

exam_id	question	option_1	option_2	option_3
	1. Which of the following is a paramagnetic carbonyl?	$\text{Cr}(\text{CO})_6$	$\text{Fe}(\text{CO})_6$	$\text{V}(\text{CO})_6$
	2. Which of the following contains M – M single bond?	$\text{Ni}(\text{CO})_4$	$\text{Fe}(\text{CO})_6$	$\text{Mn}_2(\text{CO})_{10}$
	3. According to Wade's rules, $\text{B}_5\text{H}_9$ is:	Closo	Nido	Arachno
	4. According to Wade's rules, $\text{B}_4\text{H}_{10}$ is:	Closo	Nido	Arachno
	5. $[\text{B}_{12}\text{H}_{12}]^{2-}$ has the geometry:	Icosahedral	Octahedral	Tetrahedral
	6. Carbonyl with only terminal CO ligands:	$\text{Co}_2(\text{CO})_8$	$\text{Fe}(\text{CO})_5$	$[\text{Fe}_2(\text{CO})_9]$
	7. Spectroscopy for pi backbonding detection:	IR Spectroscopy	Mass Spectrometry	UV Spectroscopy
	8. Electrophilic substitution on ferrocene occurs:	On Fe center	On Cp ring	On both Cp rings simultaneously
	9. Eclipsed ferrocene point group:	$\text{D}_{5h}$	$\text{D}_{5d}$	$\text{C}_{5v}$
	10. Which one undergoes electrophilic substitution more easily than benzene?	Ferrocene	Zeise's salt	$\text{Ni}(\text{CO})_4$

11. Coordination of ethylene in Zeise's salt results in:	Shortening of C=C bond	Lengthening of C=C bond	Conversion to C≡C
12. How many skeletal electron pairs are present in [B <sub>5</sub> H <sub>9</sub> ] ?	4	6	7
13. Which fragment is isolobal with CH?	BH <sub>2</sub>	Fe(CO) <sub>4</sub>	Mn(CO) <sub>5</sub>
14. Which feature confirms $\pi$ -backbonding in Zeise's salt?	Shortened Pt-Cl bond	Elongated C=C bond of ethylene	Blue color of the salt
15. The isolobal relationship helps in:	Predicting stereochemistry	Mapping between organic and inorganic fragments	Calculating redox potentials
16. The difference in $\nu(\text{CO})$ frequencies between bridging and terminal CO is generally:	Bridging > terminal	Bridging < terminal	Same
17. The formal oxidation state of Fe in ferrocene, $\text{Fe}(\eta^5\text{-C}_5\text{H}_5)_2$ , is:	0	2+	3+
18. The hapticity of each cyclopentadienyl ligand in ferrocene is:	$\eta^1$	$\eta^3$	$\eta^5$

19. According to Wade's rules, $B_5H_9$ is:	Closo	Nido	Arachno
20. According to Wade's rules, $B_4H_{10}$ is:	Closo	Nido	Arachno
21. $[B_{12}H_{12}]^{2-}$ has the geometry:	Icosahedral	Octahedral	Tetrahedral
22. How many skeletal electron pairs are present in $[B_5H_9]$ ?	4	6	7
23. Which fragment is isolobal with CH?	$BH_2$	$Fe(CO)_4$	$Mn(CO)_5$
24. The isolobal relationship helps in:	Predicting stereochemistry	Mapping between organic and inorganic fragments	Calculating redox potentials
25. According to Wade's rules, $[B_6H_6]^{2-}$ is:	Nido	Arachno	Closo
26. $CH_3$ is isolobal with:	$Fe(CO)_4$	$Mn(CO)_5$	$Co(CO)_5$
27. Which borane is classified as nido by Wade's rules?	$B_{10}H_{14}$	$B_4H_{10}$	$[B_{12}H_{12}]^{2-}$
28. According to Wade's rules, the skeletal electron pair count (SEP) for $[B_5H_5]^{2-}$ is:	4	5	6

29. The isolobal analogy helps in rationalizing the electronic structure of:	Organic molecules only	Organometallic fragments only	Both organic and organometallic fragments
30. The number of skeletal electrons present in the compounds $C_2B_3H_5$ , $C_2B_4H_6$ , and $B_4H_9$ are respectively	10, 12, 12	12, 14, 14	10, 12, 14
32. Classify the structure of the given complex $[PCB_9H_{11}]^-$	closo	nido	arachno
33. Classify the structure of the complex: $C_2B_3H_7$	closo	arachno	nido
34. Classify the structure of the given complex: $As_2C_2B_7H_9$	closo	nido	arachno
35. The replacement of Cl atom from P-Cl part of phosphazene takes place by mechanism	$S_N^1$	$S_E^1$	$S_N^2$
36. Phospham is	$P_3N_3Cl_6$	$P_3N_6(NH)_3$	$P_3N_3(NH_2)_3$

37. The reaction of  $\text{BCl}_3$  with  $\text{NH}_4\text{Cl}$  gives product A which upon reduction by  $\text{NaBH}_4$  gives product B. product B upon reacting with  $\text{HCl}$  affords compound C, which is

$\text{Cl}_3\text{B}_3\text{N}_3\text{H}_9$        $(\text{ClBNH})_3$        $(\text{HBNH})_3$

38. How many B-B-B 3 centre -2 electron bonds are present in  $\text{B}_4\text{H}_{10}$ ?

4

0

1

39. The structure of diborane ( $\text{B}_2\text{H}_6$ ) contains:

two 2 centre - 2 electron bonds and four 3 centre - 2 electron bonds

four 2 centre - 2 electron bonds and two 3 centre - 2 electron bonds

two 2 centre - 2 electron bonds and two 3 centre - 2 electron bonds

40. Which is inorganic benzene?

Boron

Borax

Boroline

option\_4

image

correct option



**Answer: C.**



**Answer: C.**

Hypho

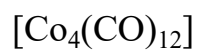
**Answer: B.**

Hypho

**Answer: C.**

Cubic

**Answer: A.**



**Answer: B.**

NQR  
Spectroscopy

**Answer: A**

On solvent

**Answer: B.**



**Answer: A.**



**Answer: A.**

No change

**Answer: B.**

8

**Answer: C.**

$\text{Co}(\text{CO})_3$

**Answer: D.**

Square-pyramidal  
geometry

**Answer: B.**

Measuring bond  
lengths

**Answer: B.**

Depends on metal  
only

**Answer: B.**

-2

**Answer: B.**

$\eta^6$

**Answer: C.**

Hypho

**Answer: B.**

Hypho

**Answer: C.**

Cubic

**Answer: A.**

8

**Answer: C.**

$\text{Co}(\text{CO})_3$

**Answer: D.**

Measuring bond  
lengths

**Answer: B.**

Hypho

**Answer: C.**

BH

**Answer: B.**

$\text{B}_6\text{H}_6$

**Answer: A.**

7

**Answer: C.**



Inorganic salts  
only

**Answer: C.**

12,14,12

**Answer: D**

klado

**Answer: B**

klado

Hypercloso

$S_E^2$

**Answer: C**

$P_3N_3(NH_2)_6$

**Answer: C**



Answer: A

2

Answer: B

four 2 centre - 2  
electron bonds  
and four 3 centre -  
2 electron bonds

Answer: B

Borazole

Answer: D