

# 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

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## 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> +**





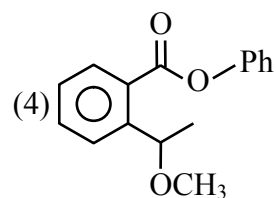
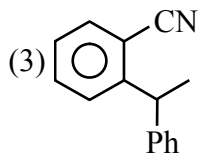
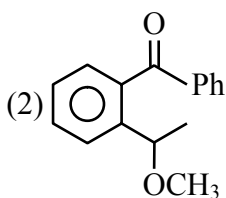
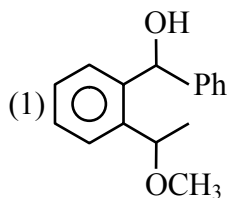
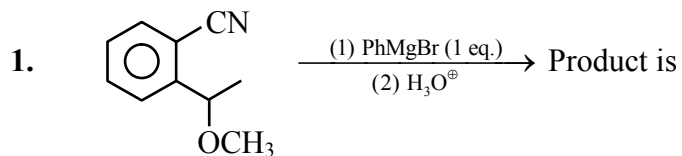
**JEE-MAIN-2021**

**MARCH ATTEMPT**

**16.03.21\_SHIFT - II**

**CHEMISTRY**

## CHEMISTRY



Ans. (2)

2. Green house gases are

(I) CO<sub>2</sub>

(II) Methane

(III) O<sub>2</sub>

(IV) Water vapour

(1) I, II, III

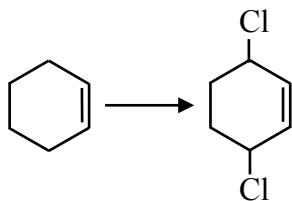
(2) I, II, IV

(3) I, III

(4) III, IV

Ans. (2)

3. Which of the following reagent is used for given conversion?



(1) Anhydrous AlCl<sub>3</sub>/Cl<sub>2</sub>(dark)

(2) HCl + ZnCl<sub>2</sub>

(3) Cl<sub>2</sub>/hν

(4) Cl<sub>2</sub>/CCl<sub>4</sub>

Ans. (3)

4. Match the column

(A) CuO

(I) Halogen

(B) AgNO<sub>3</sub>

(II) Sulphur

(C) Lassaingne

(III) Carbon

(D) Black ppt with (CH<sub>3</sub>COO)<sub>2</sub>Pb

(IV) Nitrogen

(1) A→ III ; B→ I ; C→ IV , D→ II

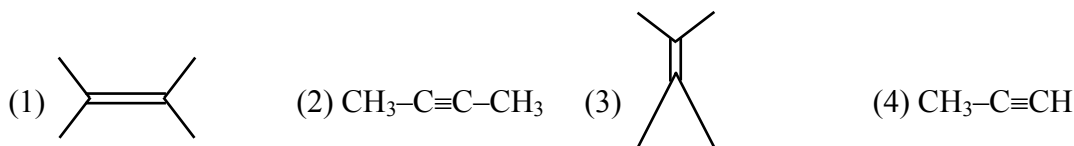
(2) A→ IV ; B→ III ; C→ II , D→ I

(3) A→ III ; B→ I ; C→ II , D→ IV

(4) A→ IV ; B→ I ; C→ III , D→ II

Ans. (1)

5. Compound (X)  $\xrightarrow{\text{O}_3}$  Y  $\xrightarrow{\text{AgNO}_3}$  silver mirror  
Which of the following is [X]



Ans. (4)

6. Wooden laminates are made by

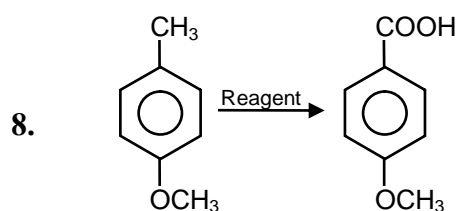
- (1) Urea–formaldehyde resin (2) Melamine–formaldehyde resin  
(3) Phenol–formaldehyde resin (4) PVC

Ans. (2)

7. Which of the following is least basic among the following compounds?

- (1)  $\text{Et}_3\text{N}$  (2)  $(\text{Et})_2\text{NH}$  (3)  $(\text{CH}_3\text{CO})_2\text{NH}$  (4)  $\text{CH}_3\text{--C(=O)--NH--Et}$

Ans. (3)



Reagent is

- (1)  $\text{LiAlH}_4$  (2)  $\text{NaBH}_4$  (3)  $\text{ZnHg/HCl}$  (4)  $\text{KMnO}_4/\text{H}^+$

Ans. (4)

9. Ammonolysis of alkyl halide to prepare primary, secondary and tertiary amines followed by NaOH is

- (1) to remove acidic impurities  
(2) to remove basic impurities  
(3) to activate halide  
(4) to activate ammonia

Ans. (1)

10. Secondary structure of protein is stabilized by

- (1) H-bond (2) Vanderwaal force of attraction  
(3) Peptide bond (4) Glycosidic linkage

Ans. (1)



**11. Statement-1:** NaH can be used as an oxidising agent.

**Statement-2:** Pyridine is basic due to lone pair of nitrogen.

(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)

**12.** Vapour pressure of pure liquid A & B are 21 & 18 mm of Hg respectively. Determine vapour pressure of a solution (in mm of Hg) obeying Raoult's law containing 1 mole of A & 2 mole of B.

**Ans.** (19)

**Sol.**  $X_A = \frac{1}{1+2} = \frac{1}{3}$

$$X_B = \frac{2}{3}$$

$$P_A^\circ = 21 \text{ mm of Hg}$$

$$P_B^\circ = 18 \text{ mm of Hg}$$

$$P_{\text{total}} = P_A^\circ X_A + P_B^\circ X_B$$

$$= 21 \times \frac{1}{3} + 18 \times \frac{2}{3}$$

$$= 7 + 12 = 19 \text{ mm of Hg}$$

**13.** Two elements A & B have following ionisation energy data:

	<b>IE<sub>1</sub></b>	<b>IE<sub>2</sub></b>
A	400	4000 (in kJ/mol)
B	700	1400 (in kJ/mol)

A & B are respectively :

(1) Na, Mg

(2) Mg, Na

(3) Na, F

(4) Mg, F

**Ans.** (1)

**14.** Half life time of two first order reactions

A  $\longrightarrow$  Products

B  $\longrightarrow$  Products

are 54 & 18 min respectively. Starting with equimolar quantities of A & B, determine the time after which  $[A] = 16 [B]$

**Ans.** (108)

**Sol.**  $[A]_t = \frac{[A]_0}{2^{\frac{\text{Time}}{54}}}$        $[B]_t = \frac{[B]_0}{2^{\frac{\text{Time}}{18}}}$

$$\therefore [A]_0 = [B]_0 \text{ and } [A]_t = 16 [B]_t$$

$$\frac{[A]_0}{2^{\frac{T}{54}}} = 16 \frac{[A]_0}{2^{\frac{T}{18}}}$$

$$16 = 2^{\frac{T}{18} - \frac{T}{54}}$$

$$16 = 2^{\frac{2T}{54}}$$

$$2^4 = 2^{\frac{2T}{54}}$$

$$4 = \frac{2T}{54}$$

$$T = 108 \text{ min}$$

**15.** If both  $\text{FeX}_2$  &  $\text{FeY}_3$  are found to exist, X & Y can be :

(1) X = F, Cl, Br, I    Y = F, Cl, Br    (2) X = Cl, Br, I    Y = F, Cl, Br, I

(3) X = F, Cl, Br    Y = Cl, Br, I    (4) X = F, Cl, Br, I    Y = F, Cl, Br, I

**Ans.** (1)

**Sol.**  $\text{FeI}_3$  does not exist because of  $\text{I}^-$  being very good reducing agent.

**16.** Which of the following cannot be reduced by coke?

(1)  $\text{Al}_2\text{O}_3$     (2)  $\text{ZnO}$     (3)  $\text{Fe}_2\text{O}_3$     (4)  $\text{Cu}_2\text{O}$

**Ans.** (1)

**17.** Volume of 1 M NaOH solution required to neutralise 50 mL 1M  $\text{H}_3\text{PO}_3$  & 100 ml 2M  $\text{H}_3\text{PO}_2$  respectively are

(1) 100 ml, 200 ml    (2) 200 ml, 100 ml    (3) 50 ml, 100 ml    (4) 100 ml, 50 ml

**Ans.** (1)

**Sol.** (1)  $2\text{NaOH} + \text{H}_3\text{PO}_3 \longrightarrow \text{Na}_2\text{HPO}_3 + 2\text{H}_2\text{O}$   
                  100 m mole    50 m mole

$$100 \text{ m mole} = M \times V_{\text{ml}}$$

$$100 \text{ m mole} = 1 \times V_{\text{ml}}$$

$$V_{\text{ml}} = 100 \text{ ml}$$

(2)  $\text{NaOH} + \text{H}_3\text{PO}_2 \longrightarrow \text{NaH}_2\text{PO}_2 + \text{H}_2\text{O}$   
                  200 m mole    200 m mole

$$200 \text{ m mole} = M \times V_{\text{ml}}$$

$$V_{\text{ml}} = 200 \text{ ml}$$

- 
18. Elements with atomic number 33, 53 & 83 are respectively
- (1) Metalloid, Non-metal, Metal                      (2) Metal, Non-metal, Metalloid  
(3) Non-metal, Metal, Metalloid                      (4) Metalloid, Metal, Non-metal

**Ans.** (1)

**Sol.**

Atomic number		Element
33	→	As (Metalloid)
53	→	I (Non-metal)
83	→	Bi (Metal)

19. Which of the following are correct for  $\text{H}_2\text{O}_2$
- (A) Used in pollution control treatment of industrial effluents.  
(B)  $\text{H}_2\text{O}_2$  can act as both oxidising agent & reducing agent  
(C) Miscible in water  
(D) two hydroxy groups are in same plane
- (1) ABC                      (2) ACD                      (3) ABCD                      (4) BCD

**Ans.** (1)

**Sol.** In  $\text{H}_2\text{O}_2^{-1}$  oxidation state of oxygen is  $-1$  therefore acts both as oxidising agent & reducing agent.  
 $\text{H}_2\text{O}_2$  is miscible in water due to intermolecular H-bonding.  
 $\text{H}_2\text{O}_2$  has open book structure in which both  $-\text{OH}$  groups are not in same plane

20. Arrange the following compounds (assuming to be high spin) in increasing order of spin magnetic moment :
- (1)  $(\text{NH}_4)_2[\text{Ce}(\text{NO}_3)_6] < \text{Eu}(\text{NO}_3)_3 < \text{Gd}(\text{NO}_3)_3$   
(2)  $(\text{NH}_4)_2[\text{Ce}(\text{NO}_3)_6] < \text{Gd}(\text{NO}_3)_3 < \text{Eu}(\text{NO}_3)_3$   
(3)  $\text{Eu}(\text{NO}_3)_3 < \text{Gd}(\text{NO}_3)_3 < (\text{NH}_4)_2[\text{Ce}(\text{NO}_3)_6]$   
(4)  $\text{Gd}(\text{NO}_3)_3 < (\text{NH}_4)_2[\text{Ce}(\text{NO}_3)_6] < \text{Eu}(\text{NO}_3)_3$

**Ans.** (1)

**Sol.**  $(\text{NH}_4)_2[\text{Ce}(\text{NO}_3)_6]$  ( $n=0$ )  $\Rightarrow \mu = 0 \text{ BM}$   
 $\text{Eu}(\text{NO}_3)_3$  ( $n=6$ )  $\Rightarrow \mu = 6.93 \text{ BM}$   
 $\text{Gd}(\text{NO}_3)_3$  ( $n=7$ )  $\Rightarrow \mu = 7.94 \text{ BM}$



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**21.** Gallium (At. Mass = 70) crystallises in HCP lattice. If the total number of voids in 0.581 gram of gallium is  $x \times 10^{21}$  then determine 'x' :

**Ans.** 15

**Sol.** No. of moles of Ga =  $\frac{0.581}{70}$

$$\text{No. of atoms of Ga} = \frac{0.581}{70} \times N_A$$

$$\therefore \text{Total no. of voids} = \frac{0.581}{70} \times N_A \times 3$$

$$= 0.0249 \times 6 \times 10^{23}$$

$$= 15 \times 10^{21}$$

As there are one octahedral void and two tetrahedral voids per atom.

**22.** Which of the following is incorrect?

- (1)  $\text{Al}^{3+} > \text{Na}^+$  flocculation power
- (2) Colloids show Brownian motion
- (3) Colloids show colligative property
- (4) Colloidal solution can not pass through ordinary filter paper

**Ans.** (4)

**Sol.** Colloidal solution can pass through ordinary filter paper but can not pass through special filter paper.

**23.** Number of orbitals having  $m_\ell = +2$  in  $n = 5$  are:

**Ans.** (3)

**Sol.**  $n = 5$

$$\ell = 0, 1, 2, 3, 4$$

$$\ell = 2 \rightarrow m = -2, -1, 0, +1, +2$$

$$\ell = 3 \rightarrow m = -3, -2, -1, 0, +1, +2, +3$$

$$\ell = 4 \rightarrow m = -4, -3, -2, -1, 0, +1, +2, +3, +4$$

**24.** Incorrect statement regarding  $\text{C}_{60}$  is:

- (1) It has 24 6-membered rings & 12 5-membered rings.
- (2) It has 5-membered rings only attached to 6-membered rings.
- (3) It has 6-membered rings attached to both 5 & 6-membered rings.
- (4) Each Carbon is attached to 3 C-atoms.

**Ans.** (1)

**25.** The number of mol of  $\text{PbSO}_4$  obtained on reacting 35 ml of 0.15M  $\text{Pb}(\text{NO}_3)_2$  with 50 ml, 0.2M  $\text{Cr}_2(\text{SO}_4)_3$  is  $x \times 10^{-5}$ . Find x.

**Ans.** (525)

**Sol.**

$$3\text{Pb}(\text{NO}_3)_2 + \text{Cr}_2(\text{SO}_4)_3 \longrightarrow 3\text{PbSO}_4 + 2\text{Cr}(\text{NO}_3)_3$$

m.mol.	5.25 (L.R.)	10	
	0		5.25 m.mol formed $\Rightarrow$ i.e. $= 525 \times 10^{-5}$ $\therefore x = 525$

**26.** Determine pH of 0.588 M  $\text{H}_2\text{SO}_3$  solution given  $K_{a_1} = 1.7 \times 10^{-2}$   $K_{a_2} = 10^{-8}$

**Ans.** (1)

**Sol.**

$$\frac{0.588\alpha^2}{1-\alpha} = 1.7 \times 10^{-2}$$

$$\frac{\alpha^2}{1-\alpha} = 0.029 \quad \therefore \alpha^2 + 0.029\alpha - 0.029 = 0$$

$$\alpha = \frac{-0.029 + \sqrt{(0.029)^2 + 4(1)(0.029)}}{2}$$

$$= 0.1564$$

$$[\text{H}^+] = 0.588 \times 0.1564 = 0.092 \text{ M}$$

$$\text{pH} = 2 - \log 9.2 = 2 - 0.964 = 1.036 \approx 1$$