

Total No. of Printed Pages—8

5 SEM TDC CHM M 3 (N/O)

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(November)

CHEMISTRY

(Major)

Course : 503

(Inorganic Chemistry—II)

*The figures in the margin indicate full marks
for the questions*

(New Course)

Full Marks : 48

Pass Marks : 14

Time : 2 hours

1. Select the correct answer from the following :

1×5=5

(a) The total electron count for the compound $\text{Fe}_5\text{C}(\text{CO})_{15}$ is

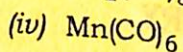
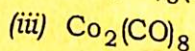
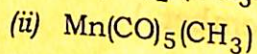
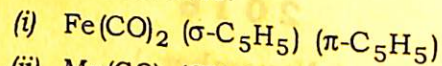
(i) 62

(ii) 72

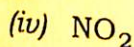
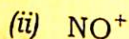
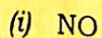
(iii) 74

(iv) 86

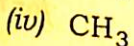
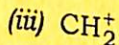
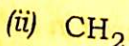
(b) Which of the following does not obey 18-electron rule?



(c) Sodium nitroprusside contains species



(d) $\text{Mn}(\text{CO})_5$ is isolobal with



(e) 1,10-phenanthroline iron (II) sulphate may be used as

(i) adsorption indicator

(ii) metal ion indicator

(iii) redox indicator

(iv) neutralization indicator

2. Answer the following questions :

2×5=10

(a) What do you mean by oxidative addition reaction?

(b) How will you detect bridging and terminal CO in $\text{Fe}_2(\text{CO})_9$?

(c) What are metal cluster compounds? Give examples.

(d) Explain why two nitrosyl groups can substitute three carbonyl group from metal carbonyl compounds.

(e) Write a note on adsorption indicator.

3. Answer any three questions : 3×3=9

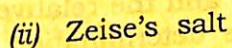
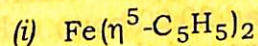
(a) Give two important reactions of ferrocene from which the aromatic character of the molecule can be established. 3

(b) Explain reductive elimination reaction with suitable example. 3

(c) What do you mean by hapticity of a ligand in organometallic compound? Give the name and formula of one monohapto and one pentahapto ligand. 3

(d) Discuss about the bonding in mononuclear metal carbonyls. 3

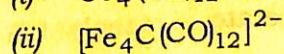
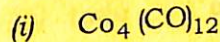
(e) How will you prepare the following? $1\frac{1}{2}\times 2=3$



4. Answer any three questions : 3×3=9

(a) What are low nuclearity carbonyl clusters? Discuss the structure of one such cluster. $1+2=3$

(b) Predict the structure of the following clusters in the light of PSEP theory : $1\frac{1}{2}\times 2=3$



- (c) What are nitrosyl complexes? Give one example of nitrosyl complex formed by Fe and Co. 2+1=
- (d) Outline the rules for polyhedral skeletal electron pair theory.

5. Answer any *three* questions : 3×3=

- (a) Define accuracy, precision and mean deviation.
- (b) What indicator will you use in the titration of (i) strong acid with weak base and (ii) strong acid with strong base? Give reasons. 1½+1½=
- (c) What are metal ion indicators? Give two examples with structure. 1+2=
- (d) What are determinate and indeterminate errors? In a determination, the concentration of iron in a given sample was found to be 20.17 ppm. Taking the accepted value as 20.00 ppm, calculate the absolute error and the relative error as percent in the determination. 1+2=

6. Discuss the use of the following reagents in inorganic analysis (any *three*) : 2×3=

- (a) Cupferron
- (b) Magneson
- (c) Dithizone
- (d) 1,10-phenanthroline
- (e) Zinc uranyl acetate