

**JEE Main January 2024**  
**Question Paper With Text Solution**  
**27 January | Shift-1**

**CHEMISTRY**



**JEE Main & Advanced | XI-XII Foundation| VI-X Pre-Foundation**

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1. Cyclohexene  is \_\_\_\_\_ type of an organic compound.

- (1) Benzenoid aromatic (2) Acyclic  
(3) Alicyclic (4) Benzenoid non-aromatic

Question Type : MCQ

Question ID : 533543447

Ans. Official Answer NTA (3)

Sol.

2. Element not showing variable oxidation states is :

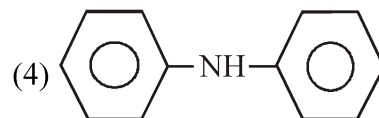
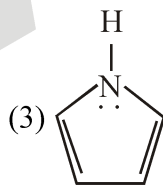
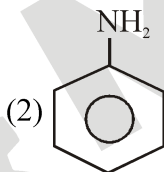
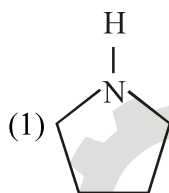
- (1) Iodine (2) Chlorine (3) Bromine (4) Fluorine

Question ID : 533543441

Ans. Official Answer NTA (4)

Sol.

3. Which of the following is strongest Bronsted base ?

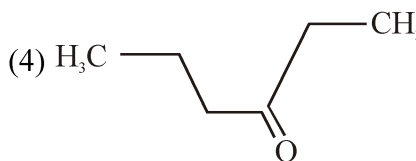
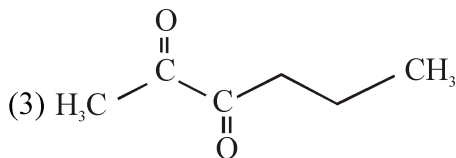
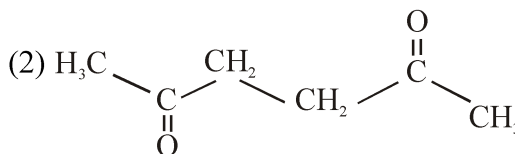
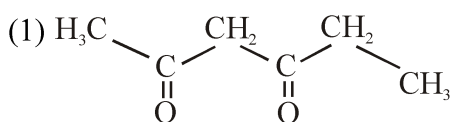


Question ID : 533543453

Ans. Official Answer NTA (1)

Sol.

4. Which of the following has highly acidic hydrogen ?



Question ID : 533543448

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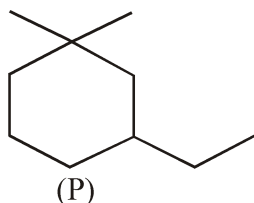
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Ans. Official Answer NTA (1)

Sol.

5. IUPAC name of following compound (P) is :



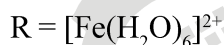
- (1) 1-Ethyl-3,3-dimethylcyclohexane
- (2) 3-Ethyl-1,1-dimethylcyclohexane
- (3) 1,1-Dimethyl-3-ethylcyclohexane
- (4) 1-Ethyl-5,5-dimethylcyclohexane

Question ID : 533543446

Ans. Official Answer NTA (2)

Sol.

6. Consider the following complex ions



The correct order of the complex ions, according to their spin only magnetic moment values (in B.M.) is :

- (1)  $R < P < Q$
- (2)  $R < Q < P$
- (3)  $Q < R < P$
- (4)  $Q < P < R$

Question ID : 533543445

Ans. Official Answer NTA (3)

Sol.

7. The electronic configuration for Neodymium is :

[Atomic Number for Neodymium 60]

- (1)  $[\text{Xe}] 4f^6 6s^2$
- (2)  $[\text{Xe}] 4f^1 5d^1 6s^2$
- (3)  $[\text{Xe}] 4f^4 6s^2$
- (4)  $[\text{Xe}] 5f^7 7s^2$

Question ID : 533543444

Ans. Official Answer NTA (3)

Sol.

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8. Two nucleotides are joined together by a linkage known as :

- (1) Peptide linkage (2) Disulphide linkage  
(3) Phosphodiester linkage (4) Glycosidic linkage

Question ID : 533543454

Ans. Official Answer NTA (3)

Sol.

9. Given below are two statements :

**Statement (I) :** The 4f and 5f - series of elements are placed separately in the Periodic table to preserve the principle of classification.

**Statement (II) :** s-block elements can be found in pure form in nature.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

- (1) Both Statement I and Statement II are false  
(2) Statement I is true but Statement II is false  
(3) Both Statement I and Statement II are true  
(4) Statement I is false but Statement II is true

Question ID : 533543440

Ans. Official Answer NTA (2)

Sol.

10. NaCl reacts with conc.  $H_2SO_4$  and  $K_2Cr_2O_7$  to give reddish fumes (B), which react with NaOH to give yellow solution (C). (B) and (C) respectively are :

- (1)  $CrO_2Cl_2$ ,  $Na_2CrO_4$  (2)  $Na_2CrO_4$ ,  $CrO_2Cl_2$   
(3)  $CrO_2Cl_2$ ,  $KHSO_4$  (4)  $CrO_2Cl_2$ ,  $Na_2Cr_2O_7$

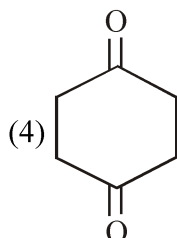
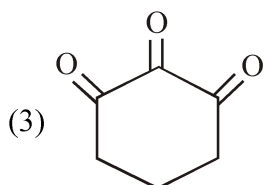
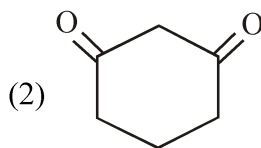
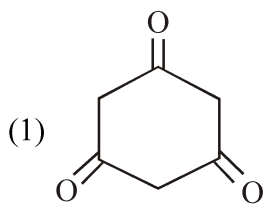
Question ID : 533543456

Ans. Official Answer NTA (1)

Sol.



11. Highest enol content will be shown by :



Question ID : 533543452

Ans. Official Answer NTA (1)

Sol.

12. Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

**Assertion (A)** : Melting point of Boron (2453 K) is unusually high in group 13 elements.

**Reason (R)** : Solid Boron has very strong crystalline lattice.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) (A) is true but (R) is false

(2) Both (A) and (R) are correct but (R) is not the correct explanation of (A)

(3) Both (A) and (R) are correct and (R) is the correct explanation (A)

(4) (A) is false but (R) is true

Question ID : 533543442

Ans. Official Answer NTA (3)

Sol.

13. A solution of two miscible liquids showing negative deviation from Raoult's law will have :

(1) decreased vapour pressure, decreased boiling point

(2) increased vapour pressure, decreased boiling point

(3) increased vapour pressure, increased boiling point

(4) decreased vapour pressure, increased boiling point

Question ID : 533543438

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Ans. Official Answer NTA (4)

Sol.

14. Given below are two statements :

**Statement (I) :** p-nitrophenol is more acidic than m-nitrophenol and o-nitrophenol.

**Statement (II) :** Ethanol will give immediate turbidity with Lucas reagent.

In the light of the above statements, choose the **correct** answer from the options given below :

(1) Both statement I and statement II are true

(2) Statement I is false but statement II is true

(3) Both statement I and statement II are false

(4) Statement I is true but statement II is false

Question ID : 533543450

Ans. Official Answer NTA (4)

Sol.

15. The correct statement regarding nucleophilic substitution reaction in a chiral alkyl halide is :

(1) Retention occurs in  $S_N1$  reaction and inversion occurs in  $S_N2$  reaction.

(2) Racemisation occurs in  $S_N1$  reaction and inversion occurs in  $S_N2$  reaction.

(3) Racemisation occurs in  $S_N1$  reaction and retention occurs in  $S_N2$  reaction.

(4) Racemisation occurs in both  $S_N1$  and  $S_N2$  reactions.

Question ID : 533543449

Ans. Official Answer NTA (2)

Sol.

16. Given below are two statements :

**Statement (I) :** Aqueous solution of ammonium carbonate is basic.

**Statement (II) :** Acidic/basic nature of salt solution of a salt of weak acid and weak base depends on  $K_a$  and  $K_b$  value of acid and the base forming it.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Statement I is incorrect but statement II is correct

(2) Statement I is correct but statement II is incorrect

(3) Both statement I and statement II are correct

(4) Both statement I and statement II are incorrect

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Question ID : 533543439

Ans. Official Answer NTA (3)

Sol.

17. Which of the following electronic configuration would be associated with the highest magnetic moment ?

- (1)
- $[\text{Ar}] 3d^7$
- (2)
- $[\text{Ar}] 3d^6$
- (3)
- $[\text{Ar}] 3d^3$
- (4)
- $[\text{Ar}] 3d^8$

Question ID : 533543443

Ans. Official Answer NTA (2)

Sol.

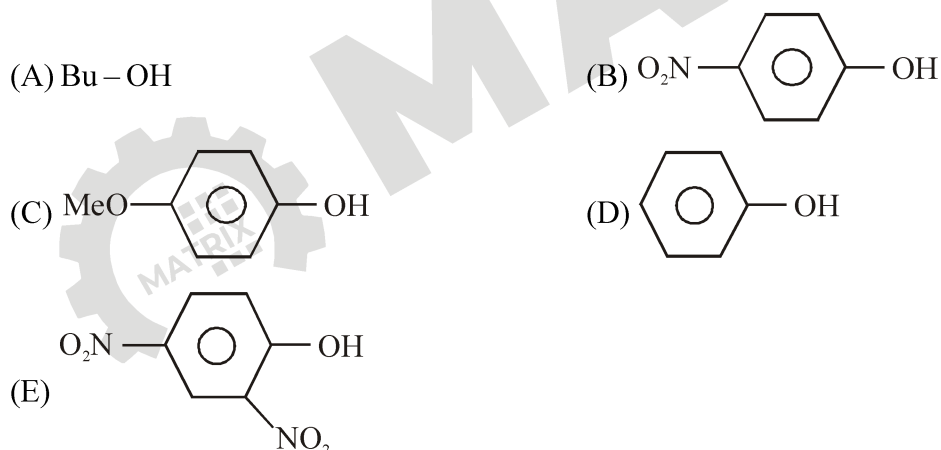
18. Choose the polar molecule from the following :

- (1)
- $\text{CH}_2 = \text{CH}_2$
- (2)
- $\text{CO}_2$
- (3)
- $\text{CCl}_4$
- (4)
- $\text{CHCl}_3$

Question ID : 533543437

Ans. Official Answer NTA (4)

Sol.

19. The ascending order of acidity of  $-\text{OH}$  group in the following compounds is :

- (1) (A) < (D) < (C) < (B) < (E)      (2) (C) < (A) < (D) < (B) < (E)
- 
- (3) (C) < (D) < (B) < (A) < (E)      (4) (A) < (C) < (D) < (B) < (E)

Question ID : 533543451

Ans. Official Answer NTA (4)

Sol.



20. Yellow compound of lead chromate gets dissolved on treatment with hot NaOH solution. The product of lead formed is a :

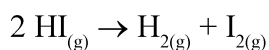
- (1) Dianionic complex with coordination number six
- (2) Dianionic complex with coordination number four
- (3) Neutral complex with coordination number four
- (4) Tetraanionic complex with coordination number six

Question ID : 533543455

Ans. Official Answer NTA (2)

Sol.

21. Consider the following data for the given reaction



	1	2	3
HI (mol L <sup>-1</sup> )	0.005	0.01	0.02
Rate (mol L <sup>-1</sup> s <sup>-1</sup> )	$7.5 \times 10^{-4}$	$3.0 \times 10^{-3}$	$1.2 \times 10^{-2}$

The order of the reaction is \_\_\_\_\_.

Question ID : 533543463

Ans. Official Answer NTA (2)

Sol.

22. Among the following, total number of meta directing functional groups is \_\_\_\_\_.

(Integer based)

$-\text{OCH}_3$ ,  $-\text{NO}_2$ ,  $-\text{CN}$ ,  $-\text{CH}_3$ ,  $-\text{NHCOCH}_3$ ,  $-\text{COR}$ ,  $-\text{OH}$ ,  $-\text{COOH}$ ,  $-\text{Cl}$

Question ID : 533543464

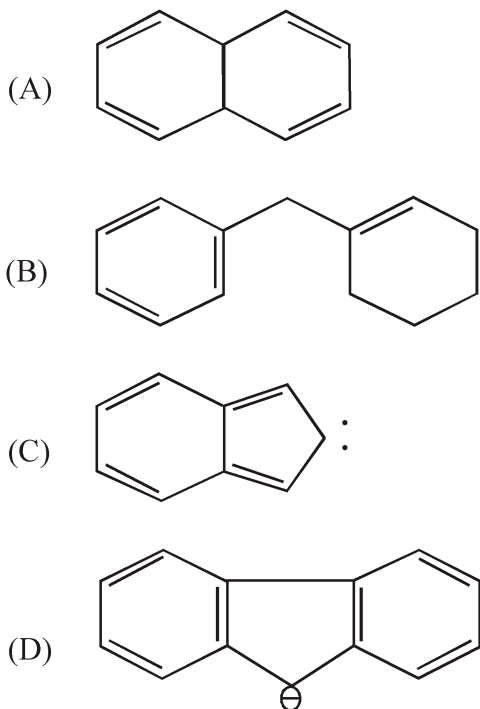
Ans. Official Answer NTA (4)

Sol.





23. Among the given organic compounds, the total number of aromatic compounds is \_\_\_\_\_.



Question ID : 533543465

Ans. Official Answer NTA (3)

Sol.

24. 3-Methylhex-2-ene on reaction with HBr in presence of peroxide forms an addition product (A).  
The number of possible stereoisomers for 'A' is \_\_\_\_\_.

Question ID : 533543466

Ans. Official Answer NTA (4)

Sol.

25. Sum of bond order of CO and  $\text{NO}^+$  is \_\_\_\_\_.

Question ID : 533543459

Ans. Official Answer NTA (6)

Sol.



26. The mass of silver (Molar mass of Ag :  $108 \text{ gmol}^{-1}$ ) displaced by a quantity of electricity which displaces 5600 mL of  $\text{O}_2$  at S.T.P. will be \_\_\_\_\_ g.

Question ID : 533543462

Ans. Official Answer NTA (108)

Sol.

27. From the given list, the number of compounds with +4 oxidation state of Sulphur is \_\_\_\_\_.  
 $\text{SO}_3$ ,  $\text{H}_2\text{SO}_3$ ,  $\text{SOCl}_2$ ,  $\text{SF}_4$ ,  $\text{BaSO}_4$ ,  $\text{H}_2\text{S}_2\text{O}_7$

Question ID : 533543461

Ans. Official Answer NTA (3)

Sol.

28. The number of electrons present in all the completely filled subshells having  $n=4$  and  $s = +\frac{1}{2}$  is \_\_\_\_\_.  
(Where  $n$  = principal quantum number and  $s$  = spin quantum number)

Question ID : 533543458

Ans. Official Answer NTA (16)

Sol.

29. Mass of methane required to produce 22 g of  $\text{CO}_2$  after complete combustion is \_\_\_\_\_ g.  
(Given Molar mass in  $\text{g mol}^{-1}$  C = 12.0  
H = 1.0  
O = 16.0)

Question ID : 533543457

Ans. Official Answer NTA (8)

Sol.

30. If three moles of an ideal gas at 300 K expand isothermally from  $30 \text{ dm}^3$  to  $45 \text{ dm}^3$  against a constant opposing pressure of 80 kPa, then the amount of heat transferred is \_\_\_\_\_ J.

Question ID : 533543460

Ans. Official Answer NTA (1200)

Sol.