

# NARAYANA'S SENSATIONAL SUCCESS ACROSS INDIA

## 7 Students Secured 100 Percentile in All India JEE Main-2020

BELOW 10  
**21**  
RANKS  
All Cat

BELOW 100  
**113**  
RANKS  
All Cat



## ADMISSIONS OPEN (2020-21)

### OUR REGULAR CLASSROOM PROGRAMME

**One Year Classroom Program**  
**JEE/NEET-2021**  
(for students moving from XI to XII)

**Two Year Classroom Program**  
**JEE/NEET-2022**  
(for students moving from X to XI)

**Three Year Integrated Classroom Program**  
**JEE/NEET-2023**  
(for students moving from IX to X)

**Four Year Integrated Classroom Program**  
**JEE/NEET-2024**  
(for students moving from VIII to IX)

**FOUNDATION PROGRAMMES**  
**For NTSE, NSEJS, JSTSE,**  
**Olympiads & School/Board Exams**  
(for students moving to  
Class VI, VII, VIII, IX & X)

**APEX BATCH**  
**Two years school Integrated**  
**Classroom Program - 2022**  
For JEE Main & Advance / NEET (for XI Studying Students)  
**Course Feature** - Complete Coverage of CBSE - Regular Classes - Weekly Test & Regular Analysis - Lab Facility  
- Motivation & Counseling - Competitive Exam Prep - Ample time for self study

#### Online Classes for IIT/NEET/Foundation/Olympiads

- Access Recording of Past Classes on n-Learn App
- Online Parent Teacher Meeting
- Personalized Extra Classes & Live Doubt Solving
- Hybrid/Customized Classroom model
- Video Solution of Weekly/Fortnightly Test
- Printed Study Material will be sent by us
- n-Learn App
- Counselling Motivational sessions
- Affordable Fee
- Doubt Classes / Practice Classes
- Provision to Convert from online to regular classroom programme
- Once Classes resume by just paying nominal fee

#### Online Test

- Micro & Macro Analysis
- Relative performance (All India Ranking)
- Question wise Analysis
- Unlimited Practice Test
- Grand Test

**NARAYANA**

**Digital**  
**Classes**  
STUDY ONLINE FROM HOME

**For Class**  
**7<sup>th</sup> to 12<sup>th</sup> +**





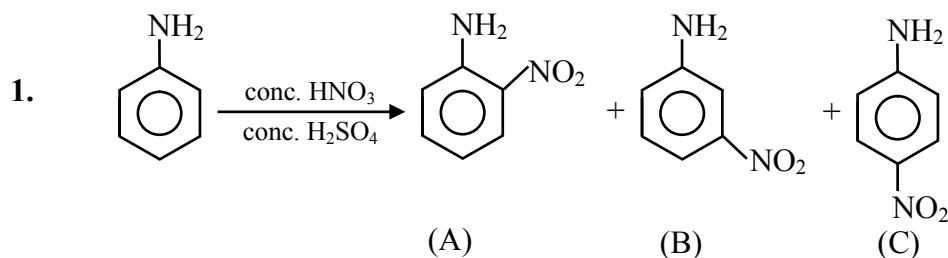
**JEE-MAIN-2021**

**MARCH ATTEMPT**

**18.03.21\_SHIFT - II**

**CHEMISTRY**

## CHEMISTRY



Select the correct order of percentage yield of products A, B & C respectively -

- (1)  $A > B > C$               (2)  $B > A > C$               (3)  $A > C > B$               (4)  $C > B > A$

Ans. (4)

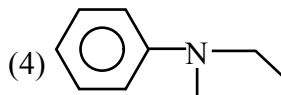
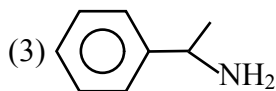
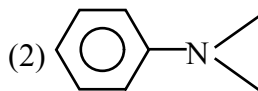
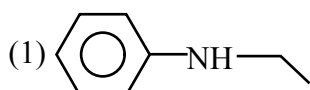
2. Statement-1: Thermal power plant waste is non biodegradable.

Statement-2: Biodegradable detergent causes eutrophication.

- (1) Both Statement-1 and Statement-2 are correct  
 (2) Both Statement-1 and Statement-2 are false  
 (3) Statement-1 is correct and Statement-2 is false  
 (4) Statement-1 is false and Statement-2 is correct

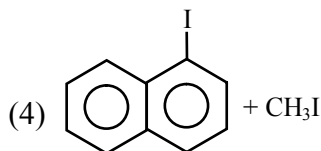
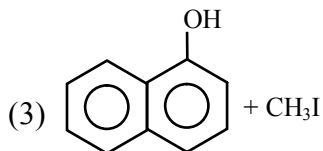
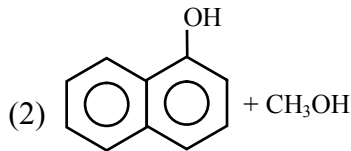
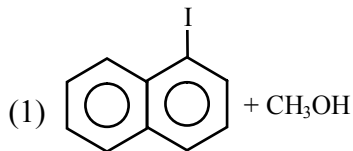
Ans. (1)

3. Compound A reacts with benzene sulfonyl chloride to form B which is soluble in NaOH. Compound A is-

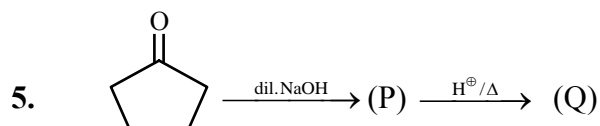


Ans. (3)

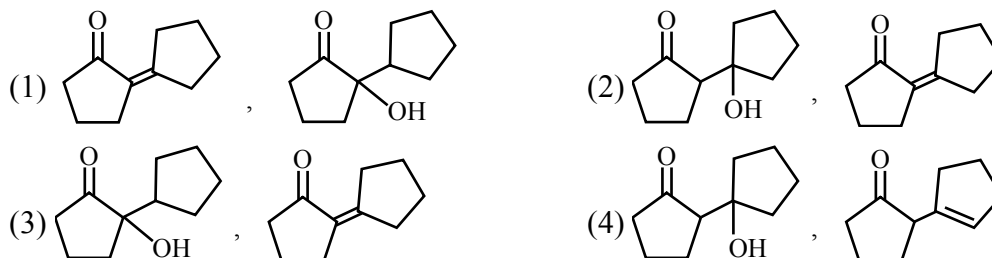
4. What product are obtained when 1-Methoxy naphthalene reacts with hydroiodic acid?



Ans. (3)



(P) and (Q) respectively are :



Ans. (2)

6. Match the column

**Column-I**

- (A) Artificial sugar  
 (B) Tranquilizer  
 (C) Antifertility drug  
 (D) Antacid

**Column-II**

- (i) Meprobamate  
 (ii) Ranitidine  
 (iii) Norethindrone  
 (iv) Alitame

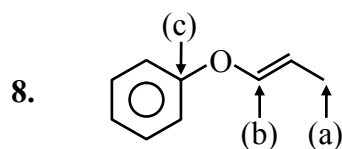
- (1) (A) → (iv) ; (B) → (i) ; (C) → (iii) ; (D) → (ii)  
 (2) (A) → (iv) ; (B) → (i) ; (C) → (ii) ; (D) → (iii)  
 (3) (A) → (iv) ; (B) → (iii) ; (C) → (i) ; (D) → (ii)  
 (4) (A) → (i) ; (B) → (iii) ; (C) → (iv) ; (D) → (ii)

Ans. (1)

7. Vitamin K deficiency causes -

- (1) increased blood clotting time.                      (2) decreased blood clotting time.  
 (3) increased fragility of RBCs.                        (4) night blindness.

Ans. (1)



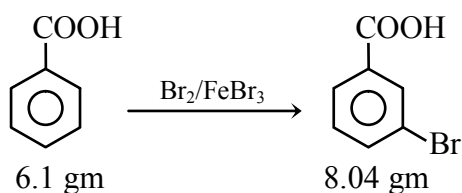
Hybridisation of marked carbon atoms a, b and c are respectively-

- (1)  $sp^3$ ,  $sp^3$ ,  $sp^3$                       (2)  $sp^2$ ,  $sp^2$ ,  $sp^3$                       (3)  $sp^3$ ,  $sp^2$ ,  $sp^2$                       (4)  $sp^3$ ,  $sp^2$ ,  $sp$

Ans. (3)



9. Percentage yield of product obtained in the following reaction is



Ans. (80)

10. In the reaction of benzamide with hypobromite CO group is obtained in the form of -  
 (1) CO (2) CO<sub>2</sub> (3) CO<sub>3</sub><sup>-2</sup> (4) HCO<sub>3</sub><sup>-</sup>

Ans. (3)

11. Match the column

**Column-I**

- (A) Be  
(B) Mg  
(C) Ca  
(D) Ra

**Column-II**

- (P) Used in treatment of cancer  
(Q) Used in reduction of metals  
(R) Used for making windows of x-ray tubes  
(S) Used in signal & explosive

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

Ans. (1)

12. H<sub>2</sub>O<sub>2</sub> in basic medium shows which of the following reaction

- (A) Mn<sup>2+</sup> → Mn<sup>4+</sup>  
 (B) I<sub>2</sub> → I<sup>-</sup>  
 (C) PbS → PbSO<sub>4</sub>

- (1) A & B (2) A only (3) B & C (4) B only

Ans. (1)

Sol. ⇒ PbS(s) + H<sub>2</sub>O<sub>2</sub> → PbSO<sub>4</sub>(s) + H<sub>2</sub>O

This reaction occurs in acidic medium

⇒ all other occur in basic medium.

13. An ideal gas is taken in a container which is divided into 2 parts by a partition. Entropy of the parts is S<sub>1</sub> & S<sub>2</sub>. What will be the entropy if partition is removed?

- (1) S<sub>1</sub> + S<sub>2</sub> (2) S<sub>1</sub> × S<sub>2</sub> (3)  $\frac{S_1}{S_2}$  (4)  $\frac{S_2}{S_1}$

Ans. (1)

Sol. Entropy is an extensive property

14.  $2A \longrightarrow A_2$   
 $T = 400 \text{ K}$ ,  
 $K_{eq} = x \times 10^{-4}$ ,  
 $\Delta G^\circ = 25.2 \text{ kJ/mol}$ ,  
 $R = 8.3 \text{ J/k-mol}$   
 Determine x?

**Ans. (5)**

**Sol.**  $\Delta G^\circ = -RT \ln K_{eq}$   
 $25.2 \times 10^3 = -2.3 \times 8.3 \times 400 \log_{10} K_{eq}$   
 $\log_{10} K_{eq} = -3.3$   
 $\therefore K_{eq} = 5 \times 10^{-4}$

15. In a first order reaction,  $t_{1/2} = 1 \text{ min}$ . Time taken for 99.9% completion is ..... min.  
 ( $\ln 2 = 0.69$ ,  $\ln 10 = 2.3$ )

**Ans. (10)**

**Sol.**  $k = \frac{1}{t} \ln \left( \frac{C_0}{C_t} \right)$   
 $\frac{\ln 2}{1} = \frac{1}{t} \ln \left( \frac{100}{0.1} \right) \therefore t = \frac{\ln 1000}{\ln 2} = \frac{3 \times 2.3}{0.69} = 10$

16. Match the column

**Column-A**  
**Metals**

- (A) Ni  
 (B) Si  
 (C) Cu  
 (D)

**Column-B**

**Refining process**

- (p) Vapour phase refining  
 (q) Electrolytic refining  
 (r) Zone refining

- (1) A — p ; B — r ; C — q ; D —  
 (2) A — p ; B — q ; C — r ; D —  
 (3) A — r ; B — p ; C — q ; D —  
 (4) A — ; B — r ; C — q ; D — p

**Ans. (1)**

17. **Statement-1** : Bohr's model helps in explaining spectral lines and stability of  $\text{Li}^+$   
**Statement-2** : Bohr's model fails to explain splitting of spectral lines in magnetic field.  
 (1) Both Statement-1 and Statement-2 are correct  
 (2) Both Statement-1 and Statement-2 are false  
 (3) Statement-1 is correct and Statement-2 is false  
 (4) Statement-1 is false and Statement-2 is correct

**Ans. (4)**



18. CdS & TiO<sub>2</sub> have \_\_\_\_\_ & \_\_\_\_\_ charged colloidal particles.

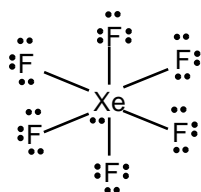
- (1) -, +                      (2) +, +                      (3) -, -                      (4) +, -

Ans. (1)

19. Upon partial hydrolysis of A, XeO<sub>2</sub>F<sub>2</sub> gets formed. Number of lone pairs in A = ?

Ans. (19)

Sol.  $\text{XeF}_6 \xrightarrow{\text{Partial hydrolysis}} \text{XeO}_2\text{F}_2 + \text{HF}$



No. of lone pair =  $3 \times 6 + 1 = 19$

20. CuSO<sub>4</sub>.5H<sub>2</sub>O has x secondary valency of Cu<sup>2+</sup> & y H<sub>2</sub>O molecules bonded through H-bonding. x & y are respectively :

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

Ans. (1)

21. Boiling point of 2 molal aqueous solution of a non volatile solute is 100.52°C. Determine percentage of dimerisation of solute in solution. (Given K<sub>b</sub> = 0.52 K kg mol<sup>-1</sup> of H<sub>2</sub>O)

Ans. (100)

Sol.  $\Delta T_b = K_b \times i \times m$

$$0.52 = 0.52 \times i \times 2$$

$$i = \frac{1}{2}$$

$$\text{for dimerisation } i = 1 + \left( \frac{1}{2} - 1 \right) \alpha = \frac{1}{2}$$

$$\alpha = 1 \text{ (100 \%)}$$

22. Arrange the following species in decreasing order of oxidation number of nitrogen.

NO, N<sub>2</sub>O, NO<sub>3</sub><sup>-</sup>, NO<sub>2</sub>

$$(1) \text{NO}_3^- > \text{NO}_2 > \text{NO} > \text{N}_2\text{O}$$

$$(2) \text{NO}_2 > \text{NO}_3^- > \text{NO} > \text{N}_2\text{O}$$

$$(3) \text{N}_2\text{O} > \text{NO} > \text{NO}_2 > \text{NO}_3^-$$

$$(4) \text{NO}_3^- > \text{NO}_2 > \text{N}_2\text{O} > \text{NO}$$

Ans. (1)

Sol. NO<sub>3</sub><sup>-</sup>

$$x + 3(-2) = -1$$

$$x = +5$$

NO<sub>2</sub>

$$x + 2(-2) = 0$$

$$x = 4$$

NO

$$x + 1(-2) = 0$$

$$x = 2$$

$N_2O$

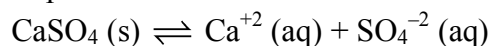
$$2x + 1(-2) = 0$$

$$x = 1$$

- 23.** Solubility of  $CaSO_4$  in pure water is  $8 \times 10^{-4}$  M. If solubility of  $CaSO_4$  in 0.01 M  $H_2SO_4$  is  $x \times 10^{-6}$  M, determine x.

**Ans. (64)**

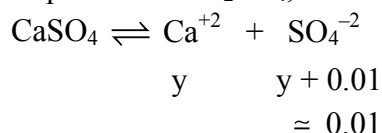
**Sol.** In pure  $H_2O$



$$K_{sp} = x^2 \text{ (x: solubility in pure } H_2O \text{)}$$

$$K_{sp} = 64 \times 10^{-8} = 6.4 \times 10^{-7}$$

In presence of  $H_2SO_4$ , Let solubility = y mol/L



$$\Rightarrow K_{sp} = [Ca^{+2}][SO_4^{-2}]$$

$$\Rightarrow 6.4 \times 10^{-7} = y(10^{-2})$$

$$\Rightarrow y = 6.4 \times 10^{-5} = 64 \times 10^{-6} = x \times 10^{-6}$$

$$x = 64$$

- 24.** If  $O_2$  behaves as ideal gas, find ratio of root mean square velocity & average velocity.

(1)  $\sqrt{\frac{3\pi}{8}}$

(2)  $\sqrt{\frac{3}{3}}$

(3)  $\sqrt{\frac{8\pi}{3}}$

(4)  $\sqrt{\frac{3\pi}{2}}$

**Ans. (1)**

**Sol.**  $v_{rms} = \sqrt{\frac{3RT}{M_o}}$

$$v_{avg} = \sqrt{\frac{8RT}{\pi M_o}}$$

$$\frac{v_{rms}}{v_{avg}} = \sqrt{\frac{3\pi}{8}}$$



25. The molar conductivity of  $\text{BaSO}_4$  at infinite dilution is :-

Given:  $\lambda_m^\circ (\text{BaCl}_2) = 278 \, \Omega^{-1} \text{mol}^{-1} \text{cm}^2$

$$\lambda_m^\circ (\text{H}_2\text{SO}_4) = 860 \, \Omega^{-1} \text{mol}^{-1} \text{cm}^2$$

$$\lambda_m^\circ (\text{HCl}) = 426 \, \Omega^{-1} \text{mol}^{-1} \text{cm}^2$$

**Ans. (286)**

**Sol.**  $\lambda_m^\circ (\text{BaCl}_2) = \lambda_m^\circ (\text{Ba}^{+2}) + \lambda_m^\circ (\text{SO}_4^{-2})$

$$= \lambda_m^\circ (\text{BaCl}_2) + \lambda_m^\circ (\text{H}_2\text{SO}_4) - 2\lambda_m^\circ (\text{HCl})$$
$$= 278 + 860 - 2 \times 426$$
$$= 286 \, \Omega^{-1} \text{mol}^{-1} \text{cm}^2$$