CHEMISTRY

BOOKS - NTA MOCK TESTS

REDOX REACTIONS TEST -1

Multiple Choice Questions

1. Number of moles of MnO_4^- is required to oxidize one mole of ferrous oxalate completely in an acidic medium will be

A. 0.4 moles.

B. 7.5 moles

C. 0.2 moles

D. 0.6 moles

Answer: D

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2. The volume strenght of $1.5NH_2O$ is

A. 4.8

B. 8.4

C. 3.0

D. 8.0

Answer: B

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3. The brown - ring complex compound of iron is formulate as $\left[Fe(H_2O)_5(NO)\right]SO_4$. The oxidation state of iron is :

A. 1

B. 2

C. 3

D. 0

Answer: A

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4. For the redox reaction,

$MnO_4^- + C_2O_4^{2-} + H^+ \rightarrow Mn^{2+} + CO_2 + H_2O$

Correct stoichiometric coefficients of MnO_4^-, $C_2O_4^{2-}$ & H^+ are

A. 2, 5, 16

B. 16, 5, 2

C. 5, 16, 2

D. 2, 16, 5

Answer: A

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5. A sample of chromium containing alloy weighing 3.45 g was dissolved in acid and all chromium was oxidised to CrO_4^{2-}. 3.15g of Na_2SO_3 was required to reduce the CrO_4^{2-} to CrO_2, in a basic solution while so ion being oxidised to SO_4^{2-}. Calculate mass % of chromium in sample. [Molar mass of Cr=52]

A. $25.13\ \%$

B. $76.3\ \%$

C. $80\ \%$

D. $10\ \%$

Answer: A

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6. 2.5 g sample of $AgNO_3$ is dissolved in 50 ml of water. It is titrated with 50 ml of KI solution. The Agi precipitate is filtered out. Excess KI in the

filtrate is titrated with 50 ml M/10 KIO_3 acidified with dilute H_2SO_4, 20 ml of the same stock solution of KI requires 30 ml of M/10 KIO_3 under similar conditions. Calculate the percentage of $AgNO_3$ in the sample.

A. 85

B. 43

C. 90

D. 97

Answer: A

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7. 1 mole of equimolar mixture of $Fe_2(C_2O_4)_3$ and FeC_2O_4 requires X moles of $KMnO_4$ in acid medium for complete reaciton. The value of X is:

A. 0.9

B. 0.6

C. 1.2

D. 0.8

Answer: A

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8. A solution contains Cu^{2+} and $C_2O_4^-$ ions which on titration with $1MKMnO_4$ consumes 10 ml of the oxidizing agent for complete oxidation in acidic medium. The resulting solution is neutralized with Na_2CO_3, acidified with dilute CH_3COOH and is treated with excess of KI. The liberated iodine requires 25 ml of 1 M of hypo solution, then what will be the molar ratio of Cu^{2+} to $C_2O_4^{2-}$ ions in the solution?

A. $5:2$

B. $1:2$

C. $2:1$

D. $1:1$

Answer: D

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9. A mixture of FeO and Fe_2O_3 is completely reacted with 100 mL of 0.25 M acidified $KMnO_4$ solution. The resultant solution was then titrated with Zn dust which converted Fe^{3+} of the solution to Fe^{2+}. The Fe^{2+} required 1000 mL of $0.10M K_2Cr_2O_7$ solution. Find out the weight % Fe_2O_3 in the mixture.

A. 80.85

B. 19.15

C. 50

D. 89.41

Answer: A

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10. To a 10 ml, 1 M aqueous solution of Br_2, excess of NaOH is added so that all the Br_2 is disproportional to Br_2 and BrO_3^- . The resulting solution is free from Br^- , by extraction and excess of OH^- neutralised by acidifying the solution The resulting solution is sufficient to react with 2 g of impure, CaC_2O_4 (M = 128 g/mol) sample The per cent purity of oxalate sample is

A. $85.3\ \%$

B. $12.5\ \%$

C. $90\ \%$

D. $64\ \%$

Answer: D

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11. $5gNa_2CO_3$ and Na_2SO_4. This sample is dissolved and the volume made up to 250 mL, 25 mL 20 mL $0.1MH_2SO_4$. Calculate the % of

Na_2SO_4 in the sample

A. 42.4

B. 57.6

C. 36.2

D. None of these

Answer: B

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12. An impure sample of sodium oxalate $(Na_2C_20 = O_4)$ weighing 0.20 g is dissolved in an aqueous solution of H_2SO_4 and the solution is titrated at $70^\circ C$, requiring 45 ml $0.02MKMnO_4$ solution. The endpoint is overrun, and the back titration is carried out with 10 ml of 0.1 M oxalic acid solution. Find the per cent purity of $Na_2C_2O_4$ in the sample.

A. 75

B. 83.75

C. 90.25

D. None of these

Answer: B

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13. A 150 ml solution of I_2, is divided into two unequal parts. First part reacts with hypo solution in acidic medium. 15 ml of 0.4M hypo was consumed. Second part was added with 100 ml of 0.3 M NaOH solution. The residual base required 10 ml of $0.3MH_2SO_4$ solution for complete neutralization. What was the initial concentration of I_2?

A. 0.08 M

B. 0.1 M

C. 0. 2M

D. None of these

Answer: B

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14. 20 ml of $0.2MNaOH$ (aq) solution is mixed with 35 ml of 0.1 M NaOH (aq) solution and the resultant solution is diluted to 100 ml. 40 ml of this diluted solution reacted with 10% impure sample of oxalic acid $(H_2C_2O_4)$. The weight of the impure sample is

A. 0.15 gram

B. 0.135 gram

C. 0.59 gram

D. None of these

Answer: A

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15. Equivalent weight of H_3PO_2, when it disproportionate into PH_3 and H_3PO_3 is

A. $\frac{5M}{4}$

B. $\frac{7M}{4}$

C. $\frac{3M}{4}$

D. $\frac{9M}{4}$

Answer: C

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16. 433 g sample of CrI_3 with percentage purity 10%, with background impurity, is completely reacted with 540 ml of H_2O_2 solution in basic medium, where CrI_3 is oxidised into $Cr_2O_7^{2-}$ and IO_4, then what will be the volume strength of $H_2O_2(M_{CrI_3} = 433g/\text{mole})$?

A. 28

B. 56

C. 5.6

D. 2.8

Answer: A

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17. A 100 ml solution of 0.1 N – HCl was titrated with 0.2 N – NaOH solution. The titration was discontinued after adding 30 ml of NaOH solution. The remaining titration was completed by adding 0.25 N – KOH solution. The volume of KOH required for completing the titration is

A. 16 ml

B. 32 ml

C. 35 ml

D. 70 ml

Answer: A

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18. Volume of $0.1MH_2SO_4$ required to neutralize 30 mL of 0.2 N NaOH is

A. 30 mL

B. 15 mL

C. 40 mL

D. 60 mL

Answer: A

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19. Molecular weight of oxalic acid is 126. The weight of oxalic acid required to neutralise 100 cc of 1 normal solution of NaOH is

A. 6.3 gm

B. 126 gm

C. 530 gm

D. 63 mg

Answer: A

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20. 10 moles of electrons are lost by 1 mole of N_2H_4 to form a new compound Y. Assuming that all the nitrogen appears in the new compound. What is the oxidation state of N in y? (There is no change in oxidation state of H).

A. -1

B. -3

C. $+3$

D. $+5$

Answer: C

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21. What is the oxidation number of Br in $KBrO_4$

A. $+6$

B. $+5$

C. $+3$

D. $+7$

Answer: D

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22. Identify the oxidized and reduced species in the following reaction.

$Cl_{2(g)} + 2Br^-_{aq.} \rightarrow 2Cl^-_{(aq.)} + Br_2(l)$

A. Cl_2 oxidized and Br^- oxidized.

B. Cl_2 reduced and Br^- reduced.

C. Cl_2 oxidized and Br^- reduced

D. Cl_2 reduced and Br^- oxidized.

Answer: D

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23. How many moles of $FeSO_4$ oxidized separately by one mole of $KMnO_4$ in acid medium?

A. Five moles

B. Four moles.

C. Seven moles.

D. Three moles

Answer: A

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24. How many mole of $H_2C_2O_4$ oxidized separately by one mole of $KMnO_4$ in acid medium.

A. 8 mole

B. 2 mole

C. $\frac{5}{2}$ mole

D. 3 mole

Answer: C

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25. Reaction $2Br^-(aq) + Cl_2(aq) \rightarrow 2Cl^-(aq) + Br_2(aq)$ is used for commercial preparation of bromine from its salts. Suppose we have 50 mL of a 0.60 M solution of NaBr. What volume of a 0.050 M solution of Cl_2 is needed to react completely with the Br?

A. V=500 mL

B. V = 400 mL

C. V = 200 mL

D. V=300 mL

Answer: D

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26. What mass of N_2H_4 can be oxidised to N_2 by 24.0 g K_2CrO_4, which is reduced to $Cr(OH)_4^-$ (Given : Molar mass of $K_2CrO_4 = 194.2$)

A. 9.97 g

B. 2.97 g

C. 3.97 g

D. 4.97 g

Answer: B

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27. A particular acid-rain water has SO_2 . If a 25.00 mL sample of this water requires 35 mL of 0.02 M $KMnO_4$ for its titration, what is the

molarity of SO_3^{2-} in acid-rain?

$$2MnO_4^- + 5SO_3^2 + 6H^+ \rightarrow 5SO_4^{2-} + 2Mn^{2+} + 3H_2O$$

A. 0.7 M

B. 0.07 M

C. 1.07M

D. 1.7 M

Answer: B

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28. The products obtained when chlorine gas reacts with cold and dilute aqueous NaOH are

A. ClO_2^- and ClO_3^-

B. Cl^- and ClO^-

C. Cl^- and ClO_2^-

D. ClO^- and ClO_3^-

Answer: B

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29. Which of the following reactions is an example of a redox reaction?

A. $XeF_2 + PF_5 \rightarrow [XeF]^+ PF_6^-$

B. $XeF_6 + H_2O \rightarrow XeOF_4 + 2HF$

C. $XeF_6 + 2H_2O \rightarrow XeO_2Fe_2 + 4HF$

D. $XeF_4 + O_2F_2 \rightarrow XeF_6 + O_2$

Answer: D

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30. 0.5 g mixture of $K_2Cr_2O_7$ and $KMnO_4 was treated with excess of KI \in acidic medium. Iod \in eliberated r$ cm^(3) $of 0.15M sodium thiosp\hat{e}solution f$ or $titration. The percentamount of$ KMnO_(4)` in the mixture is

(Atomic weight – K = 39, Cr = 52, Mn=55, Na=23, S=32)

A. $85.36\ \%$

B. $82.34\ \%$

C. $54.22\ \%$

D. $34.56\ \%$

Answer: A

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