P13-17

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ADVANCED PATTERN PART TEST-5(APT-5)

TARGET : JEE (MAIN+ADVANCED) 2018

SUBJECT : CHEMISTRY COURSE : VIJAY (01JR)

Date : 11-02-2018 Time: 2 Hours Maximum Marks : 160

Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.

GENERAL :

1. The sealed booklet is your Question Paper. Do not break the seal till you are instructed to do so.
2. The question paper CODE is printed on the right hand top corner of this sheet.
3. Use the Optical Response Sheet (ORS) provided separately for answering the question.
4. Blank spaces are provided within this booklet for rough work.
5. Write your Name and Roll Number in the space provided on the below cover.
6. After the open booklet, verify that the booklet contains all the **40** questions along with the options are legible.

QUESTION PAPER FORMAT AND MARKING SCHEME :

7. This questions paper consists of **Two sections**.
8. Each section as detailed in the following table :

Section	Question Type	Number of Questions	Category-wise Marks for Each Question				Maximum Marks of the Section
			Full Marks	Partial Marks	Zero Marks	Negative Marks	
1	One or More Correct Option(s)	20	+4 If only the bubble(s) corresponding to all the correct option(s) is(are) darkened	+1 For darkening a bubble corresponding to each correct option, provided NO incorrect option is darkened	0 If none of the bubbles is darkened	–2 In all other cases	80
2	Comprehension (One or More Correct Option(s))	20	+4 If only the bubble(s) corresponding to all the correct option(s) is(are) darkened	–	0 If none of the bubbles is darkened	–2 In all other cases	80

OPTICAL RESPONSE SHEET :

9. Darken the appropriate bubbles on the original by applying sufficient pressure.
10. The original is machine-gradable and will be collected by the invigilator at the end of the examination.
11. Do not tamper with or mutilate the ORS.
12. Write your name, roll number and the name of the examination centre and sign with pen in the space provided for this purpose on the original. **Do not write any of these details anywhere else**. Darken the appropriate bubble under each digit of your roll number.

DARKENING THE BUBBLES ON THE ORS :

13. Use a **BLACK BALL POINT** to darken the bubbles in the upper sheet.
14. Darken the bubble **COMPLETELY.**
15. Darken the bubble **ONLY** if you are sure of the answer.
16. The correct way of darkening a bubble is as shown here : ●
17. There is **NO** way to erase or "un-darkened bubble.
18. The marking scheme given at the beginning of each section gives details of how darkened and **not darkened** bubbles are evaluated.

DO NOT BREAK THE SEAL WITHOUT BEING INSTRUCTED TO DO SO BY THE INVIGILATOR

NAME OF THE CANDIDATE : .....

ROLL NO. : .....

I have read all the instructions and shall abide by them

- -
Signature of the Candidate

I have verified the identity, name and roll number of the candidate.

- -
Signature of the Invigilator

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CHEMISTRY

Atomic masses : [H = 1, D = 2, Li = 7, C = 12, N = 14, O = 16, F = 19, Na = 23, Mg = 24, Al = 27, Si = 28, P = 31, S = 32, Cl = 35.5, K = 39, Ca = 40, Cr = 52, Mn = 55, Fe = 56, Cu = 63.5, Zn = 65, As = 75, Br = 80, Ag = 108, I = 127, Ba = 137, Hg = 200, Pb = 207]

SECTION – 1: (Maximum Marks : 80)

- This section contains **TWENTY** questions
- Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is(are) correct
- For each question, darken the bubble(s) corresponding to all the correct option(s) in the ORS
- For each question, marks will be awarded in one of the following categories :

Full Marks	:	+4	If only the bubble(s) corresponding to all the correct option(s) is(are) darkened.
Partial Marks	:	+1	For darkening a bubble corresponding to **each correct option,** provided NO incorrect option is darkened.
Zero Marks	:	0	If none of the bubbles is darkened.
Negative Marks	:	–2	In all other cases.

- For example, if (A), (C) and (D) are all the correct options for a question, darkening all these three will result in +4 marks ; darkening only (A) and (D) will result in +2 marks and darkening (A) and (B) will result in –2 marks, as a wrong option is also darkened.

1. Which of the following must not have negative value for formation of ideal solution ?

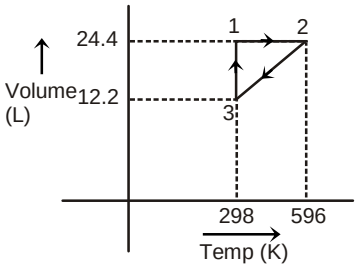
(A) Enthalpy change (B) Volume change

(C) Entropy change (D) Gibb's energy change

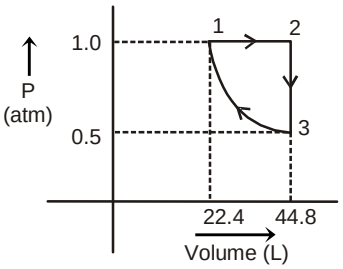
Space for Rough Work

2. Statement -1 : Net work done by system or on the system lies between 100 cal to 200 cal.
Statement -2 : Net heat released or absorbed by the system lies between 100 cal to 200 cal.
Which of the following graph(s) for one mol of an ideal mono atomic gas is/are satisfying both the statements (log 2 = 0.30, $R = \frac{2\text{cal}}{\text{molK}}$)?

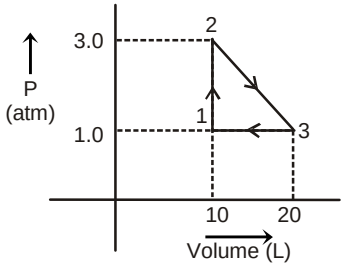
(A)



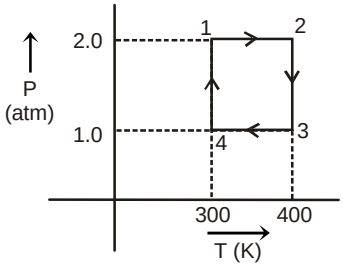
(B)



(C)



(D)



3. Which of the following condition(s) is/are necessary for the deriving the expression $P_1V_1^{\gamma} = P_2V_2^{\gamma}$?

(A) It is applicable for ideal gases only.

(B) It is applicable for reversible adiabatic process only.

(C) The process must be carried out in a thermostat.

(D) The process must be carried out in a thermos flask (insulated system).

Space for Rough Work

4. Consider the following reaction :

$HClO_4 + P_2O_5 \longrightarrow A + B$

Product A is an acidic oxide. Select correct statement(s) :

(A) B is oxy acid of phosphorous.

(B) B undergoes cyclisation for stability.

(C) In product A, at least one element is present in its lowest oxidation state.

(D) Product A has six equivalent bonds.

5. $Cu(s) + \text{dil } HNO_3 \longrightarrow X\ (g)$

Select correct statement(s) :

(A) [X] is oxide of nitrogen.

(B) Gas [X] is paramagnetic in nature.

(C) [X] is acidic in nature.

(D) In the above reaction on balancing with simplest whole number coefficients for three mol of Cu(s), three mol of [X] will be preduced.

6. Consider the following reaction sequence :

$SF_4 + XeF_4 \longrightarrow \underset{(\mu=0)}{A(g)} + \underset{\text{(sparingly soluble in water)}}{B(g)}$

If [A] is polyatomic gas then :

(A) Gas [A] is highly soluble in hexane .

(B) Product [B] is fluorinating agent.

(C) Gas [A] has larger boiling point than B.

(D) Product [B] will react with SbF_5 to give SbF_6^- .

Space for Rough Work

7. In which of the following reaction(s) coloured gas is a product ?

(A) $H_3PO_3 \xrightarrow{\Delta}$ (B) $H_3PO_2 \xrightarrow{\Delta}$

(C) $KClO_3 + H_2SO_4 \longrightarrow$ (D) $HBr + H_2SO_4(conc.) \longrightarrow$

8. Select the correct statement(s) :

(A) Iodine is a solid at room tempeturare.

(B) Iodine sublimies easily.

(C) In iodine van der Waal forces are present between I_2 molecules.

(D) With hot and concentrated HNO_3 , I_2 shows disproportionation reaction.

9. Sodium thiosulphate is prepared by:

(A) Boiling Na_2SO_3 solution with S in acidic medium.

(B) Boiling NaOH solution with S.

(C) Neutralising H_2SO_3 solution with NaOH.

(D) Boiling Na_2SO_3 with S in absence of air.

10. Iodine can be obtained from NaI solution by the action of :

(A) Cl_2 (B) Br_2 (C) Soluble Cl^- (D) Soluble Br^-

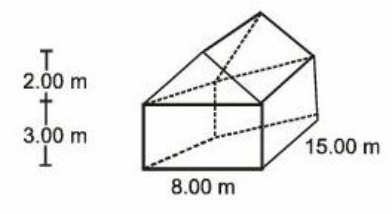
11. Consider a setup of two urea solutions of concentrations C_1 and C_2 ($C_2 > C_1$), both at temperature T, separated by a semi permeable membrane. External pressures P_1 and P_2 respectively are applied on the two solutions. For what values of P_1 and P_2, osmosis does not occur through the semi permeable membrane? (R = Universal gas constant)

(A) $P_1 = C_1RT$ and $P_2 = C_2RT$ (B) P_1 = Zero and $P_2 = (C_2 - C_1)RT$

(C) $P_1 = C_2RT$ and $P_2 = C_1RT$ (D) $P_1 = 2C_1RT$ and $P_2 = (C_2 + C_1)RT$

Space for Rough Work

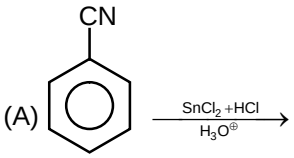
12. The swimming pool inside a house is 3.00 m wide, 5.00 m long and 1.50 m deep (below the floor). The temperature of water in pool is 8.00°C and the air temperature in the house (dimension given in the figure) is 10.0°C. Assume density of water = 1.00 Kg L^{-1} and air (21.0% of O_2, 79% of N_2 by volume) behaving like an ideal gas. Select the incorrect statement(s) $\left(R = \frac{25\,J}{3\,molK}\right)$:

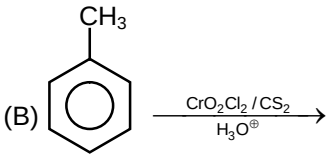


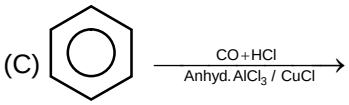
Cρ of water = 75 J K^{-1} mol^{-1}

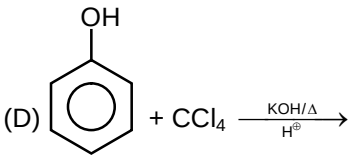
(A)The energy which is required to heat water in pool to 24.0°C is 1500 MJ
(B) The energy which is required to heat the air (21.0% of O_2, 79% of N_2) to 30.0°C at 1.013×10^5Pa pressure is nearly 12MJ
(C) Required energy for heating air cannot be calculated as any type of heat capacity of air is not given.
(D) The energy which is required to heat water in pool to 24.0°C is 1000 MJ

13. In which of the following reactions benzaldehyde will form in final product.

(A) 

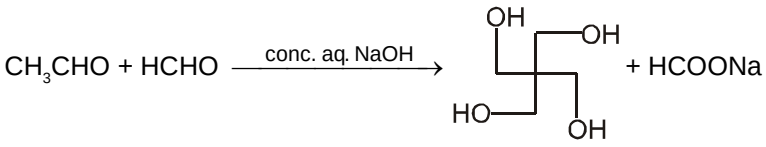
(B) 

(C) 

(D) 

Space for Rough Work

14. Observe the following reaction and choose the correct options :



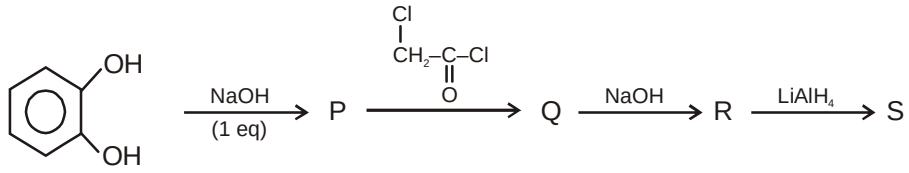
(A) Reaction shows three times aldol condensation.

(B) Reaction shows one time cannizzaro reaction.

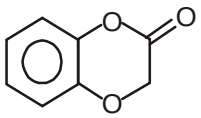
(C) Four equivalent of formaldehyde are used in the given reaction.

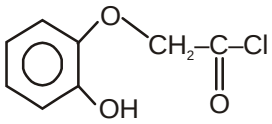
(D) One equivalent of CH_3CHO is used in the given reaction.

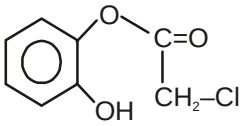
15.

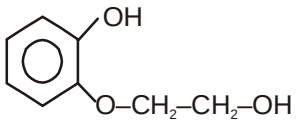


Choose the correct options :

(A) R = 

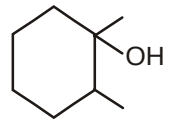
(B) Q = 

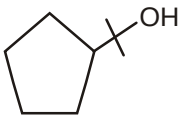
(C) Q = 

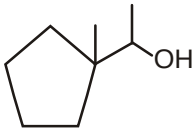
(D) S = 

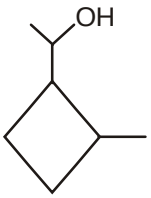
Space for Rough Work

16. Which of the following alcohols will give same alkene on reaction with conc. H_2SO_4/Δ ?

(A) 

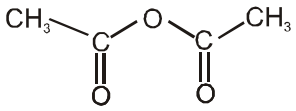
(B) 

(C) 

(D) 

17. In which of the following reactions cinnamic acid is formed as a major product :

(A) $Ph - CH = CH - CHO \xrightarrow[(2)\ H^{\oplus}]{(1)\ \text{Tollen's reagent}} Ph - CH = CH - COOH$

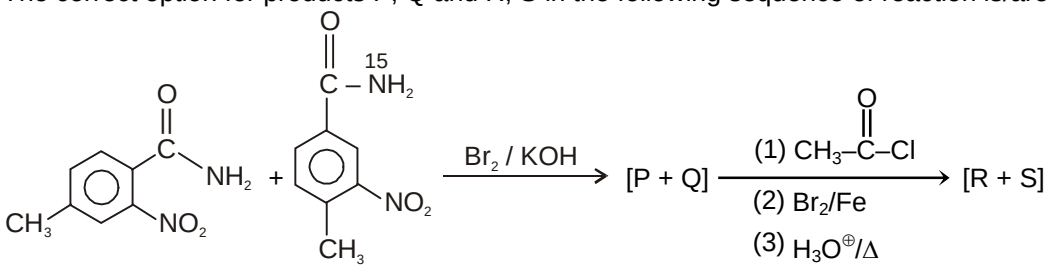
(B) $Ph - CH = O +$  $\xrightarrow{CH_3COO^{\ominus}\ Na^{\oplus}/\Delta} Ph - CH = CH - COOH$

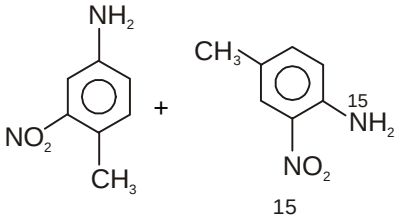
(C) $Ph - \underset{\underset{OH}{|}}{CH} - CH_2 - COOH \xrightarrow{H^{\oplus}/\Delta} Ph - CH = CH - COOH$

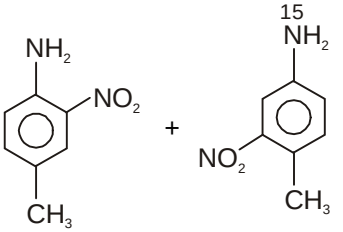
(D) $Ph - CH = CH - CHO \xrightarrow{KMnO_4/\Delta/H^+} Ph - CH = CH - COOH$

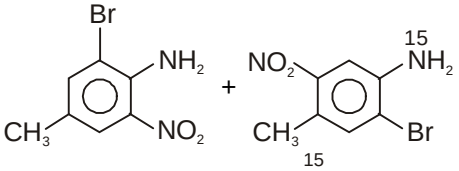
Space for Rough Work

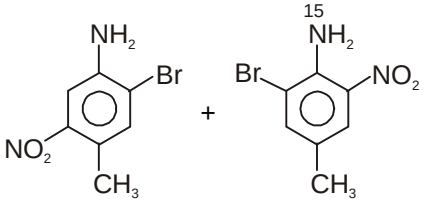
18. The correct option for products P, Q and R, S in the following sequence of reaction is/are :



(A) P & Q are 

(B) P & Q are 

(C) R & S are 

(D) R & S are 

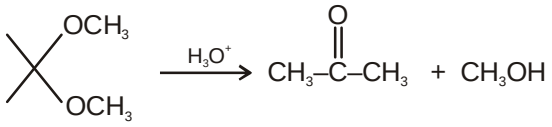
Space for Rough Work

19. Which of the following hydrolysis reaction/s is/are correct ?

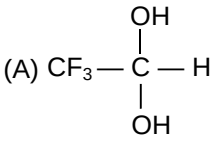
(A) $CH_3 - CN \xrightarrow{H_3O^+} CH_3COOH + NH_4^{\oplus}$

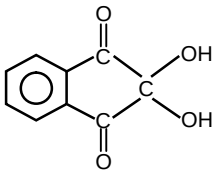
(B) $CH_3 - NC \xrightarrow{H_3O^+} CH_3\overset{+}{N}H_3 + HCOOH$

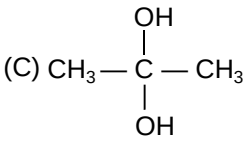
(C) $CH_2 = CH - OCH_3 \xrightarrow{H_3O^+} CH_3CHO + CH_3OH$

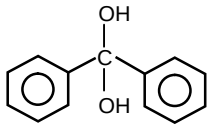
(D) 

20. Which of the following are stable gem diols ?

(A) 

(B) 

(C) 

(D) 

Space for Rough Work

SECTION – 2 : (Maximum Marks : 80)

- This section contains **TEN** paragraphs
- Based on each paragraph, there will be **TWO** questions.
- Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is(are) correct
- For each question, darken the bubble(s) corresponding to all the correct option(s) in the ORS
- Marking scheme :

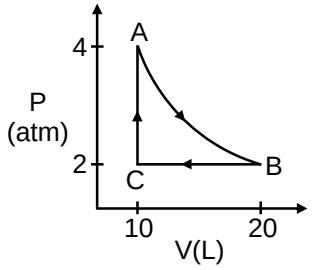
  +4 If the bubbles corresponding to the answers are darkened

  0 If none of the bubbles is darkened

  –2 In all other cases

Paragraph for Question Nos. 21 to 22

1 mol of an ideal gas undergoes different thermodynamical process in P–V diagram given below :



21. If temperature at point C is T K then :

(A) Temperature at point A is T K.
(B) Temperature at point A is 2T K.
(C) Temperature at point B is T K.
(D) Temperature at point B is 2T K.

Space for Rough Work

22. What will be the value of ΔH and ΔE for overall process?

(A) $\Delta H = 0$ (B) $\Delta E = 0$ (C) $\Delta H = 48.4$ calorie (D) $\Delta E = 13.82$ calorie

Paragraph for Question Nos. 23 to 24

(i) $P + Cl_2 \xrightarrow{\Delta} Q$ (ii) $Q + H_2O \longrightarrow R + HCl$

(iii) $BN + H_2O \longrightarrow R + NH_3\uparrow$ (iv) $Q + LiAlH_4 \longrightarrow S + LiCl + AlCl_3$

(v) $S + H_2O \longrightarrow R + H_2\uparrow$ (vi) $S + NaH \longrightarrow T$

(P, Q, R, S, and T do not represent their chemical symbols)

23. Compound Q has :

(A) zero dipole moment (B) A planar trigonal structure

(C) An electron deficient compound (D) A Lewis base

24. Compound T is used as a/an :

(A) Oxidising agent (B) Complexing agent (C) Bleaching agent (D) Reducing agent

Paragraph for Question Nos. 25 to 26

Pseudo halides are anions having resemblence with halide ions. On this basis answer the following questions

Space for Rough Work

25. Cyanogen gas $(CN)_2$, when treated with cold and dilute NaOH solution, the product(s) formed is/are :

(A) NaCN (B) HCOONa (C) NaOCN (D) NH_3

26. When NaCN reacts with H_2SO_4, the product(s) is/are:

(A) HCN (B) Na_2SO_4 (C) $(CN)_2$ (D) $Na_2SO_4 . H_2O$

Paragraph for Question Nos. 27 to 28

Consider the following reaction and answer the given questions :

$$CH_2(COOH)_2 \xrightarrow{P_4O_{10}} [X] + H_2O$$

27. Which of the following is/are correct statement(s)?

(A) Product [X] is linear molecule.

(B) At least one element of [X] is present in its maximum oxidation state.

(C) At least one element of [X] is present in zero oxidation state.

(D) 1 mol of product [X] contains 32 g of oxygen.

28. Which of the following reaction(s) represents correct product ?

(A) $X + HCl \longrightarrow CH_2(COCl)_2$

(B) $X + NH_3 \xrightarrow{H_3O^+} CH_2(CONH_2)_2$

(C) $X + HCl \longrightarrow$ No reaction

(D) $X + NH_3 \xrightarrow{H_3O^+} (NH_4)_2CO_3$

Space for Rough Work

Paragraph for Question Nos. 29 to 30

In depression of freezing point the solution of volatile solvent in a non-volatile solute always freezes at lower temperature than the freezing point of solvent. $\Delta T_f = K_f m$ is for non-electrolytes, where as for electrolytes we have to use the vant Hoff factor (i).

29. A saturated solution of a sparingly soluble metal chloride MCl_2 has a vapour pressure of 31.973 mm of Hg at 30ºC, while aqueous tension of water at 30ºC is 32 mm of Hg. Select correct statement(s) :

(A) $K_{sp}\ (MCl_2) = 4 \times \left(\frac{1}{64}\right)^3$

(B) $K_{sp}\ (MCl_2) = 4 \times \left(\frac{1}{8}\right)^3$

(C) Solubility of salt MCl_2 in $\frac{M}{6.4}$ NaCl solution is 6.25×10^{-4} M

(D) Solubility of salt MCl_2 in $\frac{M}{6.4}$ NaCl solution is 6.25×10^{-2} M

30. Freezing point of 1000 g of aqueous solution of glucose containing 125 g glucose is :
$[K_f(H_2O) = 1.89\ K\ molal^{-1}]$

(A) –0.9ºC (B) –1.5ºC (C) –0.2ºC (D) –0.15ºC

Space for Rough Work

Paragraph for Question Nos. 31 to 32

100 mmole of compound (P) when added to 1 Litre pure water at 25°C suppress the pH by 6 units. Compound (Q) can be obtained by reacting Caustic soda with (P). Electrolysis of aqueous solution of (Q) produces pungent gas (R) at anode which is also obtained when Bleaching powder is treated with acidic solution.

31. Select the correct option(s) :

(A) P = NaCl (B) P = HCl (C) Q = NaCl (D) Q = HCl

32. Which of the following statement(s) is/are correct for gas (R) ?

(A) The gas (R) is also produced on heating table salt with concentrated H_2SO_4.

(B) The gas (R) acts as bleaching agent.

(C) Gas (R) dispropotionates in basic medium.

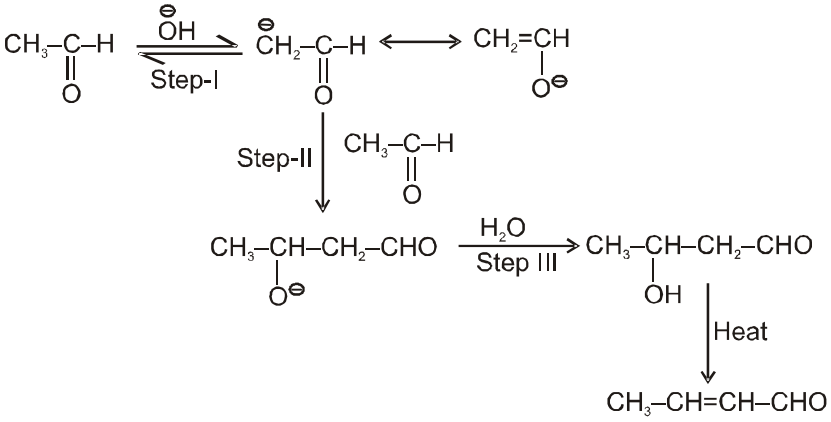
(D) Gas (R) dissolves decently in water and its aqueous solution forms white precipitate with $AgNO_3$.

Space for Rough Work

CHEMISTRY

Paragraph for Question Nos. 33 to 34

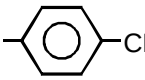
Carbonyl compound which contains α–H gives aldol condenation reaction in presence of alkaline medium. The reaction between two molecules of acetaldehyde take place as follows in presence of base.



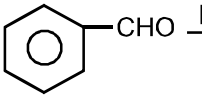
33. Aldol condensation reaction(s) is/are not given by

(A) C_6H_5–CHO

(B) CX_3 – CHO

(C) O_2N  CHO

(D) C_6H_5–CH_2–CHO

34. CH_3CHO +  $\xrightarrow{NaOH,\ \Delta}$ Product

Possible products are :

(A) Ph–CH=C(Ph)–CHO

(B) Ph – CH = CH – CHO

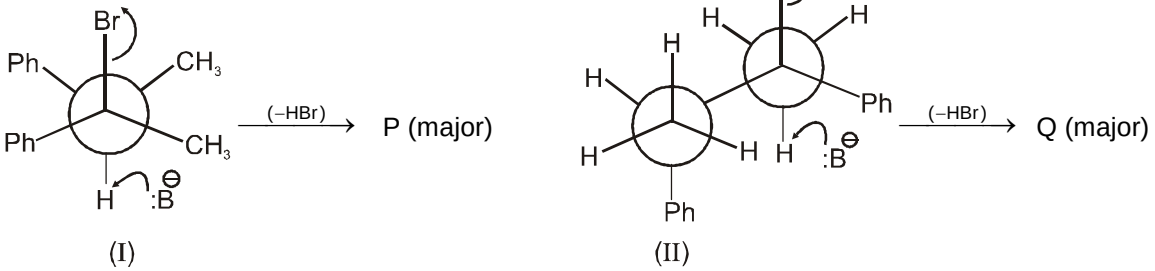
(C) Ph–CH=C(CHO)–CH_3

(D) CH_3 – CH = CH – CHO

Space for Rough Work

Paragraph for Question Nos. 35 to 36

Observe the reaction I and II.



(I) (II)

35. The compounds P and Q are

(A) Identical (B) Homologous

(C) Stereoisomers (D) Structural isomers

36. What is/are true about the given two reactions.

(A) The I reaction is a β–elimination reaction.

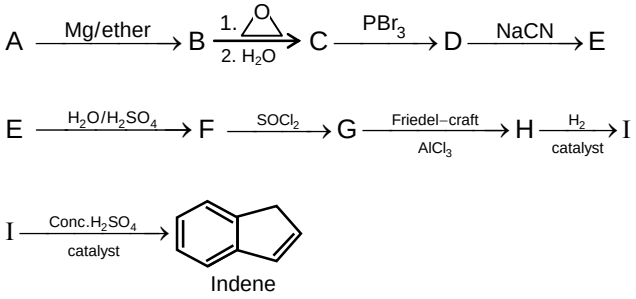
(B) Both are anti–elimination reactions

(C) Both are bimolecular elimination reactions

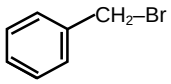
(D) The II reaction is an α–elimination reaction.

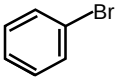
Space for Rough Work

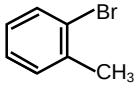
Paragraph for Question Nos. 37 to 38

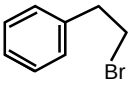


37. A may be :

(A) 

(B) 

(C) 

(D) 

38. Find the correct statement(s) :

(A) F gives positive test with $NaHCO_3$.

(B) H gives positive test with 2.4 DNP Test.

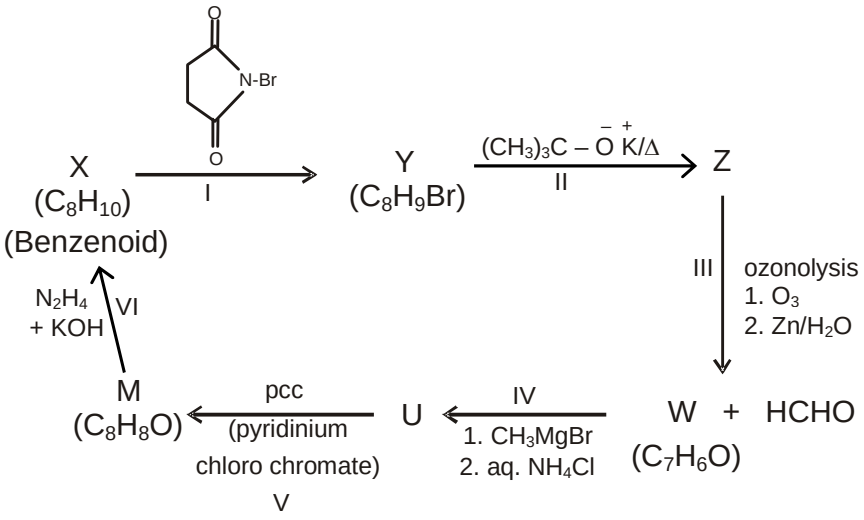
(C) I gives positive test with Lucas reagent.

(D) H gives positvive iodoform test.

Space for Rough Work

CHEMISTRY

Paragraph for Question Nos. 39 to 40



39. Which of the following is/are correct?

(A) U $\xrightarrow{\text{conc.}H_2SO_4/\Delta}$ Z

(B) M $\xrightarrow[H_2O]{NaBH_4}$ U

(C) U $\xrightarrow{HBr}$ Y

(D) M $\xrightarrow{Zn-Hg/\text{Conc.}HCl/\Delta}$ X

40. Which of the following is/are correct for stp I to VI.

(A) In step-I free radical allylic substitution occurs.

(B) In step-II unimolecular elimination takes place

(C) The products of step III can be distinguished by fehling solution test.

(D) In step V & VI reduction & oxidation process occurs, respectively.

Space for Rough Work