MHT-CET 2020 Question Paper

14th October 2020

1. What is IUPAC name of mesityl oxide?
   (A) 2-Bromohexan-3-one
   (B) 1-Phenylbutan-2-one
   (C) 4-Methylpent-3-en-2-one
   (D) 4-Methylbenzaldehyde

2. Lithium crystallises into body centered cubic structure. What is the radius of lithium if edge length of it's unit cell is 351 pm?
   (A) 75.50 pm (B) 151.98 pm
   (C) 240.80 pm (D) 300.50 pm

3. The edge length of fcc type unit cell of copper having atomic radius 127.6 pm is equal to _____.
   (A) 361 pm (B) 295 pm
   (C) 331 pm (D) 378 pm

4. Which of the following oxides is NOT volatile?
   (A) SO_2 (B) As_2O_3
   (C) P_2O_5 (D) ZnO

5. What is IUPAC name of 3-chloropropyl ethyl ether?
   (A) 1-Chloro-3-ethoxypropane
   (B) 1-Chloro-3-propoxyethane
   (C) 3-Chloro-1-ethoxypropane
   (D) 3-Chloro-1-propoxyethane

6. Which among following compounds contains phantom atom?
   (A) $CH_3CH_2NH_2$ (B) CH_3COOH
   (C) CH_3CH_2Cl (D) $CH_3CH_2CH_2OH$

7. Which of the following halogens combine with dihydrogen at lowest temperature?
   (A) Iodine (B) Bromine
   (C) Chlorine (D) Fluorine

8. What is the number of atoms present per unit cell of aluminium having edge length 4 Å?
   (If density of Al = 2.7 g cm^{-3}, At. Mass of Al = 27)
   (A) 2 (B) 1
   (C) 4 (D) 8

9. Which of the following can form colloidal sol with water?
   (A) Ammonium sulphate
   (B) Glucose
   (C) Starch
   (D) Common salt

10. When SO_2 is passed through acidified $K_2Cr_2O_7$, the process that takes place is _____.
    (A) the solution is decolourised
    (B) SO_2 is reduced
    (C) the solution turns blue
    (D) green $Cr_2(SO_4)_3$ is formed

11. Identify product B obtained in following reaction.
    $CH_3 - CH_3 \xrightarrow[\Delta]{HNO_2} A \xrightarrow[ether]{LiAlH_4} B$
    (A) Ethanamine (B) Ethanal
    (C) Ethanol (D) Ethanoic acid

12. Osmotic pressure of one molar solution at 27 °C is _____.
    (A) 24.6 atm (B) 12.1 atm
    (C) 2.46 atm (D) 1.21 atm

13. Resonance is NOT exhibited by _____.
    (A) aniline (B) phenol
    (C) nitrobenzene (D) cyclohexane

14. Heat of combustion of $C_{(s)}$, $H_{2(g)}$ and $C_2H_{6(g)}$ are $-x_1$, $-x_2$ and $-x_3$ respectively.
    Hence heat of formation of $C_2H_{6(g)}$ is _____.
    (A) $-2x_1 - 3x_2 + x_3$ (B) $-x_1 - x_2 + x_3$
    (C) $x_1 + x_2 - x_3$ (D) $-x_3 + 2x_1 + 3x_2$

15. Which among the following is TRUE for Balz-Schiemann reaction?
    (A) In this Ar-F is obtained from Ar- $N_2^+X^-$.
    (B) It is useful for preparation of nitrobenzene from benzene diazonium salts.
    (C) In this Ar-CN is obtained from Ar- $N_2^+X^-$.
    (D) In this Ar-Cl is obtained from Ar- $N_2^+X^-$.

16. Which among the following is a cross-linked polymer?
    (A) Orlon (B) Vulcanised rubber
    (C) Polypropylene (D) PVC

17. Which type of overlap is involved in formation of O – H bonds in water molecule?
    (A) $sp^2 - p$ (B) $sp^3 - s$
    (C) $sp - s$ (D) $sp^2 - s$

18. What is the mass percentage of carbon in urea?
    (mol. Mass of urea = 60 g mol^{-1})
    (A) 20.0 % (B) 28.0 %
    (C) 26.67 % (D) 46.67 %

19. Which among following is TRUE for the value of Henry's law constant K?
(A) Increases with increase in temperature.
(B) First increases and then drcreases with incrase in temperature.
(C) Is same for all gases.
(D) Is greater for gases with higher solubilities.

20. The rate law for the reaction A + B + C $\longrightarrow$ Product ; is expressed as Rate = $K[A]^2[B]^1[C]^0$. What is the overall order of the reaction?
(A) 0 (B) 3
(C) 1 (D) 2

21. Which is TRUE for heat and temperature?
(A) Intensive and extensive properties respectively.
(B) Both are intensive properties.
(C) Both are extensive properties.
(D) Extensive and intensive properties respectively.

22. The compound which causes antidepressant action on central nervous system is _____.
(A) phenelzine (B) terpineol
(C) penicillin (D) chloroxylenol

23 Which of the following is used as an antiseptic in soap?
(A) Boric acid (B) Tincture iodine
(C) Bithional (D) Iodoform

24. If side chain group –R for amino acid is $-CH_2OH$ identify the amino acid from following?
(A) Arginine (B) Serine
(C) Proline (D) Tyrosine

25. Identify product 'C' in following reaction.
Propylene dibromide $\xrightarrow[\text{Alcohol}]{\text{Zn. }\Delta}$ A $\xrightarrow{\text{HBr}}$ B $\xrightarrow[\text{ether}]{\text{Na}}$ C
(A) 2-Bromobutane
(B) 2,3-Dimethylbutane
(C) Isobutane
(D) 1,2-Dibromobutane

26. Which of the following compounds is obtained when benzoic acid is treated with conc. H_2SO_4 and conc. HNO_3?
(A) o-Nitrobenzoic acid
(B) m-Nitrobenzoic acid
(C) 2,4,6-Trinitrobenzoic acid
(D) p-Nitrobenzoic acid

27. Identify the oxidation state of Cr in $K_3[Cr(C_2O_4)_3]$.
(A) +5 (B) +3
(C) +6 (D) +2

28. What is the symbol of element if it's atomic number is 116?
(A) Uut (B) Uus
(C) Uuh (D) Uun

29. Which among the following complexes is a heteroleptic and cationic in nature?
(A) $[Co(NH_3)_4Cl_2]Cl$ (B) $[Ni(CO)_4]$
(C) $[Pt(NH_3)_2Cl_2]$ (D) $K_4[Fe(CN)_6]$

30. What type of hybridisation results in tetrahedral geometry?
(A) dsp^2 (B) sp
(C) sp^2 (D) sp^3

31. What is the cell constant of $\frac{N}{10}$ KCl solution at 25°C, if conductivity and resistance of a solution is 0.0112 Ω^{-1} cm^{-1} and 55.0 Ω respectively?
(A) 2.0 cm^{-1} (B) 0.491 cm^{-1}
(C) 0.2 cm^{-1} (D) 0.616 cm^{-1}

32. Which among the following is powerful bleaching and oxidising agent?
(A) HI (B) SO_2
(C) Cl_2 (D) PH_3

33. Energy required to dissociate 16g $O_{2(g)}$ into free atoms is *x* kJ. The value of bond enthalpy of O=O bond is _____.
(A) 4*x* kJ (B) $\frac{x}{2}$ kJ
(C) 2*x* kJ (D) 16*x* kJ

34. Which statement from following is TRUE for a complex hexamine cobalt(III) chloride?
(A) In this oxidation state of cobalt is +3.
(B) It is an anionic complex.
(C) In this coordination number of cobalt is 9.
(D) It is a heteroleptic complex.

35. When Butan-2-ol is dehydrated using sulphuric acid, the concentration of acid and temperature needed respectively is _____.
(A) 60 % conc. and 373 K
(B) 20 % conc. and 363 K
(C) 20 % conc. and 373 K
(D) 95 % conc. and 373 K

36. Identify CORRECT decreasing order of ionic radii of lanthanoids.
(A) Pm > Sm > Ce > Gd
(B) Gd > Pm > Ce > Sm
(C) Ce > Pm > Sm > Gd
(D) Sm > Gd > Ce > Pm

37. Among the following isomeric amines, an amine having highest boiling point is _____.
(A) ethyldimethylamine
(B) n-butylamine
(C) diethylamine
(D) tert-butylamine

38. What is the molar conductivity at infinite dilution of $CaCl_2$, if the molar conductivity of Ca^{2+} ion and Cl^- ion at infinite dilution is 119 and 71 Ω^{-1} cm^2 mol^{-1}?
(A) 431.0 Ω^{-1} cm^2 mol^{-1}
(B) 341.0 Ω^{-1} cm^2 mol^{-1}
(C) 261.0 Ω^{-1} cm^2 mol^{-1}
(D) 126.0 Ω^{-1} cm^2 mol^{-1}

39. How many optical isomers are possible for a compund having four asymmetric carbon atoms?
(A) 4 (B) 8
(C) 16 (D) 12

40. For the reaction $4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$ if the rate of disappearance of NH_3 is 3.6×10^{-3} M/s. What is the rate of formation of water?
(A) 4.0×10^{4} M/s (B) 5.4×10^{-3} M/s
(C) 6.0×10^{-4} M/s (D) 3.6×10^{-3} M/s

41. What is the product formed when bauxite ore is treated with sodium hydroxide?
(A) Sodium hydrogen carbonate
(B) Sodium meta aluminate
(C) Sodium aluminate
(D) Aluminium hydroxide

42. Which among following compounds is obtained when calcium formate is dry distilled alone?
(A) Methanal
(B) Methoxy methane
(C) Methanoic acid
(D) Methanol

43. What is the relative rate of S_N1 reaction for $(CH_3)_2CH–Br$?
(A) 1.0 (B) 0.02
(C) 10^6 (D) Less than 10^{-4}

44. A solution is 0.25% by mass. What is the weight of solvent containing 1.25 g solute?
(A) 600 g (B) 200 g
(C) 498.75 g (D) 300 g

45. Which among the following regents is used for conversion of glucose to glucoxime?
(A) Br_2 water
(B) Hydroxylamine
(C) HCN
(D) dilute Nitric acid

46. Which among the following is a dihydric phenol?
(A) Catechol (B) Pyrogallol
(C) Phloroglucinol (D) p-Cresol

47. Which among the following halogen does NOT form polyhalide ion?
(A) F (B) I
(C) Cl (D) Br

48. Caesium is used in _____.
(A) extraction of boron
(B) devising photo electric cells
(C) fast breeder nuclear reactors
(D) air conditioning plants

49. Which among the following polymer is used to make crockeries?
(A) Melamine (B) HDPE
(C) Buna-S (D) Buna-N

50. A certain mass of a gas occupies a volume of 2 dm^3 at STP. At what temperature the volume of gas becomes double, keeping the pressure constant?
(A) 540.15°C (B) 546.15°C
(C) 273.15°C (D) 400.15°C