SEKOLAH MENENGAH KEBANGSAAN RAJA PEREMPUAN, IPOH

PEPERIKSAAN AKHIR TAHUN 2009

T6A

Kertas 1
Paper 1 **Chemistry(Kimia)**
1 jam 45 min **962/1**

Do not open this booklet until you are told to do so.

There are fifty questions in this paper. For each question, four suggested answers are given. Choose one correct answer and indicate it on the multiple choice sheet provided. Answer all questions. Marks will not be deducted for wrong answers.

Ada lima puluh soalan dalam kertas ini. Bagi setiap soalan, empat cadangan jawapan deberikan. Pilih satu jawapan yang betul dan tandakan jwapan ity pada helaian jawapan aneka pilihan yang dibekalkan.. Jawab semua soalan. Markah tidak akan ditolak bagi jawapan yang salah.

This question paper consists of 13 printed pages.
Kertas soalan ini mengandungi 13 halaman bercetak

Answers

1.B	**2.A**	**3.C**	**4.A**	**5.D**	**6.A**	**7.C**	**8.B**	**9.D**	**10.B**	**11.D**	**12.C**
13.D	**14.B**	**15.B**	**16.C**	**17.C**	**18.A**	**19.B**	**20.D**	**21.D**	**22.C**	**23.D**	**24.C**
25.C	**26.A**	**27.D**	**28.D**	**29.A**	**30.A**	**31.B**	**32.D**	**33.C**	**34.B**	**35.D**	**36.C**
37.D	**38.B**	**39.D**	**40.B**	**41.B**	**42.A**	**43.A**	**44.C**	**45.B**	**46.B**	**47.D**	**48.B**
49.B	**50.A**										

Section A

Four suggested answers labeled A,B,C and D are given for each question. Choose one correct answer.

1. What particle is produced during the following decay process :
   Sodium -24 decays to magnesium -24 .

   A. ${}^{1}_{1}H$ B. ${}^{0}_{-1}e$ C. ${}^{4}_{2}He$ D. ${}^{1}_{0}n$

2. Calculate the number of sodium ions in 1 cm^3 of 0.01m solution of sodium phosphate.

   A. 18×10^{19} B. 2×10^{20} C. 5×10^{16} D. 3×10^{12}

3. Hydrogen has two stable isotopes ${}^{1}_{1}H$ and , ${}^{2}_{1}H$ and sulphur has four stable isotopes ${}^{32}_{16}S$, ${}^{33}_{16}S$, ${}^{35}_{16}S$, ${}^{36}_{16}S$ How many peaks would you observe in the mass spectrum of the positive ion of hydrogen sulphide H_2S^+ ? Assume no decomposition of the ion into small fragments.

   A. 4 B. 6 C. 8 D. 10

4. 1 dm^3 of oxygen gas at s.t.p. contains x atoms of oxygen. How many molecules of ozone (O_3) are present in 22.4 dm^3 of ozone at s.t.p.

   A. 11.2x B. 22.4x C. 33.6x D. 44.8x

5. A volume of 0.280 dm^3 of a gas at s.t.p. weighs 0.400g . Calculate the molar mass of the gas.

   A. 18g mol^{-1} B. 28g mol^{-1} C. 30g mol^{-1} D. 32g mol^{-1}

6. Helium is mixed with oxygen gas for deep sea divers. Calculate the percent by volume of oxygen gas in the mixture if the diver has to submerge (dive) to a depth where the total pressure is 4.2 atm. The partial pressure of oxygen is maintained at 0.2 atm at this depth.

   A. 4.8% B. 6.0% C. 7.5% D. 16.0%

7. The table below shows some physical properties of element W

   Relative atomic mass = A
   Density = ρ
   Volume of an atom = V

   Based on the information above , the value of the Avogadro constant is

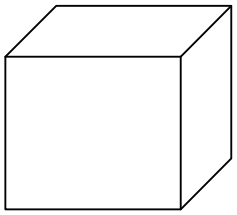
A. $\frac{V}{\rho A}$ B. ρVA C. $\frac{A}{\rho V}$ D. $\frac{\rho V}{A}$

8. The behaviour of hydrogen chloride gas deviates widely from ideality because it
   A. has a large molecular size
   B. has strong intermolecular attractions
   C. consists of molecules of negligible volume
   D. can be compressed easily at high pressures and low temperatures

9. One of the emission lines of the hydrogen atom has a wavelength 410nm (violet). What transition is associated with this emission?

   A. 3 → 2 B. 4 → 2 C. 5 → 6 D. 6 → 2

10. The diagram below shows a unit cell for bromine solid at $5^{\circ}C$.



represents one Br_2 molecule

The number of bromine atoms in the unit cell is

A. 4 B. 8 C. 14 D. 28

11. In the arrangement of electrons in an atom, which rule/principle states that electrons must occupy degenerate orbitals singly with parallel spins before they occupy the orbital in pairs?

   A. Aufbau B. Pauli Exclusion C. Bohr's D. Hunds

12. Identify the group of elements that corresponds to the following generalized electron configuration.

   [Noble gas] ns^2np^5

   A. group 7 B. group 10 C. group 17 D. group 5

13. Which of the quantum numbers governs the energy of an orbital?

   A. The principal quantum number only
   B. The spin quantum number only
   C. The magnetic quantum number only
   D. The principal quantum number and its subshells

14. How is the second rule of the VSEPR theory used in predicting the shapes of molecules?

   A. Arrangement of electron pairs that results in the minimum electron repulsion
   B. Order of repulsion strengths for electron pairs
   C. Double bond/triple bonds is counted as one bonding pair

D. Total number of valence electrons in the covalent bonds

15. What is the shape of the ICl_4^- molecular ion?

A. tetrahidral B. square C. pyrimidal D. tetragonal

16. Which of the following molecules will not form a hydrogen bond with another similar molecule?

A. C_2H_5OH B. H_2NCH_2COOH C. $CH_3 - C - CH_3$ D. N_2H_4

17. In the gas phase reaction $2HBr(g) \rightarrow H_2(g) + Br_2(g)$, which rate expression correctly describes the appearance of the product Br_2 with the disappearance of the reactant HBr?

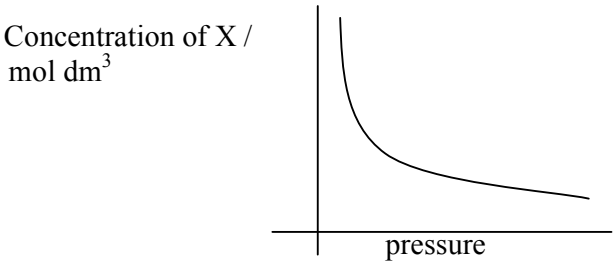
A. $\frac{1}{2}\frac{d[HBr]}{dt} = -\frac{d[Br_2]}{dt}$

B. $-\frac{1}{2}\frac{d[HBr]}{dt} = \frac{d[Br_2]}{dt}$

C. $-\frac{1}{2}\frac{d[HP_2]}{dt} = -\frac{d[Br_2]}{dt}$

D. $\frac{1}{2}\frac{d[HBr]}{dt} = \frac{d[Br_2]}{dt}$

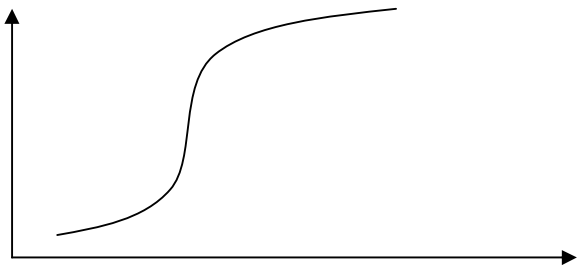
18. The graph below shows the variation of concentration of substance X with pressure.



Which of the following equilibrium reactions could give the graph above at constant temperature?

A. $2W(g) + X(g) \quad Y(g) + Z(g)$
B. $2W(g) + X(g) \quad 2Y(g) + Z(g)$
C. $W(g) + 2X(g) \quad 2Y(g) + Z(g)$
D. $W(g) + X(g) \quad Y(g) + Z(g)$

19. The graph below shows the pH change for the titration of propanoic (0.1m) and sodium hydroxide (0.1m).



At which of the points A, B, C and D above will the maximum buffer capacity occur?

20. The electrode potential of a metal that is in contact with its ionic solution will not be influenced by the

    A. temperature
    B. ion concentration
    C. formation of a complex by the metal ion
    D. metal mass

21. Which of the following is true regarding electrolysis?

    A. Oxidation occur at the cathode and reduction occurs at the anode
    B. Electrons flow from the cathode to the anode through the external circuit
    C. Electricity is conducted through the electrolyte by electrons
    D. The ease of discharge of metallic cations is inversely proportional to the reactivity of the metal

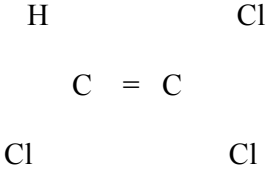
22. The second ionisation energy for calcium is 1150 KJ mol^{-1} . Which of the following represents this statement accurately?

    A. $Ca(g) \rightarrow Ca^{2+}(g) + 2e$ $\quad \Delta H = +1150 \text{ KJ mol}^{-1}$
    B. $Ca(s) \rightarrow Ca^{2+}(g) + 2e$ $\quad \Delta H = +1150 \text{ KJ mol}^{-1}$
    C. $Ca^{+}(s) \rightarrow Ca^{2+}(s) + e^-$ $\quad \Delta H = +1150 \text{ KJ mol}^{-1}$
    D. $Ca^{+}(g) \rightarrow Ca^{2+}(g) + e$ $\quad \Delta H = +1150 \text{ KJ mol}^{-1}$

23. Which one of the following is a propogation step in the reaction between ethane and chlorine?

    A. $CH_3CH_2 + CH_3CH_2 \rightarrow CH_3CH_2H_2CH_3$
    B. $CH_3CH_2 + Cl \rightarrow CH_3CH_2Cl$
    C. $Cl_2 \rightarrow Cl + Cl$
    D. $CH_3CH_2 + Cl_2 \rightarrow CH_3CH_2Cl + Cl$

24. Which of the following compounds reacts with trichloroethane to give an optically active product?



    A. KOH(ag) B. $H_2(g)$ C. Br_2 D.

25. Which of the following compounds gives a yellow precipitate when treated with a mixture of iodine in aqueous sodium hydroxide?

    A. $CH_3CH_2CH_2OH$
    B. $CH_3CH_2CH(OH)CH_2CH_3$
    C. $CH_3COCH_2CH_3$
    D. $CH_3CH_2COCH_2CH_3$

26. Hydrogen cyanide adds to aldehydes and ketones. The rate of reaction increases as the reaction condition becomes more alkaline. Which of the following is most likely to be

involved in the rate determining step?

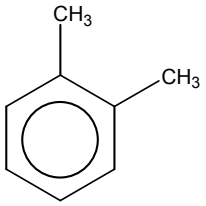
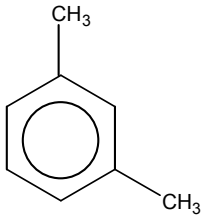
A. OH^- B. CN^- C. H_3O^+ D. HCN

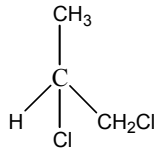
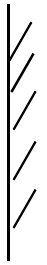
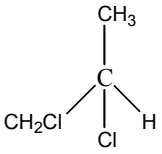
27. When butanal is treated with Fehling's reagent, what are the principal inorganic and organic products?

A. CuO and $CH_3CH_2CH_2COO^-$
B. Cu_2O and $CH_3CH_2CH_2CH_2OH$
C. $CuSO_4$ and $CH_3CH_2CH_2COO^-$
D. Cu_2O and $CH_3CH_2CH_2COO^-$

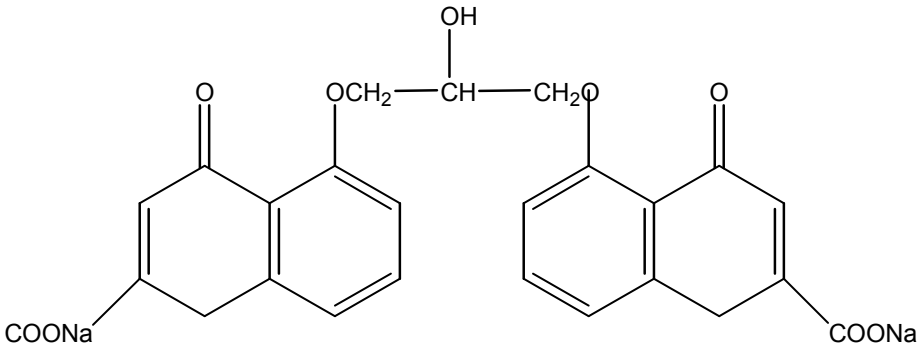
28. Which isomer pair has the same boiling point?

A. $CH_3CH_2CH_2CH_2OH$ and $(CH_3)_2CHCH_2OH$
B. $CH_3(CH_2)_4CH_3$ and $(CH_3)_2CHCH(CH_3)_2$

C  and 

D   

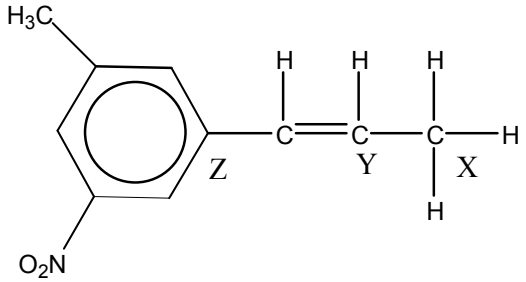
29. Intal is an antiasthma drug that contains disodium cromoglycate whose structure is shown by the formula below.



What is the number of chiral carbon centres in the molecules?

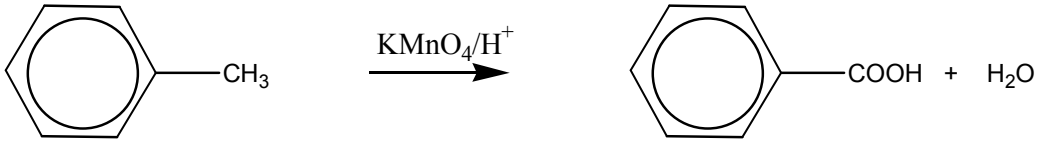
A. 0 B. 1 C. 2 D. 3

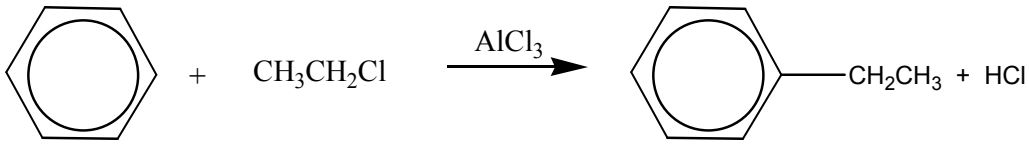
30. What type of hybridization is shown by the atoms labeled x, y and z?

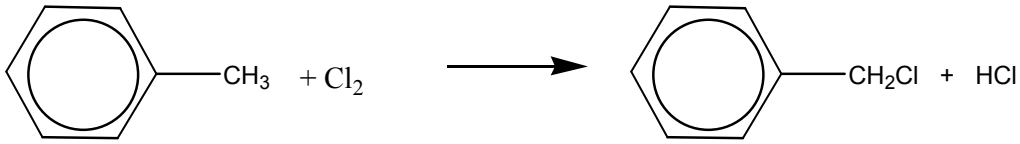


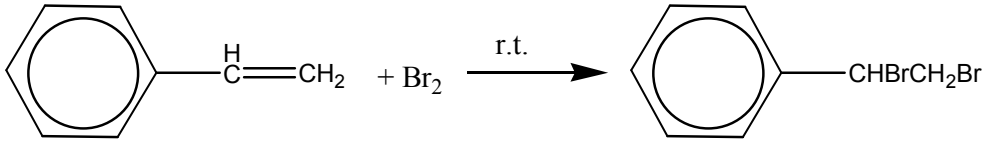
	X	Y	Z
A.	sp^3	sp^2	sp^2
B.	sp^2	sp^3	sp^2
C.	sp	sp^2	sp^3
D.	sp^2	sp^3	sp^3

31. Which reaction is an electrophilic substitution?

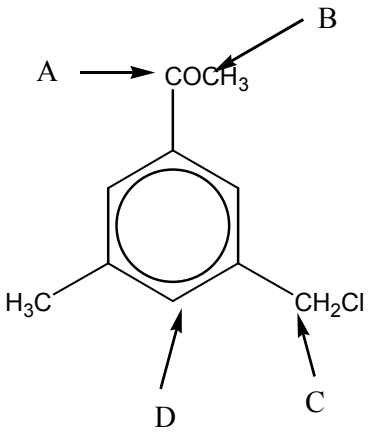
A. 

B. 

C. 

D. 

32. Which carbon atom in the following molecule can most easily be attacked by an electrophile



33. What is the product formed when phenylmethanol $C_6H_5CH_2OH$ reacts with

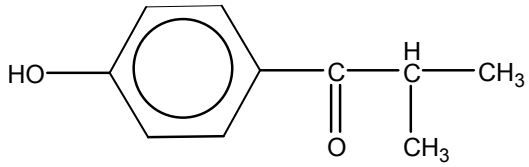
Ethanoyl chloride , CH_3COCl

A. $C_6H_5CH_2Cl$ B $C_6H_5CHCOCl$ C. $C_6H_5CH_2OCOCH_3$ D. $C_6H_5COCH_3$

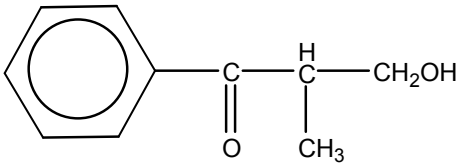
34. Which of the following molecules can

i) rotate a polarized light and
ii) react with phosphorus pentachloride and release white hydrogen chloride

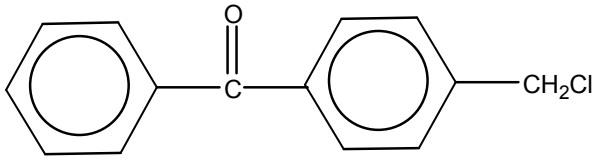
A.



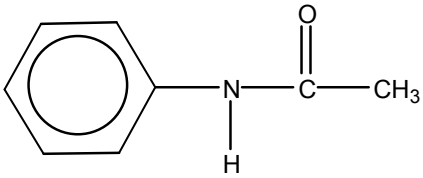
B



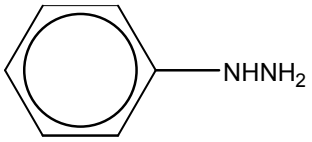
C



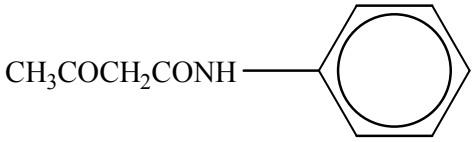
D

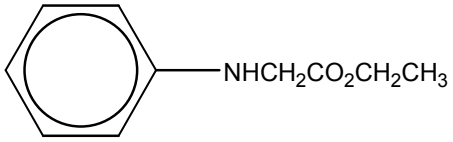


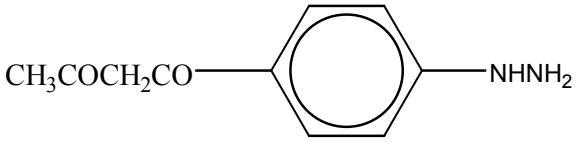
35. A reaction between compound P , $CH_3COCH_2CO_2CH_2CH$, and phenylhydrazine is the first step in synthesizing antipyrine, a type of medicine used to control fever. The reaction scheme is a follows

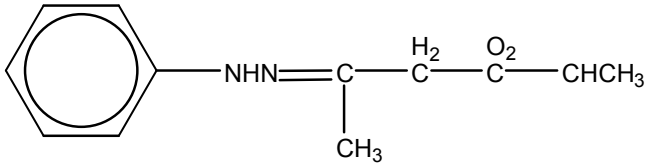
P +  Q first step

What could Q be

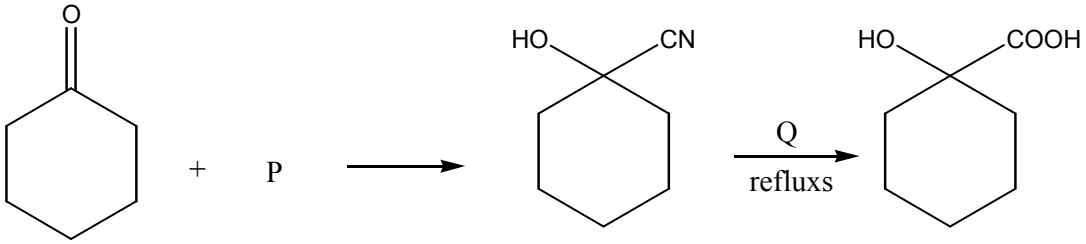
A. 

B. 

C. 

D. 

36. What are reagents P and Q in the reaction scheme below?



	P	Q
A.	KCN	NaOH(g)
B.	HCN	NaOH(aq)
C.	HCN	H_2SO_4(aq)
D.	C_2H_2	H_2SO_4(aq)

37. Hydrolysis of a nitrile compound P or the oxidation of an alcohol Q will produce the same carboxylic acid. Which of the following pairs is probably P and Q?

	P	Q
A.	CH_3CH_2CN	CH_3CH_2OH
B.	$(CH_3)_2CHCN$	$(OH_3)_3COH$
C.	$C_6H_5CH(CH_3)CN$	$C_6H_5CH_2CH(OH)CH_3$
D.	$C_6H_5CH_2CN$	$C_6H_5CH_2CH_2OH$

38. The reaction scheme below shows a few reactions of salt S

S (White solid) —(heated with dilute mineral acid)→ T (fumes with pungent aroma)

S —(heated with concentrated H_2SO_4 acid)→ U(gas that burns with blue flame)

What could S be?

A. CH_3COONa
B. HCOONa
C. $Na_2C_2O_4$
D. Na CO_3

39. When chlorine is passed through pure ethanoic acid in the presence of light, the organic compound formed is

A. CH_3COCl
B. $ClCH_2CHO$
C. $ClCH_2CH_2OH$
D. $ClCH_2COOH$

40. Which of the following compounds will produce

i) HCl fumes with PCl_5 and
ii) NH_3 when heated with NaOH(g)

A. $HOCH_2CH_2NH_2$
B. $HOCH_2CONH_2$
C. $HOCH_2C(NH_2)COOH$
D. NH_2CH_2COOH

Section B

Determine which of the statements is correct. The responses A to D should be selected on the basis of the following.

A	B	C	D
Only 1 is correct	Only 1 and 2 are correct	Only 2 and 3 are correct	1, 2 and 3 are correct

41. The emf of a Daniel Cell can be increased by

1. increasing the concentration of Cu^{2+}
2. decreasing the concentration of Zn^{2+}
3. increasing the volume of Cu^{2+}(aq) solution

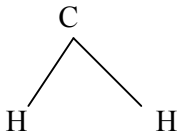
42. The solubility of calcium hydroxide in water is reduced by adding

1. sodium hydroxide
2. magnesium nitrate
3. barium sulphate

43. The activation energy of a reaction

1. is different for forward and backward reactions of exothermic reactions
2. is low for slow reactions
3. is not influenced by a catalyst

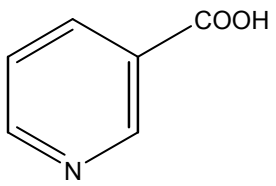
44. The bond length and the bond angle in methane, ammonia and water molecule is shown below



What causes the difference in the bond angle above?

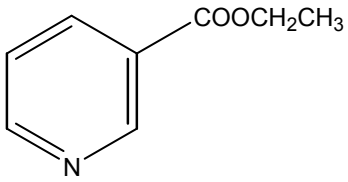
1. The increase in the repulsive force between the hydrogen atoms causes a decrease in the bond length
2. The number of lone -pair electron in the molecules are different
3. The repulsive force of the lone-pair electrons are greater than the bond-pair electrons

45. Nicotinic acid, more commonly known as niacin is one of B vitamins



Which of the following statements is true about

1. It is soluble in water
2. It reacts with ethanol to give ethyl nicotinate



3. It contains an amide group

46. The formulae of two compounds P and Q are given below

$HOCH_2CH_2COCH_2OH$ (P) $\qquad$ $HOCH_2CH(OH)CHO$ (Q)

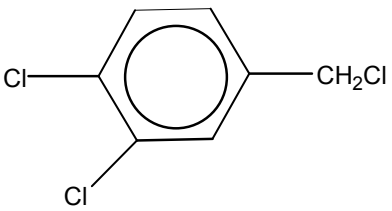
Which of the following statements applies to these compounds?

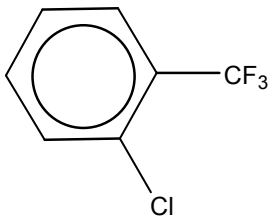
1. Q can be prepared directly from P
2. Both P and Q react with ethanoyl chloride to give esters
3. Both P and Q are chiral

47. When aqueous bromine is added to an organic compound Y, the colour of bromine is discharged. To which classes of compound could Y belong?

1. phenol $\qquad$ 2. amine $\qquad$ 3. alkene

48. Which of the following chlorocompounds gives a white precipitate when shaken with cold ethanolic silver nitrate?

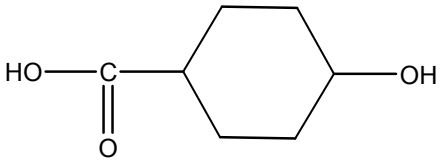
1 $(CH_3)_3C\text{-}Cl$ $\qquad$ 2. 

$\qquad$ 3. 

49. Which reactions involve electrophilic addition

1. $CH_2 = CH_2 + H_2SO_4 \rightarrow CH_3CH_2OSO_3H$
2. $CH_2 = CH_2 + Br_2 \rightarrow CH_2BrCH_2Br$
3. $C_6H_6 + HNO_3 \rightarrow C_6H\,NO_2 + H_2O$

50. A compound has the following structural formula



It can be classified as

1. phenol
2. ester
3. alcohol

Disediakan oleh :	Disemak oleh :	Disahkan oleh :
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( )	( )	( )
	Ketua Panitia Kimia	Guru Kanan Sains