidizing and reducing properties is; (A)  $\text{HNO}_3$ ; (B)  $\text{HNO}_2$ ; (C)  $\text{HCOOH}$ ; (D)  $\text{HCN}$ .
- Which is a valid Lewis structure for the nitrate ion,  $\text{NO}_3^-$ ? (A), (B), (C), (D).



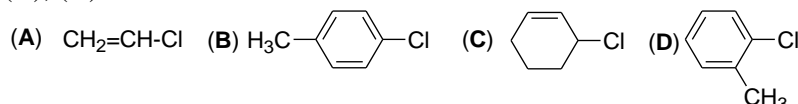
- Which of the following compounds gives only one monobromo derivative?



- (A) (i) only; (B) (i) & iii); (C) (i) & (iv); (D) (i), (ii) & (iv).
- The product in the following reaction is: (A) (i); (B) (ii); (C) (iii); (D) (iv)



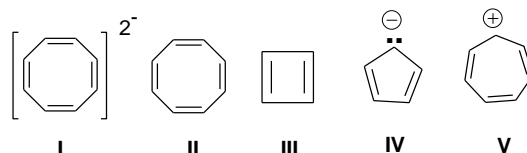
- An organic compound "X" when treated with aqueous ethanolic  $\text{AgNO}_3$  forms white ppt. "X" can be: (A), (B), (C), (D).



- "DBE" and number of possible structural and geometrical isomers of  $\text{C}_4\text{H}_8$  respectively are: (A) 1 & 6 (B) 1 & 7 (C) 1 & 5 (D) 2 & 4.
- The relative order of acidity of hydroxybenzoic acids is in the following order:

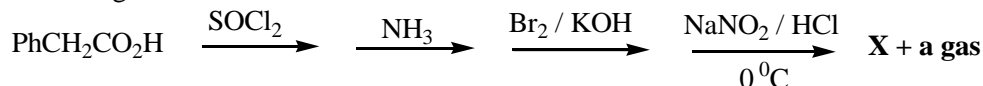
(A) iii > ii > i (B) iii > i > ii (C) i > iii > ii (D) i > ii > iii

17. Identify which amongst the following compound(s) is/are aromatic?



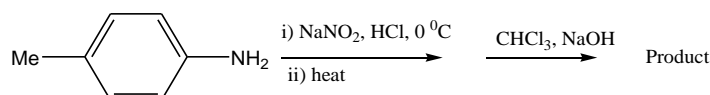
Options are: (A) I, II, V; (B) II, III, IV; (C) I, IV, V; (D) III, IV, V

18. In the following reaction:

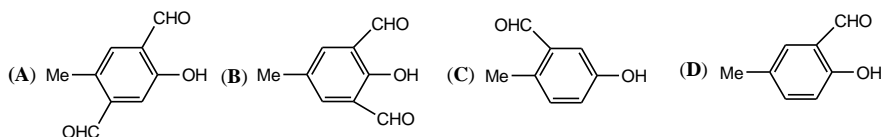


“X” is (A) PhCH<sub>2</sub>OH; (B) PhCH<sub>2</sub>CONH<sub>2</sub>; (C) PhCH<sub>2</sub>CH<sub>2</sub>OH; (D) PhOH.

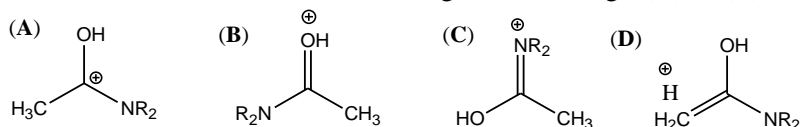
19.



Product is:



20. Which one is the most stable canonical form among the following: (A) or (B) or (C) or (D)?



21. A catalyst becomes ineffective by a catalytic poison because: (A) it combines chemically with one of the reactants; (B) it absorbs reactant molecules; (C) it is preferentially adsorbed on the catalyst; (D) none of these.

22. What is the wavelength ( $\lambda$ ) of an electron in the  $n$ th Bohr orbit? (A)  $\lambda = (n \times 0.529)$  Angstrom; (B)  $\lambda = (n \times 2 \times 3.14 \times 0.529)$  Angstrom; (C)  $\lambda = (n \times 2 \times 3.14 \times 0.529)^2$  Angstrom; (D) none of the above.

23. If an  $x$  molar acetic acid solution is  $y$  % ionized, the pH of the solution is: (A)  $\log(xy) - 2$ ; (B)  $2 + \log(xy)$ ; (C)  $2 - \log(xy)$ ; (D)  $-\log(xy) - 2$ .

24. What is the role of iron in the Haber process? (A) it shifts the position of equilibrium towards the product; (B) it decreases the rate of reaction; (C) it provides an alternative reaction pathway with a lower activation energy; (D) it reduces the enthalpy change of the reaction.

25. X-rays are produced when: (A) an electron is ejected from the outermost shell; (B) cathode rays are emitted; (C) canal rays are emitted; (D) an electron is ejected from the inner shell.

26. The value of van't Hoff factor ' $i$ ' in the case of dimerization (degree of dimerization =  $\alpha$ ) of benzoic acid in benzene is given by the expression: (A)  $i = 1 + \alpha$ ; (B)  $i = 1 - \alpha$ ; (C)  $i = 1 - \alpha/2$ ; (D)  $i = 1 + \alpha/2$ .

27. At what temperature will the average speed of H<sub>2</sub> molecules have the same value as O<sub>2</sub> has at 300K? (A) 18.75 K; (B) 20 K; (C) 10 K; (D) 100 K.

28. An unknown ideal gas weighs 70 g at STP and occupies a volume of 22.4 L. How much would it weigh at 27 °C and 760 mm Hg when it occupies a volume of 20 L? (A) 52.4 g; (B) 70 g; (C) 25.4 g; (D) none of these.

29. The solubility of Ca<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub> in water is  $y$  mol L<sup>-1</sup>. Its solubility product is (A)  $6y^4$ ; (B)  $36y^4$ ; (C)  $180y^5$ ; (D)  $108y^5$ .

30. Size distribution of colloidal particles can be determined by: (A) analyzing scattering of light by colloidal solution; (B) analyzing absorption of light by colloidal solution; (C) analyzing reflection of light by colloidal solution; (D) none of the above.

- 31.** For the reaction  $5\text{Br}^-(\text{aq}) + \text{BrO}_3^-(\text{aq}) + 6\text{H}^+(\text{aq}) \rightarrow 3\text{Br}_2(\text{aq}) + 3\text{H}_2\text{O}(\text{l})$ , the rate expression is found to be:  $\text{rate} = k[\text{Br}^-][\text{BrO}_3^-][\text{H}^+]^2$ . Which of the following statement is correct? **(A)** the overall order of the reaction is 12; **(B)** doubling the concentration of all the reactants simultaneously increases the rate 16 times; **(C)** the unit of the rate constant is  $\text{mol dm}^{-3} \text{s}^{-1}$ ; **(D)** a change in the concentrations of  $\text{Br}^-$  and  $\text{BrO}_3^-$  does not change the reaction rate.
- 32.** The slope of  $\log(\text{Pressure})$  vs  $\log(\text{density})$  at a constant temperature for an ideal gas is **(A)** 1; **(B)** -1; **(C)** 0.693; **(D)** none of these.
- 33.** The Brownian motion depends on: **(A)** temperature; **(B)** viscosity of the medium; **(C)** both; **(D)** none.

-----**XXX**-----