UNIVERSITY OF LUCKNOW

D.Pharm Entrance Examination

Mathematics Group — Model Test Paper Set 15

Total Questions: 100 | Section A: Chemistry & Physics (50) + Section B: Mathematics (50)

LUUPDATE

SECTION A — Chemistry & Physics [50]

Chemistry

1. In Parke's process of silver extraction, the metal zinc acts :

(a) complexing agent (b) reducing agent

(c) oxidizing agent (d) solvent for extraction

Answer: (b) reducing agent

2. Which one of the following complex ions deviates from Effective Atomic Number rule?

(a) [Fe(CN)]4 (b) [Co(NH)]3+ 4 3

(c) [Cu(CN)]3 (d) [Mn(H O)]2+ 6 2

Answer: (d) [Mn(H O)]2+ 6 2

3. Which one of the following is a high spin complex?

(a) [CoF]3 (b) [Co(NH)]2+

(c) [Fe(CN)]2 (d) [Co(CN)]3

Answer: (a) [CoF]3

4. The basicity of the hydroxides of Li, Na, Rb and Cs are in the order of Li, Na, Rb Deewj Cs :

(a) Cs > Rb > Na > Li (b) Li > Na > Rb > Cs

(c) Rb > Cs > Ns > Li (d) Na > Li > Rb > Cs

Answer: (a) Cs > Rb > Na > Li

5. Among the following elements, which has the highest ionization energy?

(a) Chromium (b) Neon

(c) Nitrogen (d) Molybdenum

Answer: (b) Neon

6. Which one of the following is used as a negative catalyst for the decomposition of hydrogen peroxide?

(a) platinum (b) acetanilide

(c) sodium carbonate (d) oxalic acid

Answer: (b) acetanilide

7. Lithium differs from other alkali metals due to otmejs Suke :

(a) its small atomic size and ionic size (b) the low hydration energy of Li+

(c) its extremely high electropositivity (d) the high ionic mobility

Answer: (a) its small atomic size and ionic size

8. The correct set of quantum numbers for the unpaired electron of bromine atom :

(a) 3,1, (b) 4,0,0,+1

(c) 3,0,0,+1 (d) 4,1,1,+1 2

Answer: (d) 4,1,1,+1 2

9. The common features among CO, :

(a) bond order three and weak field ligands (b) bond order three and isoelectronic

(c) bond order two and (d) isoelectronic and weak field ligands

Answer: (b) bond order three and isoelectronic

10. Potassium possesses body-centered cubic structure. The number of nearest neighboring atoms for each potassium atom in its crystal structure is hees :

(a) eight (b) twelve

(c) four (d) six

Answer: (a) eight

11. Which of the following processes leads to an increase in the atomic number of a nuclide?

(a) Positron emission (b) Electron capture

(c) Beta emission (d) Alpha emission

Answer: (c) Beta emission

12. Solid potassium chloride is a poor conductor of electricity because "esme hees :

(a) potassium and chloride ions do not conduct electricity (b) both ions occupy fixed positions in solid state

(c) both ions have uniform fields of influence (d) the charge on the ions is uniformly distributed

Answer: (b) both ions occupy fixed positions in solid state

13. With increasing quantum number, the energy difference between adjacent orbits of hydrogen atom :

(a) decreases (b) remains constant

(c) first increases followed by decreases (d) increases

Answer: (a) decreases

14. In an atomic orbital, the sign of lobes signifies hejceeCeJeer :

(a) presence of electron in positive or negative direction (b) sign of the wave function

(c) sign of probability distribution (d) sign of the charge

Answer: (b) sign of the wave function

15. A semi permeable membrane used in the measurement of osmotic pressure of a solution allows the passage of leesue :

(a) none of the above (b) both solvent and solute molecules through is

(c) solvent molecules through it (d) solute molecules through is

Answer: (c) solvent molecules through it

16. Which of the following colligative properties is used to determine the molecular mass of proteins?

(a) Depression in freezing point (b) Relative lowering of vapour pressure

(c) Osmotic pressure (d) Elevation of boiling point

Answer: (c) Osmotic pressure

17. Solids CaCO and CaO and CO gas are kept 3 2 in a closed vessel and allowed to reach equilibrium. The quantity of CaO in the vessel could be increased :

(a) adding more of CaCO (b) removing some of CO gas

(c) reducing the volume of the vessel (d) lowering the temperature

Answer: (b) removing some of CO gas

18. The pK of an aqueous solution is 13.54 at w 50 :

(a) acidic (b) neutral

(c) alkaline (d) cannot be predicted

Answer: (c) alkaline

19. An aqueous solution of sodium cyanide has the pH :

(a) greater than (b) outside the range of

(c) equal to (d) less than

Answer: (a) greater than

20. The pH of Mg(OH) is 10.45 at 298 K. The 2 solubility product of magnesium hydroxide would be 298 K hej Mg(OH) :

(a) 2.24 (b) 1.12

(c) 5.60 (d) 3.36

Answer: (b) 1.12

21. Phenolphthalein is used as an indicator in the titration of Hes :

(a) acetic acid against potassium hydroxide (b) oxalic acid against potassium permanganate

(c) hydrochloric acid against ammonium hydroxide (d) formic acid against ammonium hydroxide

Answer: (a) acetic acid against potassium hydroxide

22. The addition of sodium acetate to 0.1 M acetic acid would cause 0.1 M Sefmeef :

(a) decrease in its pH value (b) no change in its pH value

(c) increase in its pH value (d) neutralization reaction

Answer: (c) increase in its pH value

23. Which of the following acts as a Bronsted acid as well as Bronsted base?

(a) CH COO (b) HCO

(c) Na CO (d) OH

Answer: (b) HCO

24. The solubility of calcium arsenate in water if 9.0 :

(a) 6.0 (b) 9.4

(c) 2.8 (d) 4.6

Answer: (a) 6.0

25. What of the following thermochemical equations corresponds to the definition of enthalpy of formation at 298K?

(a) C(graphite) + 2H 2 (g) + (b) 2C(graphite) + 4H (g) + O (g)

(c) C(graphite) + 2H (g) + (d) C(diamond) + 2H (g) +

Answer: (a) C(graphite) + 2H 2 (g) +

Physics

26. How much force is required to change the velocity of a body of mass 1 kg from 20 m/s to 30 m/s in 2 seconds?

(a) 1 N (b) 25 N

(c) 10 N (d) 5 N

Answer: (d) 5 N

27. Scalar quantity is :

(a) velocity (b) displacement

(c) momentum (d) temperature

Answer: (d) temperature

28. The photoelectric threshold wavelength for tungsten is 2300 Ǻ. If this surface is irradiated by ultra-violet light of wavelength 1800 Ǻ, the kinetic energy of emitted electrons is ?

(a) 2.4 eV (b) 1.5 eV

(c) 2.7 eV (d) 1.8 eV

Answer: (b) 1.5 eV

29. Velocity of sound will be highest in ?

(a) Water (b) Steel

(c) Vacuum (d) Air

Answer: (b) Steel

30. The frequency of transverse vibrations of a string is 100 cycles/sec. If the tension of the string is increased to its four times, the frequency will be :

(a) 100 cycles/sec (b) 200 cycles/sec

(c) 25 cycles/sec (d) 50 cycles/sec

Answer: (b) 200 cycles/sec

31. Which of the following is not a thermo dynamical variable ?

(a) Heat (b) Temperature

(c) Enthalpy (d) Internal Energy

Answer: (a) Heat

32. If one molecule of a monoatomic gas (γ = 5/3) is mixed with one molecule of a diatomic gas (γ = 7/5), what will be the value of γ for the mixture :

(a) 2 (b) 2.5

(c) 3.5 (d) 1.5

Answer: (d) 1.5

33. The ratio of earth's magnetic intensities at its pole and at equator is ?

(a) 2.0 (b) 1.5

(c) 2.5 (d) 1.0

Answer: (a) 2.0

34. In Wheatstone bridge method of finding unknown resistance or inductance, the instrument used as null detector is ?

(a) Galvanometer (b) Ammeter

(c) All of these (d) Voltmeter

Answer: (a) Galvanometer

35. The resistances in a post office box are made of ?

(a) Copper (b) Iron

(c) Brass (d) Manganin

Answer: (d) Manganin

36. What is the fundamental basis of a laser?

(a) Spontaneous emission (b) Stimulated emission

(c) Scattering 1012Watt (d) Absorption

Answer: (b) Stimulated emission

37. A zone plate is to be constructed with focal length of 50cm forλ= 5.0×10-5cm. Its first radius will be:

(a) 0.60 mm (b) 0.40 mm

(c) 0.75 mm (d) 0.50 mm

Answer: (d) 0.50 mm

38. What should be the minimum number of lines in grating to resolve sodium doublet (5890 Å and 5896 Å) in third spectral order?

(a) 984 (b) 328

(c) 656 (d) 1312

Answer: (b) 328

39. Red light is used as a danger signal because it :

(a) is scattered least (b) produces least photo-chemical effect

(c) is comfortable for eyes (d) None of the above

Answer: (a) is scattered least

40. A parallel beam of light of wavelength 5460 Å is incident at an angle of 30o on a plane transmission grating which has 6000 lines/cm. the highest order spectrum that can be seen is ?

(a) 2 (b) 5

(c) 3 (d) 4

Answer: (a) 2

41. If the earth stops rotating, the value of 'g' at the equator will ?

(a) Remain same (b) Decrease

(c) None of the above (d) Increase

Answer: (d) Increase

42. For a particle moving under a central force, it's motion will be– ?

(a) None of the above (b) along the helix

(c) in a plane (d) in space

Answer: (c) in a plane

43. The value of λ for which vectors ˆ ˆ j+4kˆ and i-λ are perpendicular is ?

(a) 10 (b) 14

(c) 3 (d) 7

Answer: (b) 14

44. Physical quantities which have same units are :

(a) Pressure and strain (b) Pressure and stress

(c) Force and work (d) Pressure and volume

Answer: (b) Pressure and stress

45. The free electron density in a super conductor is ?

(a) Zero at absolute zero (b) None of these

(c) Finite at absolute zero (d) Infinite at absolute zero

Answer: (c) Finite at absolute zero

46. A 5.5 metre long string has a mass of 0.035 kg. If the tension in the string is 77 N, the speed of a wave on the string is ?

(a) 102 m/sec (b) 77 m/sec

(c) 165 m/sec (d) 110 m/sec

Answer: (d) 110 m/sec

47. Gibbs paradox in Statistical Mechanics is related to the additive property of ?

(a) Entropy (b) Temperature

(c) Energy (d) Momentum

Answer: (a) Entropy

48. In an isothermal reversible expansion of a perfect gas at temperature T, heat Q enters the system. The statement which is true is:

(a) No part of heat Q is converted to work (b) Part of Q increases the internal energy

(c) All the heat Q is converted to work (d) Part of heat Q is converted to work

Answer: (c) All the heat Q is converted to work

49. When applied to solar radiation, Planck's law reduces to Wien's law in following region:

(a) microwave (b) visible

(c) ultraviolet (d) infrared

Answer: (c) ultraviolet

50. According to Wien's law, a star which appears blue will be :

(a) hotter than the sun (b) as hot as sun

(c) colder than the sun (d) very cold

Answer: (a) hotter than the sun

SECTION B — Mathematics [50]

51. What are the names numbers U(p, f) and L(p, f)?

(a) Upper and lower Reimann sums (b) Upper and lower Riemann integrals

(c) Upper and lower bound (d) Supremum and infimum

Answer: (a) Upper and lower Reimann sums

52. What is the order of Klein's four group?

(a) 2 (b) 3

(c) 1 (d) 4

Answer: (d) 4

53. The union of two disjoint open intervals on the real line is a space which is ?

(a) connected (b) path connected

(c) compact (d) locally connected

Answer: (d) locally connected

54. The area of the surface obtained by rotating the circle r = 2sin ?

(a) 3 (b) 5

(c) 4 (d) 2

Answer: (c) 4

55. The graph of the equation r = sin 4 ?

(a) Four leaved Rose (b) Eight leaved Rose

(c) Five leaved Rose (d) Ten leaved Rose

Answer: (b) Eight leaved Rose

56. The set of real number R is uncountable i.e., there is no bijection N ?

(a) Cantor's theorem (b) Mean value theorem

(c) Green's theorem (d) Continuity theorem

Answer: (a) Cantor's theorem

57. If is divided by 8 then remainder is ?

(a) 3 (b) 2

(c) 4 (d) 1

Answer: (d) 1

58. The graph of r = a (1 + sin ?

(a) Symmetric about x-axis (b) Symmetric about y - axis

(c) Symmetric about y = x (d) Not Symmetric

Answer: (b) Symmetric about y - axis

59. Number of zeros in, 1000! is ?

(a) 30 (b) 25

(c) 249 (d) 248

Answer: (c) 249

60. If A and B are real square matrices then which of the following is correct AT ?

(a) A + AT is always skew-symmetric (b) AB is not necessarily symmetric

(c) A (d) AB is always symmetric

Answer: (b) AB is not necessarily symmetric

61. If the rate of growth is proportional to the amount x of the substance present and if dx ?

(a) C e2kt (b) C e

(c) C 1 1 (d) C

Answer: (d) C

62. A system by a set of variables and a set of equations that establish relationships between the variables is ?

(a) Algebra (b) Multivariate calculus

(c) Theory of real functions (d) mathematical model

Answer: (d) mathematical model

63. How many types of mathematical models are there ?

(a) 1 (b) 4

(c) 3 (d) 2

Answer: (d) 2

64. The law which enables an integral taken around a closed curve to be replaced by one taken over any surface bounded by the curve is ?

(a) Divergence law (b) Gauss's law

(c) Stoke's law (d) Closure law

Answer: (c) Stoke's law

65. If f(x) and g(x) defined as {f(x) = 1, if x ?

(a) f is not continuous (b) g is not continuous

(c) fog is not continuous (d) fog and gof both are continuous

Answer: (c) fog is not continuous

66. The function f define by f(x) = {x^2 + 3x + a, if x ?

(a) a (b) a = 5, b = 3

(c) a = 3, b = 5 (d) a = 3, b = 0

Answer: (c) a = 3, b = 5

67. The theorem which allows us to translate difficult line integrals into more simple double integral is ?

(a) Stoke's theorem (b) Green's theorem

(c) Mean value theorem (d) Cantor's theorem

Answer: (b) Green's theorem

68. A metric space is compact if every open cover of x has ?

(a) empty set (b) subgroup

(c) nonempty set (d) finite subcover

Answer: (d) finite subcover

69. A function that defines a concept of distance between any two members of set which are usually called points is ?

(a) a set (b) open set

(c) metric space (d) determinant

Answer: (c) metric space

70. A group isomorphism from a group to itself is ?

(a) homomorphism (b) Abelian

(c) closure (d) group automorphism

Answer: (d) group automorphism

71. To verify that (s, d) is a metric space we should first check that if d (x, y) = 0 then ?

(a) y = 0 (b) x = 0

(c) y = (d) x = y

Answer: (d) x = y

72. Every holomorphic function is:

(a) Complex (b) Complex vector space

(c) analytic (d) Commutative

Answer: (c) analytic

73. The external direct product of additive group of integer Z with itself is ?

(a) Abelian as well as cyclic group (b) Cyclic but not abelian

(c) Cyclic group (d) Not cyclic group

Answer: (d) Not cyclic group

74. If n and m are natural numbers then the equation.(Z ?

(a) Have two common solution (b) Have more than two common solution

(c) Have one common solution (d) Have no common solution

Answer: (d) Have no common solution

75. Number of zeros in 100 ! is:

(a) 25 (b) 100

(c) 1000 (d) 24 100!

Answer: (d) 24 100!

76. Graph of given equation y = decreases where ?

(a) x < 0 (b) x > 5

(c) 1 < x < 5 (d) 0< x <1

Answer: (c) 1 < x < 5

77. If f(-x) = f(x) for all x in the domain, then f(x) is __, even and symmetric about the y axis ?

(a) odd (b) rational

(c) irrational (d) even

Answer: (d) even

78. Let 'A' be cantor set then which of the following statement is false ?

(a) It is closed and bounded (b) perfect

(c) measure is zero (d) countable

Answer: (d) countable

79. Let S be any set then Derived set of S is ?

(a) Always Uncountable (b) Always open

(c) Always closed (d) Always Infinite

Answer: (c) Always closed

80. A prime p can be written as the sum of two squares if ?

(a) p = 2 or p (b) p = 1 or p

(c) p = 3 or p (d) p = 4 or p

Answer: (a) p = 2 or p

81. The graph of the equation r = sin 3 ?

(a) Spiral (b) Three leaved Rose

(c) Cardioid (d) Four leaved Rose

Answer: (b) Three leaved Rose

82. Let [x] denotes the greatest integer less than or equal to x. If f(x) = [x sinx ?

(a) differentiable at x = 1 (b) continuous at x = 0

(c) differentiable in (-1,1) (d) continuous in (-1,0)

Answer: (a) differentiable at x = 1

83. Graph of the curve y = x+3 (x+1)is increasing when:

(a) x<-3 or x>-2 (b) x<-3 or x>-5

(c) x > -3 or x <-y (d) 3< x <-2

Answer: (a) x<-3 or x>-2

84. A sequence is a convergent sequence if and only if it is a ?

(a) Cauchy sequence (b) subsequence

(c) bounded sequence (d) non - decreasing sequence

Answer: (a) Cauchy sequence

85. If f(x)=x+[x] then which of the following is true ?

(a) not continuous at x=0 (b) differentiable at any point

(c) differentiable at x=0 (d) continuous but not differentiable at x=0

Answer: (a) not continuous at x=0

86. If f is continuous on [a,b], then f is :

(a) decreasing (b) increasing

(c) integrable (d) differentiable

Answer: (c) integrable

87. Given set U = {(x,y) >7}is ?

(a) Semi open x (b) Close

(c) Compact (d) Open

Answer: (d) Open

88. A sequence of real numbers is a real- valued function defined on the set of :

(a) irrational number (b) whole number

(c) rational number (d) natural number i.e.f:N

Answer: (d) natural number i.e.f:N

89. How many subgroups of the permutation group S^4 have of order 3?

(a) 4 (b) can not say

(c) 8 (d) 0

Answer: (a) 4

90. How many 3-Sylow subgroup are there in the group of order 15?

(a) 1 (b) 5

(c) 0 (d) 3

Answer: (a) 1

91. The product of an even permutation and an odd permutation is ?

(a) Even (b) not define

(c) zero (d) Odd

Answer: (d) Odd

92. The rank of an integral - elementary function f is:

(a) Integral elementary function (b) real analytic function

(c) continuous function (d) the depth of the formula defining f

Answer: (d) the depth of the formula defining f

93. If external direct product of two groups A & B is abelian then ?

(a) A and B both are abelian (b) A and B both are not abelian

(c) only A is abelian (d) only B is abelian

Answer: (a) A and B both are abelian

94. Which of the following is not true?

(a) {Z\{0}, x} is a group (b) {C\{0}, x} is a group

(c) {R\{0}, x} is a group (d) {Q\{0}, x} is a group

Answer: (a) {Z\{0}, x} is a group

95. If f(z)= (x + 2)+5yi then for any z, f(z) is ?

(a) none of the above (b) Differentiable for some z

(c) Differentiable for all z (d) Not-differentiable for any z

Answer: (d) Not-differentiable for any z

96. What is the order of a 7-Sylow subgroup of $GL^3(Z^7)$?

(a) 7 (b) 1

(c) 49 (d) 343 7-Sylow

Answer: (d) 343 7-Sylow

97. The external direct product of additive group of integers Z With itself is?

(a) cyclic of finite (b) not cyclic

(c) Can not say (d) cyclic order

Answer: (b) not cyclic

98. If all the zeros of a polynomial p(z) have negative real parts, then all the zeros of p'(z) must have ?

(a) Real part is zero (b) Positive real part

(c) both positive and negative real part (d) Negative real part

Answer: (d) Negative real part

99. Find out the number of equivalence classes that can be defined by the set {4, 5, 6}:

(a) 4 (b) 15

(c) 6 (d) 5

Answer: (d) 5

100. Calculate the number of asymptotes for the (x^2 function f (x) = (x ?

(a) 0 (b) 2

(c) 1 (d) 3

Answer: (d) 3