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SET 4 – Aromatic Hydrocarbons (MCQs)

1. Aromatic hydrocarbons contain –
   a) Only single bonds
   b) Alternating single and double bonds in a ring
   c) Open chain structure
   d) No π bonds

2. The simplest aromatic hydrocarbon is –
   a) Ethane
   b) Benzene
   c) Toluene
   d) Naphthalene

3. The molecular formula of benzene is –
   a) C_6H_6
   b) C_6H_{12}
   c) C_6H_{10}
   d) C_6H_5

4. Benzene is also known as –
   a) Cyclohexane
   b) Benzol
   c) Phenol
   d) Aniline

5. The structure of benzene was first proposed by –
   a) Kekulé
   b) Dalton
   c) Mendeleev
   d) Rutherford

6. According to Kekulé, benzene consists of –
   a) A straight chain of carbon atoms
   b) A ring of six carbon atoms with alternate single and double bonds
   c) A branched chain
   d) No double bonds

7. The shape of benzene molecule is –
   a) Linear
   b) Trigonal planar
   c) Tetrahedral
   d) Octahedral

8. Each carbon atom in benzene is –
   a) sp^3 hybridised
   b) sp^2 hybridised

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c) sp hybridised
d) dsp^2 hybridised

9. The C–C bond length in benzene is –
   a) 134 pm
   b) 139 pm
   c) 154 pm
   d) 120 pm

10. The concept of resonance in benzene explains –
   a) Its instability
   b) Equal bond lengths
   c) High reactivity
   d) Non-planar structure

11. The delocalisation of π-electrons in benzene is called –
   a) Resonance
   b) Inductive effect
   c) Hyperconjugation
   d) Polarisation

12. Which of the following is not aromatic?
   a) Benzene
   b) Toluene
   c) Cyclohexane
   d) Naphthalene

13. Aromatic compounds follow –
   a) Huckel's rule
   b) Avogadro's law
   c) Boyle's law
   d) Graham's law

14. According to Huckel's rule, a compound is aromatic if it has –
   a) 2n π-electrons
   b) 4n π-electrons
   c) (4n + 2) π-electrons
   d) n π-electrons

15. Benzene contains how many π-electrons?
   a) 4
   b) 6
   c) 8
   d) 10

16. Benzene is exceptionally stable due to –
   a) Localised π bonds
   b) Delocalised π-electrons

c) Ionic bonds
d) Hydrogen bonding

17. Aromatic hydrocarbons are –
a) Saturated
b) Unsaturated but stable
c) Highly reactive like alkenes
d) Non-reactive gases

18. The compound C_7H_8 is –
a) Benzene
b) Toluene
c) Xylene
d) Cumene

19. The compound C_8H_{10} represents –
a) Xylene
b) Toluene
c) Naphthalene
d) Phenol

20. The compound C_9H_{12} represents –
a) Ethylbenzene
b) Propylbenzene
c) Cumene
d) All of these

21. The electrophilic substitution reaction in benzene proceeds through –
a) Free radical mechanism
b) Electrophilic mechanism
c) Nucleophilic mechanism
d) Substitution mechanism

22. Which of the following is not an electrophilic substitution reaction?
a) Nitration
b) Sulphonation
c) Halogenation
d) Hydrogenation

23. The nitrating mixture consists of –
a) $HNO_3 + H_2O$
b) $HNO_3 + H_2SO_4$
c) $HNO_3 + HCl$
d) $HNO_3 + NaOH$

24. The electrophile in nitration of benzene is –
a) NO_2^+
b) H^+

c) NO_3^-
d) H_2SO_4

25. In sulphonation of benzene, the electrophile is –
a) SO_3
b) HSO_4^-
c) SO_4^{2-}
d) SO_2

26. The product formed in sulphonation of benzene is –
a) Nitrobenzene
b) Benzene sulphonic acid
c) Chlorobenzene
d) Benzoic acid

27. Halogenation of benzene requires a catalyst like –
a) $AlCl_3$ or $FeCl_3$
b) H_2SO_4
c) NaOH
d) $CuSO_4$

28. The reaction of benzene with Cl_2 in presence of $FeCl_3$ gives –
a) Chlorobenzene
b) Benzyl chloride
c) Benzene hexachloride
d) Benzaldehyde

29. Friedel–Crafts alkylation involves reaction of benzene with –
a) Alkyl halide and $AlCl_3$
b) Alcohol and H_2SO_4
c) Carboxylic acid and $AlCl_3$
d) Aldehyde and HCl

30. The product of benzene + CH_3Cl + $AlCl_3$ is –
a) Toluene
b) Xylene
c) Cumene
d) Benzyl chloride

31. In Friedel–Crafts acylation, benzene reacts with –
a) Acyl chloride
b) Alkyl chloride
c) Alcohol
d) Ester

32. The product of benzene + CH_3COCl + $AlCl_3$ is –
a) Toluene
b) Acetophenone

c) Benzaldehyde
d) Benzoic acid

33. Benzene undergoes substitution rather than addition because –
a) Addition destroys aromaticity
b) Substitution is slower
c) Benzene is unsaturated
d) π-bonds are localised

34. Benzene reacts with hydrogen in presence of Ni catalyst to form –
a) Cyclohexane
b) Cyclohexene
c) Cyclopentane
d) Phenol

35. Oxidation of toluene with $KMnO_4$ gives –
a) Benzoic acid
b) Benzaldehyde
c) Benzyl alcohol
d) Phenol

36. Oxidation of ethylbenzene gives –
a) Acetophenone
b) Benzoic acid
c) Benzaldehyde
d) Ethanol

37. Benzene when treated with concentrated HNO_3 in presence of H_2SO_4 gives –
a) Aniline
b) Nitrobenzene
c) Phenol
d) Benzene sulphonic acid

38. Benzene is colourless, flammable liquid with –
a) Sweet odour
b) Pungent odour
c) No odour
d) Foul odour

39. Benzene burns with –
a) Blue flame
b) Sooty flame
c) Non-luminous flame
d) Colourless flame

40. Benzene is insoluble in water because –
a) It is polar
b) It is non-polar

c) It reacts with water
d) It forms hydrogen bonds

41. The industrial source of benzene is –
a) Petroleum
b) Coal tar
c) Natural gas
d) Biomass

42. The compound $C_{10}H_8$ is –
a) Benzene
b) Naphthalene
c) Anthracene
d) Toluene

43. Naphthalene consists of –
a) One benzene ring
b) Two fused benzene rings
c) Three benzene rings
d) Four benzene rings

44. Anthracene consists of –
a) Two fused rings
b) Three fused rings
c) One ring
d) Four rings

45. Which of the following is not aromatic?
a) Benzene
b) Naphthalene
c) Cyclohexane
d) Anthracene

46. Aromatic compounds are used in –
a) Perfumes and dyes
b) Fuels
c) Solvents
d) All of these

47. Resonance energy of benzene is about –
a) 36 kcal/mol
b) 150 kcal/mol
c) 120 kcal/mol
d) 60 kcal/mol

48. The most stable form of benzene is –
a) Resonating hybrid
b) Kekulé structure

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c) Dewar benzene
d) Cyclohexatriene

49. Benzene on ozonolysis gives –
a) Glyoxal
b) Maleic acid
c) Malonic acid
d) None

50. Benzene reacts with CH_3COCl in presence of $AlCl_3$ to give –
a) Acetophenone
b) Benzaldehyde
c) Benzoic acid
d) Benzyl alcohol

✅ Answers – SET 4

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