STARS ACADEMY LAHORE

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Roll No. of Candidate

Name of Candidate

## STARS ENTRY TEST SYSTEM-2021
(MDCAT)

Test Code: C-1 (Introduction to Fundamental Concepts of Chemistry)   Time Allowed: 50 min

CHEMISTRY

1. 46g of an element contain $2N_A$ atoms. The atomic mass of element is
   A) 46g
   B) 92g
   C) 23g
   D) 11.5g

2. Molecular formula = n (Empirical formula), here the value of n can be
   A) +1, 0
   B) -1, +1
   C) 0, -1
   D) +1, +2

3. 1 mole of which of these will have the highest number of hydrogen atoms
   A) HF
   B) NH_3
   C) H_2O
   D) CH_4

4. What is true about molar volume at STP?
   A) It is the volume of 1 mole gas
   B) It is the volume of one mole ideal gas
   C) It is the volume of 1 mole real gas
   D) It is the volume of one mole of ideal liquid

5. Which of the following is not an empirical formula?
   A) CH_2
   B) C_6H_{10}
   C) CH_3
   D) CH_4

6. If value of n in formula M.F = n (E.F) is one it means that
   A) M.F is different from E.F
   B) Molecular mass is different from empirical formula mass
   C) The compound is ionic
   D) The compound has the same M.F and E.F

7. $N_2 + O_2 \rightarrow 2NO$. What volume of NO will be produced by $20cm^3$ each of N_2 and O_2 reacted together?
   A) $20cm^3$
   B) $40cm^3$
   C) $30cm^3$
   D) $10cm^3$

8. $SiO_2 + 3C \rightarrow SiC + 2CO$
   The mass of SiC produced when 1 mole of carbon reacts with excess of sand will be
   A) 40g
   B) 13.3g
   C) 20g
   D) 26g

9. Which statement is incorrect w.r.t stoichiometry?
   A) Law of conservation of mass is obeyed
   B) It assumes that all the reactants are completely converted into products
   C) It assumes that no side reaction occurs
   D) Law of conservation of energy is obeyed

10. If 20g of each of these gases are given, which of these will occupy the highest volume at STP?
    A) H_2
    B) N_2
    C) He
    D) O_2

11. Ratio of actual yield and theoretical yield is
    A) Always zero
    B) Always one
   C) Always greater than 1
    D) Always less than 1

12. $CaCO_3 \rightarrow CaO + CO_2$

200g of $CaCO_3$ upon decomposition give 100g CaO, the % age yield is

A) 50%

B) 88%

C) 75%

D) 95%

13. A limiting reactant can determine _____

A) Rate of reaction

B) Amount of product

C) Order of reaction

D) Actual yield

14. Which of these has the highest no. of molecules?

A) 15gHCHO

B) 16gCH$_3$OH

C) 23gC$_2$H$_5$OH

D) 60g (NH$_2$)$_2$CO

15. $2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$ how much water will be produced if 98g H_2SO_4 is neutralized with excess of NaOH?

A) 98g

B) 36g

C) 18g

D) 72g

16. Moles of NaHCO3 containing 11.5g Na are

A) 1

B) 0.5

C) 2

D) 0.25

17. Stoichiometry does not give the idea of

A) mass-mass relation

B) Limiting reactant

C) Reactant – product relation

D) Mole – volume relation

18. H_2SO_4 ionizes in water according to the following equation

$H_2SO_4 \rightarrow 2H^+ + SO^{-2}_4$ 98g of H_2SO_4 constitute its

A) 1g atom

B) 1g ion

C) 1g molecule

D) 1g formula

19. 8g of CH$_4$ at STP will have molecules

A) 6.02×10^{23}

B) 3.01×10^{23}

C) 60.2×10^{23}

D) 1.5×10^{23}

20. If $V_1 - V_4$ represent volumes of different masses of $H_2(g)$, at STP which of these depicts the lowest mass of H_2

A) V$_1$

B) V$_3$

C) V$_2$
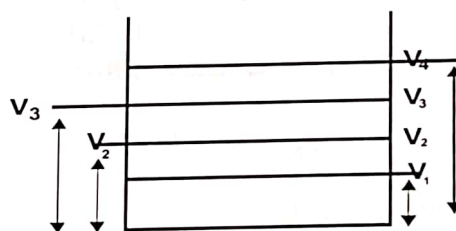
D) V$_4$

21. Which of the following graph is not possible practically for any chemical reaction

A) 1

B) 3

C) 2
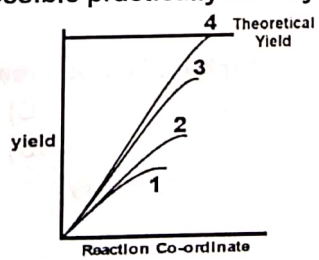
D) 4

22. Which point of time represents a stage at which the limiting reactant has been completely consumed?

A) 1

B) 3

C) 2
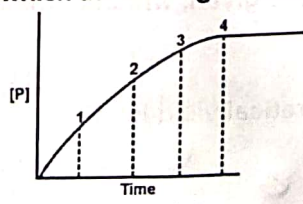
D) 4

23. $2S+3O_2 \rightarrow 2SO_3$
If 64g each of S and O_2 are rated together identify the true statement
A) S is limiting reactant
B) Both are completely consumed
C) O_2 is limiting reaction
D) 96g SO_3 is produced

24. Consider the population of the world to be 7.2×10^{10} and find out the moles of humans currently residing planet earth?
A) 1.2×10^{-13}
B) 5×10^{15}
C) 8.3×10^{13}
D) 6.02×10^{14}

25. 28 amu corresponds to
A) 1 mole of N_2
B) 1 molecule of N_2
C) 1 mole of CO
D) Molar mass of CO

26. Helium, iodine, phosphorous and sulphur exist as He, H_2, P_4 and S_8 respectively. If equal masses of each of these is taken then which of them will have the least no. of molecules?
A) H_2
B) P_4
C) He
D) S_8

27. Positive rays are
A) Ionized Protons
B) Ionized gaseous atoms
C) Always protons
D) Neutral rays

28. On moving from N to F, the e/m value of the positive rays
A) Remains same
B) Increases abruptly
C) Increases gradually
D) Decreases

29. Source of ionization of gas molecules in discharge tube is
A) e^- of gas
B) e- from cathode
C) e^- from anode
D) Collision b/w gas molecules

30. The ratio of energy and frequency of photon is called
A) Wave number
B) Planck's const.
C) Wave length
D) Energy number

31. $_{10}Ne = 1s^2 \, 2s^2 \, 2p^6$
To write this configuration which rule is not apparently necessary
A) $n+\ell$, Auf bau
B) Hund's, Pauli's
C) Auf bau, Hund's
D) Pauli's, $n+\ell$

32. Lower the wavelength of photon
A) Lower the energy
B) Higher the planck's const.
C) lower the wave no.
D) Higher the frequency

33. The frequency of a photon is $1 \times 10^6 \, s^{-1}$ what will be its energy
A) 6.6×10^{-34} Js
B) 6.6×10^{-28} Js
C) 1×10^{-6} Js
D) 10 Js

34. Which statement in not true w.r.t. Planck's quantum theory
A) Energy travels continuously
B) Photon are quanta of light
C) Quanta are packets of energy
D) Energy and wave no. are related

35. The fact that e^- can revolve in any one of the permitted energy levels and not in b/w them means that e^- is
A) Stationary
B) Having quantized momentum
C) Wave
D) Photon like packet

36. How radius of first and second orbit of e^- are linked
A) $r_1 = 1.5 \, r_2$
B) $r_1 = 4r_2$
C) $r_2 = 1.5 \, r_1$
D) $r_2 = 4r_1$

37. $E = \dfrac{-1313.31}{n^2}$, it means that e^- will have the highest energy in which of these shells.
A) 1st
B) 3rd
C) 2nd
D) 4th

38. The energy of an e^- of H – atom is
A) K.E
B) K.E + P.E
C) P.E
D) E + PV

39. Max. probability to find an e⁻ of H is at
   A) 10A°
   B) 0.053nm
   C) 0.52nm
   D) 95%

40. Which orbital lacks a directional character
   A) s
   B) P_y
   C) P_x
   D) $d_z^2 d_{z^2}^2$

41. If the formula $(2l+1)$ gives an answer 3, how many orbitals are there in that particular subshell
   A) 7
   B) 3
   C) 5
   D) 1

42. m = o means
   A) m has no value
   B) We are talking about p – orbital
   C) m has only one value
   D) e⁻ is at infinity
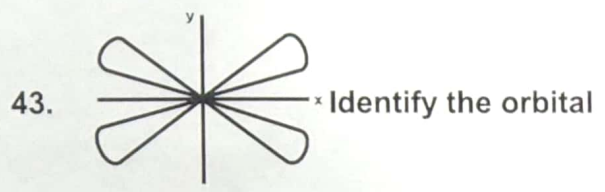
43. ⟶ˣ Identify the orbital
   A) d_{xy}
   B) d_{zx}
   C) d_{yz}
   D) $d_{x^2y^2}$

44. Which of the following pairs has the same $n+l$ value
   A) 2s, 2p
   B) 3p, 3d
   C) 4p, 5s
   D) 4d, 5s

45. Carbon in its ground state has unpaired electrons provided that it follows Hund's rule
   A) 1
   B) 3
   C) 2
   D) 4

46. Auf bau principle tells about the
   A) Relative energies of orbitals
   B) Relative energies of sub-shells
   C) Relative energies of e⁻
   D) Relative energies of shells

47. e⁻ enters 4s first and then 3d because
   A) 4s and 3d have same. energy
   B) 3d has higher energy than 4s
   C) 4s has higher energy than 3d
   D) e⁻ follows Hund's rule for this filling

48. A specie with unpaired e⁻ 's is
   A) He
   B) Na
   C) Ne
   D) Mg

49. Principal quantum no. does not tell us
   A) Size of shell
   B) Distance from nucleus
   C) Energy of shell
   D) Spin of e⁻
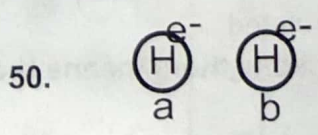
50. The electrons in a and b hydrogen atom can have the same values of
   A) n only
   B) n, l, m only
   C) n, l only
   D) n, l, m, s

Q	Answer	Q	Answer	Q	Answer
1	C	21	D	41	B
2	D	22	D	42	C
3	D	23	C	43	A
4	B	24	A	44	C
5	B	25	B	45	C
6	D	26	D	46	B
7	B	27	B	47	B
8	B	28	D	48	B
9	D	29	B	49	D
10	A	30	B	50	D
11	D	31	B	51	(A)
12	B (D crossed out)	32	D	52	—
13	B	33	B	53	—
14	D	34	A	54	—
15	B	35	B	55	—
16	B	36	D	56	—
17	B	37	D	57	—
18	C	38	B	58	—
19	B (C crossed out)	39	B	59	—
20	A	40	A	60	—