PU–CET (B.D.S.) – 2015

Paper – II : Chemistry

Important: *Please consult your Admit Card/Roll No. slip before filling your Roll Number on the Test Booklet and Answer Sheet.*

Roll No.　　　*In Figure*　　　*In Words*

O.M.R. Answer Sheet Serial No.

Signature of Candidate: _____　　　*Signature of Invigilator:* _____

Time: 70 Minutes　　Number of Questions: 60　　　Maximum Marks: 120

DO NOT OPEN THE SEAL ON THE BOOKLET UNTIL ASKED TO DO SO.

INSTRUCTIONS:

1. Write your Roll No. on the Questions Booklet and also on the OMR Answer Sheet in the space provided and nowhere else.
2. Enter the Question Booklet Serial No. on the OMR Answer Sheet. Darken the corresponding bubbles with **Black Ball Point/Black Gel Pen**.
3. Do not make any identification mark on the Answer Sheet or Question Booklet.
4. Please check that this Question Booklet contains **60** Questions. In case of any discrepancy, inform the Assistant Superintendent within 10 minutes of the start of Test.
5. Each question has four alternative answer (A,B,C,D) of which only one is correct. For each question, darken only one bubble (A or B or C or D), whichever you think is the correct answer, on the Answer Sheet with **Black Ball Point/Black Gel Pen. There shall be no negative marking.** Each question carries 2 marks.
6. If you do not want to answer a question, leave all the bubbles corresponding to that question blank in the Answer Booklet. No marks will be deducted in such cases.
7. Darken the bubbles in the OMR Answer Sheet according to the Serial No. of the question given in the Question Booklet.
8. If you want to change an already marked answer, erase the shade in the darkened bubble completely.
9. For rough work only the blank sheet at the end of the Question Booklet be used.
10. For calculation, use of simple Log tables is permitted. Borrowing of log table or other material is not allowed.
11. The Answer Sheet is designed for computer evaluation. Therefore, if you do not follow the instructions given on the Answer Sheet, it may make evaluation by the computer difficult. **Any resultant loss to the candidate on the above account, i.e. not following the instructions completely, shall be of the candidate only.**
12. After the test, hand over the Question Booklet and the Answer Sheet to the Assistant Superintendent on duty.
13. In no case the Answer Sheet, the Question Booklet, or its part or any material copied/noted from this Booklet is to be taken out of the examination hall. Any candidate found doing so would be expelled from the examination.
14. A candidate who creates disturbance of any kind or changes his/her seat or is found in possession of any paper possibly of any assistant or found giving or receiving assistant or found using any other unfair means during the examination will be expelled from the examination by the Centre Superintendent/Observer whose decision shall be final.
15. **Communication equipment such as mobile phones, pager, wireless set, scanner, camera or any electronic/digital gadget etc., is not permitted inside the examination hall. Use of calculators is not allowed.**
16. The candidates will not be allowed to leave the Examination Hall/Room before the expiry of the allotted time.

1. Atomic mass of calcium is 40. The mass of 2.5 gram atoms of calcium is

   A) 40 g   B) 2.5 g   C) 100 g   D) 80 g

2. The protecting power of lyophilic colloidal sol is expressed in terms of

   A) Critical miscelle concentration   B) Oxidation number
   C) Coagulation value   D) Gold number

3. Which of the following weighs the most?

   A) one g-atom of N   B) One mole of water
   C) One mole of sodium   D) One molecule of H_2SO_4

4. Bohr Model can explain

   A) The spectrum of hydrogen atom only
   B) Spectrum of an atom or ion containing one electron only
   C) The spectrum of hydrogen molecule
   D) The solar spectrum

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   A) Critical miscelle concentration   B) Oxidation number
   C) Coagulation value   D) Gold number

6. In $Fe_2(SO_4)_3$, the oxidation states of Fe, S and O are

   A) +2, +3, 4   B) +3, +3, -2   C) +3, +6, -2   D) +2, +4, 8

7. The rate constant of first order reaction depends upon

   A) Temperature   B) Time
   C) Concentration of the reactant   D) Concentration of the product

8. In a zero-order reaction for every $10°$ rise of temperature, the rate is doubled. If the temperature is increased from 10°C to 100°C, the rate of the reaction will become

   A) 64 times   B) 128 times   C) 256 times   D) 512 times

9. A crystal having unit cell dimensions $a \neq b \neq c$, $\alpha = \gamma = 90° \neq \beta$ is

   A) Cubic   B) Tetragonal   C) Monoclinic   D) Orthorhombic

10. The appearance of colour in solid alkali metal halides is generally due to

    A) Schottky defect   B) Frenkel defect
    C) Interstitial position   D) F-centres

11. What is pH of a 0.00001 M HCl solution?

    A) 1   B) 9   C) 5   D) 4

12. What is the molarity of a solution that contains 1.50 mol HCl in 2.50 L of solution?

    A) 1.67 M   B) 0.600 M   C) 1.20 M   D) 1.40 M

13. The temperature of a body is $90°C$. Its temperature in Fahrenheit is given by

A) 19.4   B) 124   C) 164   D) 194

14. Which one of the following statement for order of reaction is not correct?

A) Order can be determined experimentally
B) Order of reaction is equal to sum of the powers of concentration terms in differential rate law
C) It is not affected with the stoichiometric coefficient of the reactants
D) Order cannot be fractional

15. Consider the following equilibrium:

$$N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$$

What is the final result of adding some NH_3 gas to the system at constant volume?
A) K_{eq} increases   B) $[H_2]$ decreases.
C) $[NH_3]$ decreases.   C) K_{eq} remains unchanged.

16. Physical adsorption is inversely proportional to the
A) Volume   B) Temperature   C) Concentration   D) Pressure

17. The phenomenon in which a compound exists in two or more crystalline forms is called

A) Isomorphism   B) Polymorphism   C) Anisotropy   D) Allotropy

18. Which of the following is characteristic of adiabatic process

A) $\Delta U = 0$ B) $q = 0$ C) $w = 0$ D) $\Delta P = 0$

19. What do increases in temperature tend to do to equilibrium systems?

A) Shift the reaction in favour of the exothermic process
B) Shift the reaction in favour of the endothermic process
C) Shift the reaction to favour the side with fewer gas molecules
D) Have no effect on an equilibrium system

20. Lyophilic sols

A) Are irreversible sols
B) Are less viscous than dispersion medium
C) Have more surface tension than dispersion medium
D) Self–stabilizing

21. How much copper can be obtained from 100 g of copper sulphate ($CuSO_4$)?

A) 39.81   B) 45.5   C) 36.68   D) 67.43

22. A cylinder is filled with a gaseous mixture containing equal masses of CO and N_2. The ratio of their partial pressure is

A) $P(N_2) = P(CO)$ B) $0.875\ P(N_2) = P(CO)$
C) $2\ P(N_2) = P(CO)$ D) $\frac{1}{2}\ P(N_2) = P(CO)$

23. When iron is added to $CuSo_4$ solution, copper is precipitated. It is due to

A) Oxidation of Cu^{+2} B) Reduction of Cu^{+2}
C) Hydrolysis of $CuSO_4$ D) Ionization of $CuSO_4$

24. For the reversible process, the value of ΔS is given by the expression

A) $\Delta H / \Delta T$ B) T/q_{rev} C) $q_{rev} \times T$ D) q_{rev} / T
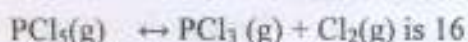
25. For the reactions

$$A \rightarrow B \qquad K_c = 1$$
$$B \rightarrow C \qquad K_c = 2$$
$$C \rightarrow D \qquad K_c = 3$$
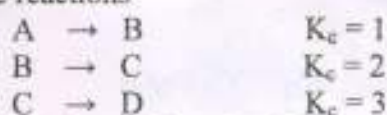
K_c for the reaction $A \leftrightarrow D$ is

A) 5   B) 6   C) 15   D) 1

26. The equilibrium constant K_p for the reaction

$PCl_5(g) \leftrightarrow PCl_3(g) + Cl_2(g)$ is 16

If the volume of the container is reduced to half of its original volume, the value of K_p for the reaction at the same temperature will be

A) 32   B) 64   C) 16   D) 4

27. Which of the following compounds will be formed, when lithium is heated with excess of oxygen?

A) Li_2O_2 B) LiO_2 C) Li_2O D) LiO

28. Ammonia is dried over

A) Slaked Lime   B) Calcium chloride
C) Phosphorus pentoxide   D) Quik lime

29. The species containing shortest O-O bond length is

A) O_2 B) O_2^- C) O_2^{2-} D) O_2^+

30. The dipole moment of vinyl chloride is lower than that of methyl chloride. This is due

A) Resonance effect   B) Inductive effect
C) Electromeric effect   D) Hyperconjugation effect

31. In hcp arrangement, co-ordination number is

A) 6   B) 12   C) 8   D) 10

32. Osmotic pressure of a solution of benzoic acid dissolved in benzene is less than expected because

A) Benzoic acid is an organic solute   B) Benzene is non polar solvent
C) Benzoic acid got dissociated in benzene D) Benzoic acid got associated in benzene

33. For zero order reaction, the plot of concentration Vs time is linear with

A) Positive slope and zero intercept   B) Negative slope and zero intercept
C) Positive slope and nonzero intercept   D) Negative slope and non zero intercept

34. Which of the following indicate the charges on colloidal particles?

A) Brownian movement   B) Electrophoresis   C) Electrolysis   D) Tyndall effect

35. In silicates, silicon is

A) sp^3 hybridised   B) sp^2 hybridised   C) sp hybridised   D) dsp^2 hybridised

(3)

36. Phosphorus has oxidation state +3 in

    A) Hypophosphorus acid

    C) Phosphorus acid

    B) Orthophosphoric acid

    D) Metaphosphoric acid

37. Rust is

    A) $FeO + Fe(OH)_2$
    B) $Fe_2O_3 + Fe(OH)_2$
    C) Fe_2O_3
    D) $Fe_2O_3 + Fe(OH)_3$

38. Which of the following statement is not correct?

    A) $La(OH)_2$, is less basic than $Lu(OH)_3$

    B) In lanthanide series ionic radius of Ln^{3+} ions decreases

    C) La is actually an element of transition series rather than lanthanide series

    D) Atomic radii of Zr and Hf are same because of lanthanide contraction

39. Methanol and ethanol can be distinguished by

    A) Luca's test

    C) Victormeyer's test

    B) Iodoform test

    D) All of these

40. Treatment of tartaric acid with fenton's reagent gives, mainly

    A) Pyruvic acid

    C) Tartaric acid

    B) Maleic acid

    D) Dihydroxymaleic acid

41. How many grams of CH_3OH must be added to water to prepare 150 mL of a solution that is 2.0 M CH_3OH?

    A) 9.6×10^1
    B) 4.3×10^2
    C) 2.4
    D) 9.6

42. What is the wavelength of light (nm) that has a frequency $4.62 \times 10^{14} s^{-1}$?

    A) 932
    B) 649
    C) 1.39×10^{23}
    D) 1.54×10^{-3}

43. Using Bohr's equation for the energy levels of the electron in the hydrogen atom, determine the energy (J) of an electron in the n = 4 level

    A) -1.36×10^{-19}
    B) -5.45×10^{-19}
    C) -7.34×10^{18}
    D) -1.84×10^{-29}

44. An electron cannot have the quantum numbers $n =, 1 =, m_l =$

    A) 6, 1, 0
    B) 3, 2, 3
    C) 3, 2, -2
    D) 1, 0, 0

45. Of the following, which gives the correct order for atomic radius for Mg, Na, P, Si and Ar?

    A) Mg > Na > P > Si > Ar

    C) Si > P > Ar > Na > Mg

    B) Ar > Si > P > Na > Mg

    D) Na > Mg > Si > P > Ar

46. Which of the following has the largest second ionization energy?

    A) Si
    B) Mg
    C) Al
    D) Na

47. A valid Lewis structure of cannot be drawn without violating the octet rule ...

    A) NF_3
    B) BeH_2
    C) SO_2
    D) CF_4

48. The molecular geometry of the PF_4^+ ion is

    A) Octahedral

    C) Trigonal pyramidal

    B) Tetrahedral

    D) Trigonal planar

49. Which of the following is a molecular hydride?

A) CaH_2
B) TiH_2
C) NaH
D) CH_4

50. Which one of the following compounds is peroxide?

A) Li_2O
B) H_2O
C) Na_2O_2
D) CsO_2

51. Chalcocite, chalcopyrite and malachite are sources of which metal?

A) Manganese
B) Copper
C) Iron
D) Zinc

52. Part of the Bayer process involves the digestion of crushed ore in concentrated aqueous sodium hydroxide. This process carried out at high pressure _____

A) To prevent boiling
B) To prevent formation of iron hydroxide
C) To prevent formation of aluminum hydroxide
D) To lower the boiling temperature of the mixture

53. The correct name for $[Ni(NH_3)_6](NO_3)_2$ is

A) Hexaamminenickel (III) trinitrate
B) Dinitrohexaamminenickelate (III)
C) Hexaamminenickel (II) nitrate
D) Hexaamminenickel (III) nitrate

54. The complex $[Zn(NH_3)_2Cl_2]^{2+}$ does not exhibit cis-trans isomerism. The geometry of this complex must be

A) Tetrahedral
B) Trigonal bipyramidal
C) Octahedral
D) Square planar

55. Which of the following is manufactured by the electrolysis of fused sodium chloride?
A) NaOH
B) NaClO
C) Na
D) $NaClO_3$

56. On the addition of mineral acid to an aqueous solution of borax, the following compound is formed

A) Borodihydride
B) Orthoboric acid
C) Metaboric acid
D) Pyroboric acid

57. Quartz is a crystalline variety of

A) Silicon
B) Silicon di oxide
C) Silicon carbide
D) Sodium silicate

58. PCl_3 fumes in moist air because

A) It is highly volatile
B) It is oxidized to $POCl_3$
C) It is hydrolysed forming HCl
D) It decomposes to the elements

59. Sodium chloride when heated with conc. H_2SO_4 and solid $K_2Cr_2O_7$ gives:

A) Chromic chloride
B) Chromyl chloride
C) Chromous chloride
D) None

60. The most significant ion formed by the lanthanoids

A) M^{+2}
B) M^+
C) M^{+3}
D) M^-

x-x-x

(5)