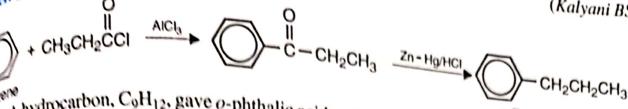
How will you synthesize n-propylbenzene from benzene? t Following steps are involved:

Phenylacetylene

(Kalyani BSc, 2015)



A hydrocarbon, C_9H_{12} , gave o-phthalic acid as the only organic product of oxidation. What is the and name of the hydrocarbon?

The hydrocarbon is o-ethyltoluene,

A secondary alcohol (A), C_3H_8O , reacted with thionyl chloride to give compound (B), C_3H_7CI . A second (B), reacted with thionyl chloride to give compound (B), C_3H_7Cl . (B) reacted with benzene in the presence of aluminium chloride to form (C), C_9H_{12} . Identify (A), (B), write equations for all the reactions. ond write equations for all the reactions. Answer. (A) = Isopropyl alcohol

- (B) = Isopropyl chloride
- (C) = Cumene

Multiple Choice Questions

- Which of the following is an incorrect description of benzene?
 - (a) The CCC bond angles are all equal to 120°.
 - (b) The molecule is planar.
 - (c) The molecule is a 6-membered ring which contains alternating single and double carbon-carbon bonds.
 - (d) The molecule can be drawn as a resonance hybrid of two Kekule structures.

Answer. (c)

- Which of the following statements are false about benzene?
 - (a) It is a planar molecule with bond angles 120°.
 - (b) It is immiscible with water forming the lower layer.
 - (c) It can be converted into cyclohexane by hydrogenation at 200°C in the presence of Ni catalyst.
 - (d) It reacts with ethyl chloride in the presence of aluminium chloride to form ethylbenzene.

- 3 Which statement about the structure of benzene is not true?
 - (a) The two Kekule structures of benzene are in equilibrium.
 - (b) The carbon-carbon bond lengths in benzene are greater than the carbon-carbon double bonds in aliphatic compounds.

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		- leader geometr	v of benzene is	best desc	moed as planar.		- 1
	(c)	The molecular geometr	ring is much	greater th	nan the stability of	1,3,5-cy	Cloha-
	(d)	The stability of benzen	la structures f	or benze	ne has been isolate	ed. No er	milibertatriene
Ansv	ver. (c	The stability of benzenda). Neither of the two Kek	na resonance sti	ructures,	differing only in t	he positi	One of the Carlo
between the							ons of electron
4.	Th	e carbon atoms in a belize	ne ring arc.	(b) sp	3 hybridized		
••	(a)	sp hybridized		(d) No	one of these		
	(c)			(a) 110			
Ancy				2 hvl	beidized carbons fo	or boud	
5.	W	c) hich of the following com	oounds uses onl	y <i>sp</i> - ny	bildized carbons it	or bond 1	formation?
3.	***						
		$\langle \rangle$ (b)	<i>(</i> ())	(c)		(d)	(())~~
	(a)						
Anev	ver. (b	5)					
6.	The	o C_C bond length in benz	zene is				
0.	(a)	greater than the C-C bo	nd length in ethi	ane.			
	(b)	shorter than the C-C bo	nd length in eth	ylene.			
	(0)	Same as that of C-C hot	nd length in ethy	ylene.			
	(4)	intermediate between C-	-C bond length	in ethane	and C-C bond le	ngth in e	thylene.
Amou	er. (d						
7.	er. (a	nich of the following comp	ounds is aromat	ic?			
/.	VV 11	nen of the following comp	Ourido io ur orinir				
		-					
	(a)	(b)		(c)		(d)	
	1		Й				~
Answ). Use the concept of arom				rect ansv	ver.
8.	Cha	aracteristic reactions of arc	matic hydrocar	bons are	initiated by		
	(a)	Electrophiles		(b)	Nucleophiles		
	(c)	Free radicals		(d)	Uncharged molecu	ules	
Answ	er. (a))			, ° 7		
9.	Phe	nol on distillation with Zir	ic dust gives				
		Phenylzinc	C	(b)	Benzene		
		Cyclohexanone		` ,	Benzoic acid		
Answe		- 1 -		(4)	Delizoic acid		
10.	Whi	ich of the following statem	ente ie falsa nha		0		
10.	(a)	can be prepared by transit	as hanname with	out toluer	ne ?		
	(b)	can be prepared by treating	ig benzene with	methyl	chloride in the pre	sence of	AICI3.
	(c)	is converted to benzoic at	and on refluxing	with acid	dic KMnO ₄ solution	on.	
	(0)	on terraxing with concent	ated H ₂ SO ₄ give	es a miyn	ire of autho and no	na taluan	nesulfonic acid
	(a)	can be nitrated with conce	ntrated nitric ac	id to give	a mixture of ortho	and met	ta nitrotoluene
Answe	1. (4)						1
11.	Whic	ch of the following reage	nts will react w	ith meth	vl group rather th	an the b	enzene ring in
methylbenzen				,	2. S. oup rumer m	un viic	
	(a)	Chlorine in the presence of	of uv light				
	<i>(b)</i>	CH ₃ Cl in the presence of	AlCl ₃				
	(c)	CH ₃ COCl in the presence	of AlCla				
	(d)	Hydrogen in the presence	of nickel				
Answer	(a)						
12.	Whic	th of the following can b	e made by u	11.		1	sance of
aluminium chlo	oride?	th of the following can b	made by the	action of	f CH ₃ Cl on benze	ene in th	e present
		Ethylbenzene					
		Chlrobenzene		(b)	-Xylene		
Answer	(b)			$(d)_{R}$	n-Xvlene		
13.	For re	actions of athulhanzana	tho at		1-710110		
101	(a) ~	eactions of ethylbenzene, ortho director	the ethyl group	is consid	lered :		
			7 - 1	(b) ~	ortho		
		neta director		(4)	ortho-para director	٢	
Answer.	(D)			(4) 0	rtho-meta director	Č.	

	Toluene reacts with bromine in the presence of un	ligh	t to give			
14.	m-Bromototuene					
		(0)	Benzyl bromide			
		<i>(a)</i>	Benzoyl bromide			
Answe	r. (b)					
Answ	Toluene reacts with chlorine in the presence of Al	Cl ₃ t	o give			
15.	Chlorotoluene		o- plus p-Chlorotoluene			
	(c) m-Chlorotoluene	(d)	o- plus m-Chlorotoluene			
	(L)	(11)	b' plus m-Chiorotoluene			
Answe	Toluene undergoes oxidation to give					
16.						
Y	(a) Benzyl alcohol	(b)	Quinone			
	(c) Benzaldehyde	(d)	Benzoic acid			
Answe	r. (d)					
	Ethylbenzene undergoes oxidation with acidic po	tassi	um dichromate to give			
17.	Ladyes		an demonate to give			
			e o			
	(a) (CH₂OH	(b)				
		(0)				
			_			
	0		0			
		<i>(</i> n				
	(c) C-CH ₂ CH ₃	(d)	(())—C—OH			
Answe	r. (d)					
18.	Oxidation of cumene with acidic K ₂ Cr ₂ O ₇ gives		4			
	(a) Phenylacetic acid	(b)	Benzaldehyde			
	(c) Benzyl alcohol		Benzoic acid			
	* · · ·	(4)	Belizole acid			
Answe			111 1 771			
19.	Oxidation of toluene with chromyl chloride gives					
	(a) Perkin reaction		Benzoin condensation			
	(c) Etard's reaction	(d)	Ozonolysis			
Answe	r. (c)					
20.	Oxidation of p-xylene with acidic potassium dich	roma	ite gives			
	Similar of p xyrene wan acraic potassium area					
	(a) HOOC—() — COOH	(b)	()>соон			
	(2)	(0)				
	(c) HOOC — >— COOH	(d)	н₃С(())— соон			
Anon		•				
Answer 21.						
41,	Cresols on distillation with zinc dust gives					
	(a) o-Xylene	(b)	Benzene			
	(c) 0- plus n Vylana	4	Toluene			
Answer	(d)	(0.)				
22.	Renzes	eiler	than addition reaction because			
	Benzene undergoes substitution reaction more ea	sity	it has three double bonds			
	(a) it has a cyclic structure	(b)	it has three dodole bolids			
An		(d)	there is delocalization of electrons			
Auswei 23,	• (4)					
		he p	resence of concentrated H ₂ SO ₄ to give			
tehe.	Benzene reacts with concentrated HNO ₃ in this reaction is an example of (a) Electrophilic addition					
	(a) sa example of	(4)	Nucleophilic addition			
	(c)	(0)	Nucleophilic substitution			
ABSWA	(c) Electrophilic substitution	(d)	Nucleoptime sacottonen			
**			and the concentrate decired and the			
Which of the following agents is used in order to make benzene react with concentrated nitric acid						
dope	hzene?					
	(a) Con-	(b)	FeCl ₃ catalyst			
	(a) Concentrated H ₂ SO ₄	(0)	Ultraviolet light			
ABSWEE	(c) Lindlar's catalyst	(a)				

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aceton	25.	Which of the following	g agents is used in order	to make benze	ene react with acetyl chloride.	
	henone	7			ene react with acetyl chloride to	give
acctop	nenone	(a) Ultraviolet light		` '	3 catalyst	
		(c) Platinum catalyst	:	(d) Al ₂ O	3 catalyst	
	Answei					
	26.	Which of the following	ng agents is used in or	der to make t	penzene react with bromine to	
bromo	benzene	?				give
		(a) Ultraviolet light		(b) Fe ca	•	
		(c) Nickel catalyst		(d) Al ₂ O	₃ catalyst	
	Answe	r. (b)			-CalAIGU	
	27.	In the Friedel-Craft ac	etylation of an aromati	c ring, the role	of the AlCl ₃ is to	
		i I) I			
		(a) Form a $CH_2 \longrightarrow C$	ion.	(b) Func	tion as a Lewis base	
		(a) Form a CH ₃ —(c) Chlorinate the arc	t matia rina	(d) With	draw electrons from 4	
	Answe	(c) Cinormate the art	omatic ring	(<i>a</i>) with	draw electrons from the aromatic	cring
	28.		h is considered to be th		in the nitration of benzene is	
		(a) NO_2	(b) NO^+	(c) NO_2^+	(d) HNO_2^+	
	Answe					
	29.	In chlorination of benz	zene, FeCl ₃ is used to ge	enerate		
		(a) Cl:	(b) Cl+	(c) Cl ₂	(d) HCl	
	Answe	3 6		-		
	30.	In sulfonation of benz	ene, the attacking speci	es is		
		(a) H ⁺	(b) SO_2	(c) SO ₃	(D _ VIGO=	
	Answe	er. (c)	(0) 502	(c) 3O ₃	(d) HSO_4^-	
	31.	Consider the followin	g reaction ·			
			g rouetion.	CH ₂ CH ₃	· .	
				J		
			+ CH ₃ CH ₂ CI (?)		1101	
			0-1.201		HCI	
		The cotal and a 1				10
		The catalyst used to c	omplete the above reac			1
	Answe	(a) LIAIH ₄				
	Answe	(a) LIAIH ₄ er. (b)	omplete the above reac (b) AlCl ₃	tion is (c) Na	(d) KOH	
		(a) LIAIH ₄ er. (b)	omplete the above reac (b) AlCl ₃	tion is (c) Na the presence of	(d) KOH	
	32.	er. (b) Benzene reacts with F (a) Cyclohexane (c) n-Hexane	omplete the above reac	tion is (c) Na the presence (b) Cyclo	(d) KOH of Ni catalyst to give	
	32.	er. (b) Benzene reacts with I (a) Cyclohexane (c) n-Hexane er. (a)	complete the above reaction (b) AlCl ₃ H_2 at 150°C at 30 atm in	tion is (c) Na the presence (b) Cyclo (d) No re	(d) KOH of Ni catalyst to give ohexene faction occurs	
	32.	er. (b) Benzene reacts with I (a) Cyclohexane (c) n-Hexane er. (a)	complete the above reaction (b) AlCl ₃ H_2 at 150°C at 30 atm in	tion is (c) Na the presence (b) Cyclo (d) No re	(d) KOH of Ni catalyst to give ohexene faction occurs	
	32.	(a) LIAIH ₄ er. (b) Benzene reacts with I (a) Cyclohexane (c) n-Hexane er. (a) Benzene reacts with c (a) Hexachlorobenze	complete the above reaction (b) AlCl ₃ H ₂ at 150°C at 30 atm in the presence the complete the above reaction (b) AlCl ₃	tion is (c) Na the presence of (b) Cyclo (d) No re of FeCl ₃ cataly	(d) KOH of Ni catalyst to give ohexene faction occurs	
	32. Answer	(a) LIAIH ₄ er. (b) Benzene reacts with I (a) Cyclohexane (c) n-Hexane er. (a) Benzene reacts with c (a) Hexachlorobenze (c) Hexachlorocyclo	complete the above reaction (b) AlCl ₃ H ₂ at 150°C at 30 atm in the presence the complete the above reaction (b) AlCl ₃	tion is (c) Na the presence of (b) Cyclo (d) No re of FeCl ₃ cataly (b) Chlor	(d) KOH of Ni catalyst to give ohexene faction occurs of to form	
	Answer	(a) LIAIH ₄ er. (b) Benzene reacts with I (a) Cyclohexane (c) n-Hexane er. (a) Benzene reacts with c (a) Hexachlorobenze (c) Hexachlorocyclo	complete the above reaction (b) AlCl ₃ H ₂ at 150°C at 30 atm in the presence the above reaction (b) AlCl ₃	tion is (c) Na the presence of (b) Cyclo (d) No re of FeCl ₃ cataly (b) Chlor (d) Benzy	(d) KOH of Ni catalyst to give shexene action occurs yest to form obenzene	
	32. Answer	(a) LIAIH ₄ er. (b) Benzene reacts with I (a) Cyclohexane (c) n-Hexane er. (a) Benzene reacts with c (a) Hexachlorobenze (c) Hexachlorocyclo	complete the above reaction (b) AlCl ₃ H ₂ at 150°C at 30 atm in the presence the above reaction (b) AlCl ₃	tion is (c) Na the presence of (b) Cyclo (d) No re of FeCl ₃ cataly (b) Chlor (d) Benzy	(d) KOH of Ni catalyst to give shexene action occurs yest to form obenzene	
	Answer	Benzene reacts with F (a) Cyclohexane (c) n-Hexane er. (a) Benzene reacts with c (a) Hexachlorobenze (c) Hexachlorocyclo er. (b) Benzene reacts with a (a) Acetophenone	complete the above reaction (b) AlCl ₃ H ₂ at 150°C at 30 atm in the presence the ene hexane	tion is (c) Na the presence of (b) Cyclo (d) No re of FeCl ₃ cataly (b) Chlor (d) Benzy	(d) KOH of Ni catalyst to give ohexene faction occurs yest to form tobenzene yel chloride	
	32. Answer 33. Answer 34.	Benzene reacts with I (a) Cyclohexane (c) n-Hexane er. (a) Benzene reacts with c (a) Hexachlorobenze (c) Hexachlorocyclo er. (b) Benzene reacts with a (a) Acetophenone (c) Phenylacetic acid	complete the above reaction (b) AlCl ₃ H ₂ at 150°C at 30 atm in the presence the ene hexane	tion is (c) Na the presence of (b) Cyclo (d) No re of FeCl ₃ cataly (b) Chlor (d) Benzy resence of AlC (b) Benze	(d) KOH of Ni catalyst to give ohexene action occurs ost to form obenzene yl chloride	
	Answer 33. Answer 34.	(a) LIAIH ₄ Ber. (b) Benzene reacts with I (a) Cyclohexane (c) n-Hexane Ber. (a) Benzene reacts with c (a) Hexachlorobenze (c) Hexachlorocyclo (c) Hexachlorocyclo (d) Acetophenone (e) Phenylacetic acid (f) (a)	complete the above reaction (b) AlCl ₃ H ₂ at 150°C at 30 atm in the presence the ene the cane the control of the presence the control of t	tion is (c) Na the presence of (b) Cyclo (d) No re of FeCl ₃ cataly (b) Chlor (d) Benzy resence of AlC (b) Benzy (d) Pheny	(d) KOH of Ni catalyst to give ohexene action occurs yest to form obenzene yl chloride	
	32. Answer 33. Answer 34.	(a) LIAIH ₄ Ber. (b) Benzene reacts with I (a) Cyclohexane (c) n-Hexane Ber. (a) Benzene reacts with c (a) Hexachlorobenze (c) Hexachlorocyclo (c) Hexachlorocyclo (d) Acetophenone (e) Phenylacetic acid (f) (a)	complete the above reaction (b) AlCl ₃ H ₂ at 150°C at 30 atm in the presence the ene the cane the control of the presence the control of t	tion is (c) Na the presence of (b) Cyclo (d) No re of FeCl ₃ cataly (b) Chlor (d) Benzy resence of AlC (b) Benzo (d) Pheny	(d) KOH of Ni catalyst to give ohexene faction occurs set to form robenzene yl chloride cl ₃ to form ophenone yl acetate	
	Answer 33. Answer 34.	Benzene reacts with F (a) Cyclohexane (c) n-Hexane er. (a) Benzene reacts with c (a) Hexachlorobenze (c) Hexachlorocyclo er. (b) Benzene reacts with a (a) Acetophenone (c) Phenylacetic acid er. (a) Benzene reacts with b (a) Benzene reacts with b	complete the above reaction (b) AlCl ₃ H ₂ at 150°C at 30 atm in the presence the ene the cane the control of the presence the control of t	tion is (c) Na the presence of (b) Cyclo (d) No re of FeCl ₃ cataly (b) Chlor (d) Benzy resence of AlC (b) Benzy (d) Pheny oresence of anh (b) Benzy	(d) KOH of Ni catalyst to give shexene action occurs st to form obenzene yl chloride cl ₃ to form ophenone yl acetate	form
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	Answer 33. Answer 34. Answer 35.	Benzene reacts with I (a) Cyclohexane (c) n-Hexane er. (a) Benzene reacts with c (a) Hexachlorobenze (c) Hexachlorocyclo er. (b) Benzene reacts with a (a) Acetophenone (c) Phenylacetic acid er. (a) Benzene reacts with b (a) Benzyl chloride (c) Benzal chloride er. (d)	complete the above reaction (b) AlCl ₃ H ₂ at 150°C at 30 atm in the presence the ene hexane acetic anhydride in the presence the ene hexane acetic anhydride in the presence the ene hexane acetic anhydride in the presence the ene hexane the energy of the enzoyl chloride in the presence the enzoyl chloride in the p	tion is (c) Na the presence of (b) Cyclo (d) No re of FeCl ₃ cataly (b) Chlor (d) Benzy resence of AlC (b) Benzy (d) Pheny oresence of anh (b) Benzy (d) Benzy (d) Benzy (d) Benzy	(d) KOH of Ni catalyst to give shexene action occurs yet to form obenzene yl chloride cl ₃ to form ophenone yl acetate ydrous aluminium chloride to aldehyde	
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cataly	32. Answe 33. Answe 35. Answe 36.	Benzene reacts with I (a) Cyclohexane (c) n-Hexane er. (a) Benzene reacts with c (a) Hexachlorobenze (c) Hexachlorocyclo er. (b) Benzene reacts with a (a) Acetophenone (c) Phenylacetic acid er. (a) Benzene reacts with b (a) Benzyl chloride (c) Benzal chloride er. (d) Benzene undergoes F (e) (a) n-Propylbenzene	complete the above reaction (b) AlCl ₃ H ₂ at 150°C at 30 atm in the presence the hexane the cetic anhydride in the presence the cetic anneal the cetic	tion is (c) Na the presence of (b) Cyclo (d) No re of FeCl ₃ cataly (b) Chlor (d) Benzy resence of AlC (b) Benzy (d) Pheny oresence of anh (b) Benzy (d) Benzy	(d) KOH of Ni catalyst to give shexene action occurs yest to form obenzene yl chloride cl ₃ to form ophenone yl acetate ydrous aluminium chloride to aldehyde ophenone alcohol in the presence of H ₂	
cataly	Answer 33. Answer 34. Answer 35. Answer 36. Vist to give	Benzene reacts with F (a) Cyclohexane (c) n-Hexane er. (a) Benzene reacts with c (a) Hexachlorobenze (c) Hexachlorocyclo er. (b) Benzene reacts with a (a) Acetophenone (c) Phenylacetic acid er. (a) Benzene reacts with b (a) Benzyl chloride (c) Benzal chloride er. (d) Benzene undergoes F (a) n-Propylbenzene (c) Isopropylbenzene (c) Isopropylbenzene	complete the above reaction (b) AlCl ₃ H ₂ at 150°C at 30 atm in the presence the hexane the cetic anhydride in the presence the cetic anneal the cetic	tion is (c) Na the presence of (b) Cyclo (d) No re of FeCl ₃ cataly (b) Chlor (d) Benzy resence of AlC (b) Benzy (d) Pheny oresence of anh (b) Benzy (d) Benzy	(d) KOH of Ni catalyst to give ohexene action occurs yet to form obenzene yl chloride cl ₃ to form ophenone yl acetate ydrous aluminium chloride to the aldehyde ophenone alcohol in the presence of H ₂	
cataly	32. Answe 33. Answe 35. Answe 36.	Benzene reacts with F (a) Cyclohexane (c) n-Hexane er. (a) Benzene reacts with c (a) Hexachlorobenze (c) Hexachlorocyclo er. (b) Benzene reacts with a (a) Acetophenone (c) Phenylacetic acid er. (a) Benzene reacts with b (a) Benzyl chloride (c) Benzal chloride er. (d) Benzene undergoes F (a) n-Propylbenzene (c) Isopropylbenzene (c) Isopropylbenzene	complete the above reaction (b) AlCl ₃ H ₂ at 150°C at 30 atm in the presence the hexane the cetic anhydride in the presence the cetic anneal the cetic	tion is (c) Na the presence of (b) Cyclo (d) No re of FeCl ₃ cataly (b) Chlor (d) Benzy resence of AlC (b) Benzy (d) Pheny oresence of anh (b) Benzy (d) Benzy	(d) KOH of Ni catalyst to give shexene action occurs yest to form obenzene yl chloride cl ₃ to form ophenone yl acetate ydrous aluminium chloride to aldehyde ophenone alcohol in the presence of H ₂	

								THE PARTY OF PERSONS ASSESSED.
	Ben	zene reacts with prop	pene	in the presence of I	1,SC	a catalyst to give		
17.	10	M-1-10h) weresene			(b)	Benzophenone		
	(0)	Cimene			(d)	Nothing happens		
Answe	10					a impletts		
	0.00		ives					
21,	(a)	Formic acid			(b)	Glyoxal		
	(0)	Formaldehyde				Glycine		
Answe	$\mathbf{r}_{\mathbf{c}}(b)$					•		
19.	Gan	micrane is						
	(a)	Hexachloroethane			(b)	DDT		
	(c)	Hexachlorocyclohex	cane		(d)	TNT		
Answe	r. (c)							
40.	Unc	ler what reaction cor	iditic	ons does the electrop	philid	chlorination of aro	matic	compounds
y occur	?							
	(a)	Cl ₂ , AlCl ₃	(b)	Cl ₂ , H ₂ O	(c)	Cl ₂ , CCl ₄	(d)	NaCl, H ₂ O
Answe	r. (a)							
41.	Wh	ich of the following	is an	incorrect statement	t abo	ut the bromination o	f ben	zene by Br ₂ and
•								
	(a)	FeBr ₃ functions to	incre	ase the electrophilic	city (of Br ₂ .		
	(b)	Formation of the si	-	•			necha	ınism.
	(c)	The carbanionic int						
		There are two carbo	on-co	ontaining intermedia	ites i	n the mechanism.		
Answe								
42.	Wh	ich of the following i	is the	best choice of reag	ents	to effect the electrop	hilic	iodination of ar
the ring	?							
	(a)	KI, acetone	(b)	I_2 , CH_3CN	(c)	KI, HNO_3	(d)	I_2 , HNO ₃
Answe								
G.	Wh	ich of the following			obut	adiene?		
	(a)	[2]annulene	(b)	[4]annulene	(c)	[6]annulene	(a)	Antibenzene
Answe 44.	r. (b)							
14.	Wh	at is the major differ	ence	between an antiaro	mati	c and aromatic comp	ounc	1.7
	(a)	Antionamatic	anne	to have at least one	SD' 1	iybridized atom in u	ic tiu	7.
	(b)	Antiaromatic comp	ound	ls can assume a chai	r-lik	e structure while aro	mauc	compounds are
		nearly flat						
	(c)	Aromatic compour	ds ca	annot have a charge	d ato	om in the structure		
An	(d)		pour	ids follow Huckle's	rule			
Answe	$\mathbf{r}_{\cdot}(d)$							