

JEE Main 2024 Chemistry Question Paper Jan 27 Shift 1

1. Which of the following has maximum magnetic moment?

- (1) $3d^3$
 - (2) $3d^6$
 - (3) $3d^7$
-

2. Mass of methane required to produce 22 g of CO_2 upon combustion is

- (1) 6 g
 - (2) 10 g
 - (3) 8 g
 - (4) 12 g
-

3. Assertion: Boron has very high melting point (2453 K).

Reason: Boron has strong crystalline lattice.

- (A) Assertion is true; Reason is true; Reason correctly explains Assertion
 - (B) Assertion is true; Reason is true; Reason does not explain Assertion
 - (C) Assertion true; Reason false
 - (D) Assertion false; Reason true
-

4. Sum of bond order of CO and NO^+ is:

- (1) 4
 - (2) 5
 - (3) 6
 - (4) 7
-

5. How many of the following have +4 oxidation state of the central atom?

BaSO_4 , SOCl_2 , SF_4 , H_2SO_3 , $\text{H}_2\text{S}_2\text{O}_7$, SO_3

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

6. $\text{PbCrO}_4 + \text{NaOH}$ (hot excess) $\rightarrow$?

Product is:

- (1) dianionic ; CN = 4
 - (2) tetra-anionic ; CN = 6
 - (3) dianionic ; CN = 6
 - (4) tetra-anionic ; CN = 4
-

7. For negative deviation from Raoult's law:

- (1) BP increases ; VP increases
 - (2) BP decreases ; VP increases
 - (3) BP decreases ; VP decreases
 - (4) BP increases ; VP decreases
-

8. $\text{NaCl} + \text{H}_2\text{SO}_4 + \text{K}_2\text{Cr}_2\text{O}_7 \rightarrow \text{Products}$

The reaction gives red fumes (A) which on hydrolysis with aqueous NaOH gives yellow solution (B). Compounds (A) and (B) are:

- (1) CrO_2Cl_2 , Na_2CrO_4
 - (2) CrCl_3 , NaCrO_2
 - (3) CrO_3 , $\text{Na}_2\text{Cr}_2\text{O}_7$
 - (4) CrCl_2 , $\text{Na}_2\text{Cr}_2\text{O}_7$
-

9. Order of spin-only magnetic moment for:

FeF_6

$^{3-}$ (P), $[\text{V}(\text{H}_2\text{O})_6]^{2+}$ (Q), $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$ (R)

- (1) $\text{P} < \text{R} > \text{Q}$
 - (2) $\text{P} > \text{Q} > \text{R}$
 - (3) $\text{R} > \text{Q} > \text{P}$
 - (4) $\text{Q} > \text{P} > \text{R}$
-

10. Electronic configuration of Nd (Z = 60) is:

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

11. Statement-1: $(\text{NH}_4)_2\text{CO}_3$ is basic.

Statement-2: The acidic nature of salt of a weak acid (WA) and weak base (WB) depends on K_a of WA and K_b of WB.

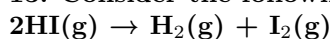
- (A) $\text{S}_1 \rightarrow \text{T}$; $\text{S}_2 \rightarrow \text{T}$
- (B) $\text{S}_1 \rightarrow \text{T}$; $\text{S}_2 \rightarrow \text{F}$
- (C) $\text{S}_1 \rightarrow \text{F}$; $\text{S}_2 \rightarrow \text{T}$

(D) $S_1 \rightarrow F$; $S_2 \rightarrow F$

12. Number of electrons present in all the completely filled subshells having $n = 4$ and $s = +\frac{1}{2}$.

- (1) 8
 - (2) 12
 - (3) 16
 - (4) 20
-

13. Consider the following data for the reaction:



	Experiment-1	Experiment-2
[HI] (mol/L)	0.005	0.01
Rate (mol L ⁻¹ s ⁻¹)	7.5×10^{-4}	3×10^{-3}

Find the order of reaction.

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

14. If 3 moles of an ideal gas at 300 K expand isothermally from 30 dm³ to 45 dm³ against constant pressure of 80 kPa, the amount of heat transferred is --- joule.

- (1) 800 J
 - (2) 900 J
 - (3) 1200 J
 - (4) 1500 J
-

15. The mass of silver ($Ag = 108$ g/mol) displaced by a quantity of electricity that displaces 5600 mL of O₂ at STP will be:

- (1) 54 g
 - (2) 81 g
 - (3) 108 g
 - (4) 216 g
-

16. Which of the following has oxidation state +4?

- (1) H₂S₂O₇
- (2) H₂SO₃

17. Which halogen does not show variable oxidation states?

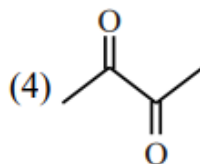
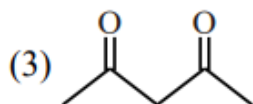
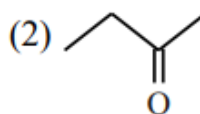
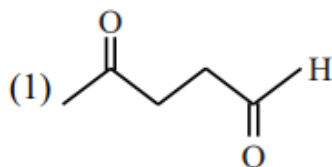
- (1) F_2
- (2) Cl_2
- (3) Br_2
- (4) I_2

18. Statement-1: The 4f and 5f series are written separately in the periodic table to preserve the principle of classification.

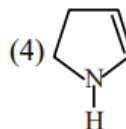
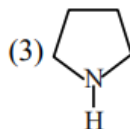
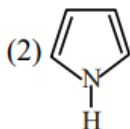
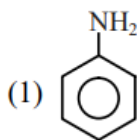
Statement-2: s-block elements are found on earth in pure form.

- (A) $S_1 \rightarrow T$; $S_2 \rightarrow T$
- (B) $S_1 \rightarrow T$; $S_2 \rightarrow F$
- (C) $S_1 \rightarrow F$; $S_2 \rightarrow T$
- (D) $S_1 \rightarrow F$; $S_2 \rightarrow F$

19. Which of the following compounds is most acidic?



20. Which of the following is the strongest Brønsted base?

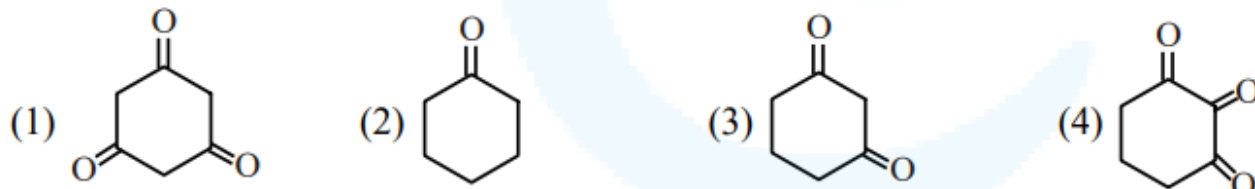


21. The correct statement regarding stereochemistry of S_N1 and S_N2 reactions is:

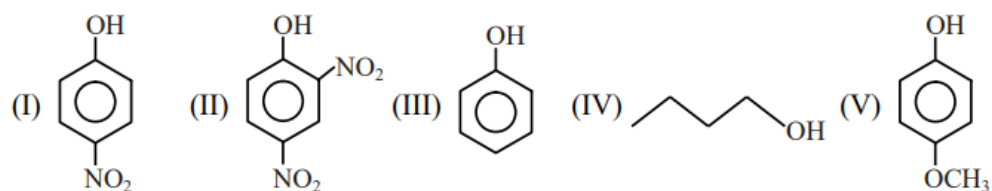
- (1) S_N1 – Racemisation ; S_N2 – Retention
- (2) S_N1 – Racemisation ; S_N2 – Inversion

- (3) S_N1 – Retention ; S_N2 – Inversion
(4) S_N1 – Inversion ; S_N2 – Retention
-

22. Which of the following has maximum enol content?

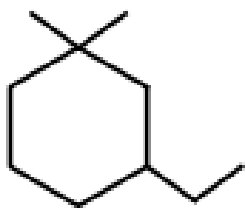


23. The correct order of acidic strength of the following compounds is:



- (1) $II > I > III > V > IV$
(2) $II > I > V > III > IV$
(3) $I > II > III > V > IV$
(4) $V > IV > III > I > II$
-

24. The correct IUPAC name of the following compound is:



- (1) 1,1-Dimethyl-3-ethyl cyclohexane
(2) 3-Ethyl-1,1-dimethyl cyclohexane
(3) 1-Ethyl-3,3-dimethyl cyclohexane
(4) 3,3-Dimethyl-1-ethyl cyclohexane
-

25. Cyclohexene is classified as:

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

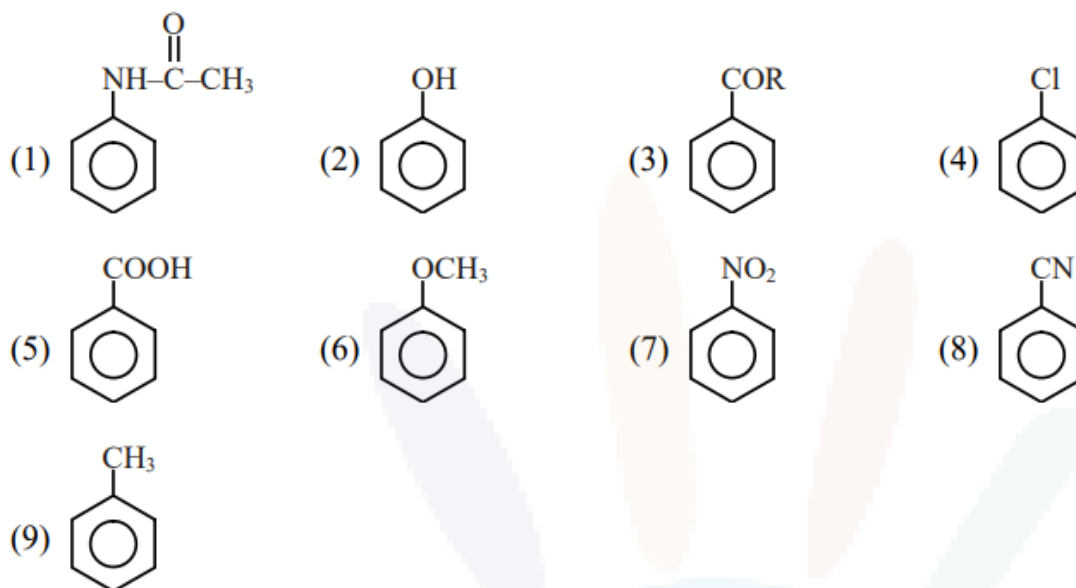
26. Which of the following is a polar solvent?

- (1) CCl_4
 - (2) CHCl_3
 - (3) $\text{CH}_2=\text{CH}_2$
 - (4) CO_2
-

27. When nucleotides form a dimer, the linkage present between them is:

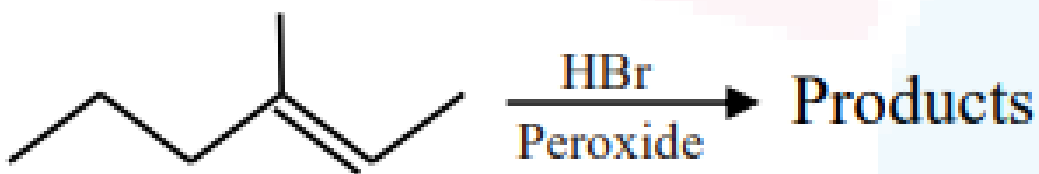
- (1) Disulphide linkage
 - (2) Glycosidic linkage
 - (3) Phosphodiester linkage
 - (4) Peptide linkage
-

28. How many groups show meta-directing effect on benzene ring?



- (1) 3
 - (2) 5
 - (3) 6
 - (4) 4
-

29. The following reaction is carried out with HBr in the presence of peroxide:
How many products including stereoisomers are obtained?



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