

## MEMORY BASED QUESTIONS JEE-MAIN EXAMINATION – JANUARY 2026

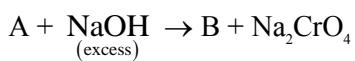
(HELD ON WEDNESDAY 21<sup>st</sup> JANUARY 2026)

TIME : 9:00 AM TO 12:00 NOON

## CHEMISTRY

## TEST PAPER WITH SOLUTION

## SECTION-A



Find A, B, C.

(1) A :  $\text{PbCrO}_4$

B :  $\text{PbO}_2$

C :  $\text{Pb}(\text{OH})_2$

(2) A :  $\text{PbCrO}_4$

B :  $\text{Na}_2[\text{Pb}(\text{OH})_4]$

C :  $\text{Pb}(\text{CH}_3\text{COO})_2$

(3) A :  $\text{PbCrO}_4$

B :  $\text{PbO}$

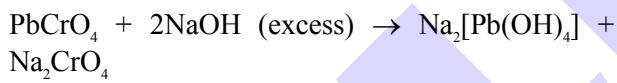
C :  $[\text{Pb}(\text{NH}_3)_4]^{2+}$

(4) A :  $\text{PbO}_2$

B :  $\text{Pb}(\text{OH})_2$

C :  $[\text{Pb}(\text{CH}_3\text{COO})_4]^{2-}$

Ans. (2)



2. Statement-I : Among  $[\text{NiCl}_4]^{2-}$ ,  $[\text{Ni}(\text{CN})_4]^{2-}$ ,  $[\text{Ni}(\text{CO})_4]$  &  $\text{CH}_4$  the  $\text{sp}^3$  hybridized species(s) are 3.

Statement-II : Number of Amphoteric pair(s) among  $(\text{SnO}, \text{SnO}_2)$ ;  $(\text{PbO}, \text{PbO}_2)$ ;  $(\text{GeO}, \text{GeO}_2)$  are 3.

(1) Both statements are correct

(2) Statement-I correct ; Statement-II incorrect

(3) Statement-II correct; Statement-I incorrect

(4) Both statements are incorrect

Ans. (2)

Sol. Statement-I  $[\text{NiCl}_4]^{2-}$ ,  $[\text{Ni}(\text{CO})_4]$  &  $\text{CH}_4$  are  $\text{sp}^3$  Hybridised

$[\text{NiCO}_4] \rightarrow \text{dsp}^2$

Statement-II  $\text{GeO}$  and  $\text{GeO}_2$  are acidic.

## Statement-I :

Among  $\text{SF}_4$ ,  $\text{XeF}_4$ ,  $[\text{NiCl}_4]^{2-}$ ,  $[\text{PtCl}_4]^{2-}$ ,  $[\text{Pt}(\text{CN})_4]^{2-}$ ,  $[\text{Ni}(\text{CN})_4]^{2-}$ ,  $\text{SeF}_4$  there are 3 tetrahedral species

Statement-II : Among three pairs  $\{[\text{Ni}(\text{CO})_4], [\text{NiCl}_4]^{2-}\}$ ,  $\{[\text{Ni}(\text{CO})_4], [\text{Ni}(\text{CN})_4]^{2-}\}$  and  $\{[\text{Ni}(\text{CN})_4]^{2-}, [\text{NiCl}_4]^{2-}\}$  only two pairs are diamagnetic.

(1) Both statements are correct

(2) Statement-I correct ; Statement-II incorrect

(3) Statement-II correct; Statement-I incorrect

(4) Both statements are incorrect

Ans. (4)

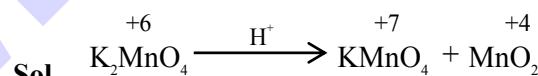
Sol.  $\text{SF}_4$  (See-saw),  $\text{XeF}_4$  (square planar),  $[\text{NiCl}_4]^{2-}$  (Tetrahedral),  $[\text{PtCl}_4]^{2-}$  (square planar),  $[\text{Pt}(\text{CN})_4]^{2-}$  (square planar),  $[\text{Ni}(\text{CN})_4]^{2-}$  (square planar),  $\text{SeF}_4$ ,  $[\text{Ni}(\text{CO})_4]$  (diamagnetic),  $[\text{NiCl}_4]^{2-}$  (paramagnetic),  $[\text{Ni}(\text{CN})_4]^{2-}$  (diamagnetic)

4.  $\text{MnO}_4^{2-}$  in acidic medium, disproportionates to

(1)  $\text{Mn}_2\text{O}_7$  and  $\text{MnO}$  (2)  $\text{MnO}_4^-$  and  $\text{MnO}$

(3)  $\text{MnO}_4^-$  and  $\text{MnO}_4$  (4)  $\text{MnO}_4^-$  and  $\text{MnO}_2$

Ans. (4)



5. Which of the following is the correct order with respect to the property indicated against it ?

(1)  $\text{B} > \text{S} > \text{P} > \text{F}$  (Ionization energy)

(2)  $\text{K}_2\text{O} > \text{Na}_2\text{O} > \text{MgO} > \text{Al}_2\text{O}_3$  (Basic nature)

(3)  $\text{K} > \text{Na} > \text{Al} > \text{Mg}$  (Metallic character)

(4)  $\text{Cl} > \text{F} > \text{S} > \text{P}$  (EA)

Which of the following option is correct

(1) 1, 2, 3 are correct

(2) 2, 4 are correct

(3) 1, 2, 4 are correct

(4) 1, 2, 3 are correct

Ans. (2)



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Sol.  $\frac{1}{\lambda} = RZ^2 \left( \frac{1}{n_1^2} - \frac{1}{n_2^2} \right)$

For 1st line of Lyman series in H-atom

$$\frac{1}{\lambda} = R(1)^2 \left( \frac{1}{1^2} - \frac{1}{2^2} \right)$$

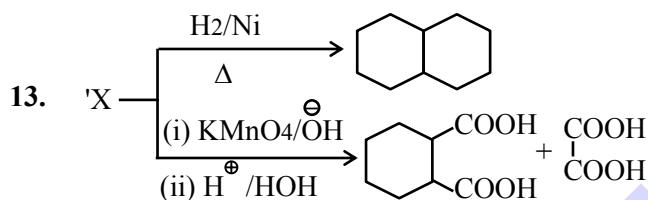
$$\frac{1}{\lambda} = \frac{3R}{4}$$

for 2<sup>nd</sup> line of Balmer series of He<sup>+</sup>

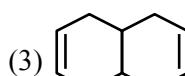
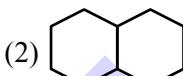
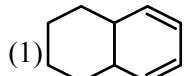
$$\frac{1}{\lambda'} = R(2)^2 \left( \frac{1}{2^2} - \frac{1}{4^2} \right)$$

$$\frac{1}{\lambda'} = \frac{3R}{4}$$

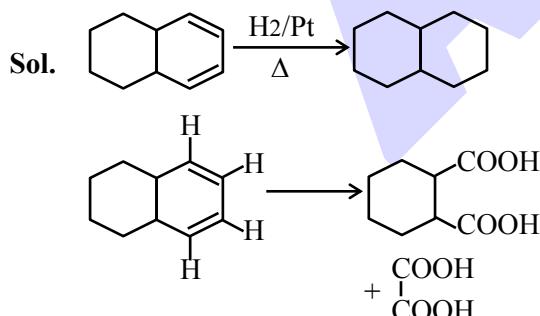
As  $\lambda$  and  $\lambda'$  is equal so frequency of these lines will be also equal.



X is :



Ans. (1)



14. Compound P when pass on from ammonia & heating gives compound Q which is further treated with KOH + Br<sub>2</sub> gives compound R with mol. formula C<sub>6</sub>H<sub>7</sub>N then find the correct structure of P, Q, R respectively.

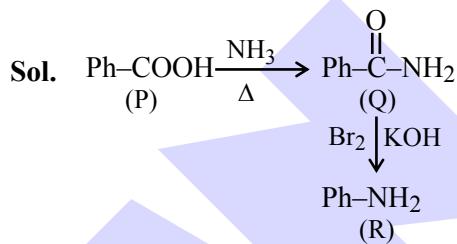
(1) Benzoic acid, benzamide, aniline

(2) Benzoic acid, ammonium benzoate, benzene

(3) Ammonium benzoate, benzamide, benzene

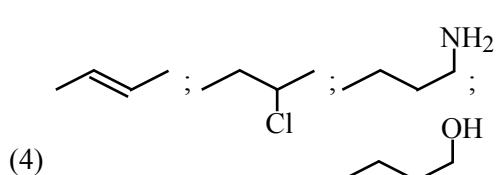
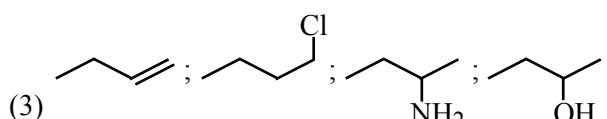
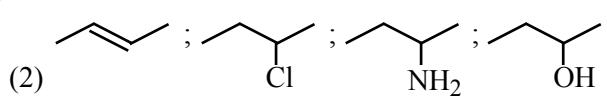
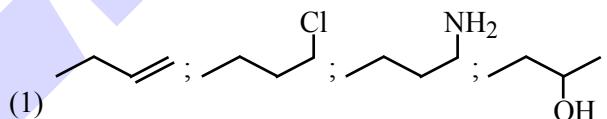
(4) Benzoic acid, aniline, benzene

Ans. (1)



15. An Alkene P (C<sub>4</sub>H<sub>8</sub>), gives optically active product Q which further react with ammonia and gives R. R react with NaNO<sub>2</sub> + HCl followed by hydrolysis gives S.

P, Q, R, S are respectively :



Ans. (2)



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16. **Statement-A** : Tryptophan, arginine are essential amino acid.

**Statement-B** : Glycine has no chiral center

**Statement-C** : Proline has 6-membered ring

**Statement-D** : Cysteine is amino acid having sulphur atom

Identify correct statement.

- (1) A, B
- (2) A, B, D
- (3) A, C, D
- (4) A, B, C

**Ans. (2)**

17. **Statement-A** : Propanal & propanone are functional group isomers.

**Statement-B** : Ethoxy ethane and methoxy propane are metamers.

**Statement-C** : But-2-ene show optical isomerism.

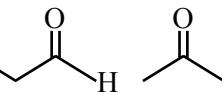
**Statement-D** : But-2-ene and But-1-ene are functional isomers.

**Statement-E** : Pentane & 2,2-dimethyl propane are chain isomers.

Identify the correct statement.

- (1) A, B, E
- (2) A, B, C
- (3) B, E
- (4) A, B

**Ans. (1)**

**Sol.**   $\Rightarrow$  Functional isomer

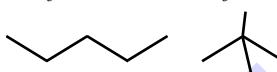
$\text{CH}_3\text{CH}=\text{CHCH}_3$  &  $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2$

Position isomer

$\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$  &  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_3$

Metamer

$\text{CH}_3\text{CH}=\text{CHCH}_3$  show G.I. not optical isomer



Chain isomer

18. In Carrius method, 0.75 gm of an organic compound gave 1.2 gm of barium sulphate, find % of sulphur (molar mass of S is 32 gm mol<sup>-1</sup>)

Molar mass of barium sulphate is 233 gm mol<sup>-1</sup>

- (1) 16.48 %
- (2) 4.55 %
- (3) 21.97 %
- (4) 10.30 %

**Ans. (3)**

**Sol.** 
$$\frac{n_{\text{BaSO}_4} \times 32}{W_{\text{unknown comp.}}} \times 100$$

$$= \frac{1.2 \times 32}{233} \times 100$$

$$= 21.97\%$$

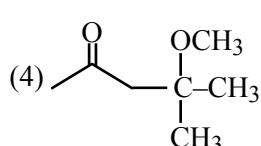
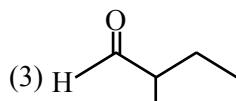
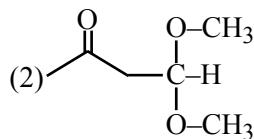
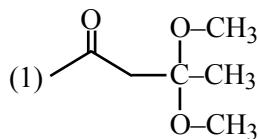
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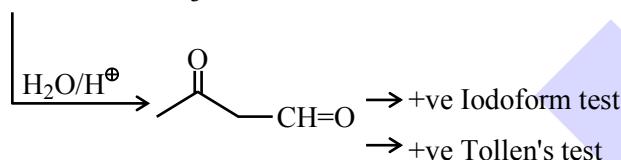
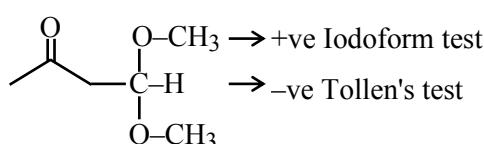


19. Compound A gives +ve iodoform test but -ve tollen's test. Acidic hydrolysis of A gives product P which gives positive tollen's test and also positive iodoform test. Compound A can be :

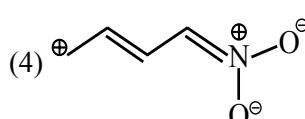
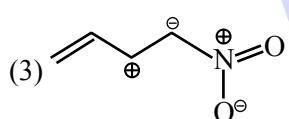
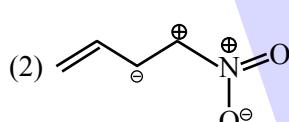
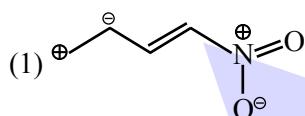


Ans. (2)

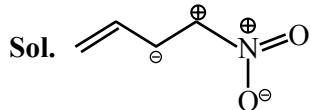
Sol.



20. Which of the following least stable resonating structure ?



Ans. (2)

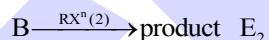
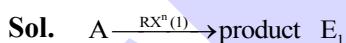


This resonating structure having +ve charge on adjacent atoms so it is least stable.

## SECTION-B

1. For two chemical reaction A & B, if the difference between their activation energy is 20 KJ of 300K determine  $\ln\left(\frac{k_2}{k_1}\right)$  :  
 $[R=8.3 \text{ J/mol-K}]$

Ans. (8)



Assuming 'A' same for both reaction.

$$\ln k_1 = \ln A - \frac{E_1}{300R}$$

$$\ln k_2 = \ln A - \frac{E_2}{300R}$$

$$\ln\left(\frac{k_2}{k_1}\right) = \frac{E_1 - E_2}{300R} = \frac{20 \times 1000}{300R}$$

$$= 8.032$$

2. 10 moles of  $O_2$  gas is heated at constant volume from 30°C to 40°C. The change in the internal energy of gas is \_\_\_\_\_ cal.

$$C_p = 7 \text{ Cal/mol-K}, R = \frac{2 \text{ Cal}}{\text{mol} - \text{K}}$$

Ans. (500 Cal)

Sol.  $C_p - C_v = R$

$$7 - C_v = 2$$

$$C_v = 5 \text{ Cal/mol-K}$$

$$\Delta U = nC_v \Delta T$$

$$= 10 \times 5 [10]$$

$$= 500 \text{ Cal}$$



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3. pH & conductance of a standard solution of HX are 5 &  $4 \times 10^{-5}$  S respectively. The standard solution is present in cell having length between electrodes 15 cm & Area is  $1 \text{ cm}^2$  then calculate limiting molar conductivity ( $\text{Sm}^2 \text{ mol}^{-1}$ ) of standard solution.

[Assume degree of dissociation of HX  $\ll 1$ ]

**Ans. (6)**

**Sol.** pH = 5

$$[\text{H}^+] = 10^{-5} = [\text{HX}] \cdot \alpha$$

$$\alpha = [\text{HX}] \cdot \frac{\Lambda_m}{\Lambda_m^\infty}$$

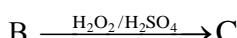
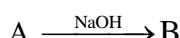
$$\Lambda_m = \frac{k \times 1000}{[\text{HX}]}$$

$$K = G \cdot G^* = 4 \times 10^{-5} \times \frac{15}{1} = 6 \times 10^{-4} \text{ S.cm}^{-1}$$

$$[\text{H}^+] = 10^{-5} = [\text{HX}] \times \frac{6 \times 10^{-4} \times 1000}{\Lambda_m^\infty \times [\text{HX}]}$$

$$\Lambda_m^\infty = 60000 \text{ S.cm}^{-1} \text{ mol}^{-1}$$

$$\Lambda_m^\infty = 6 \text{ S.m}^2 \text{ mol}^{-1}$$



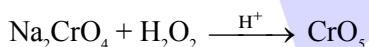
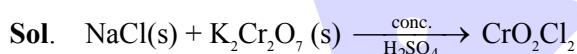
If number of  $\text{O}_2^{2-}$  ion in C = X

If number of O atom in C = Y

If oxidation state of Cr in C = Z

Then (X + Y + Z) is \_

**Ans. (13)**



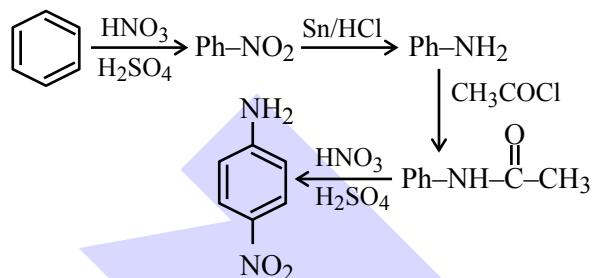
$$X = 2, Y = 5, Z = 6$$

5.  (i)  $\text{HNO}_3/\text{H}_2\text{SO}_4$   
 (ii) Sn/HCl  
 (iii)  $\text{CH}_3\text{COCl}$   
 (iv)  $\text{HNO}_3/\text{H}_2\text{SO}_4$   
 (v)  $\text{H}_2\text{O}/\text{OH}$

Find % of N in the final product.

**Ans. 20.29%**

**Sol.**



$$\text{Mol. wt} = (6 \times 12) + (6 \times 1) + (2 \times 14) + (2 \times 16) = 138$$

$$\% \text{ N} = \frac{28}{138} \times 100 = 20.29\%$$

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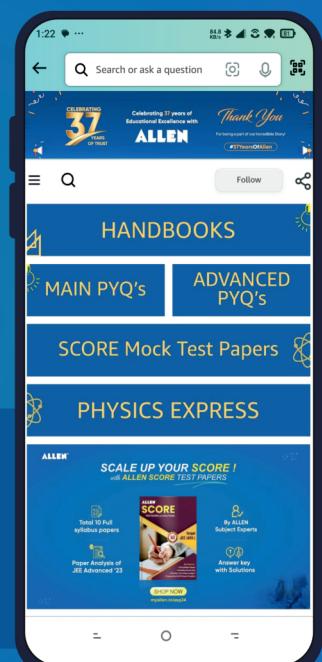
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