UNIVERSITY OF LUCKNOW

D.Pharm Entrance Examination

Mathematics Group — Model Test Paper Set 14

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

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SECTION A — Chemistry & Physics [50]

Chemistry

1. The structure of monomer unit in 'neoprene' rubber is 'neoprene' :

(a) CH = C(CH) (b) CH (CI) = CH

(c) CH = C(CI) (d) CH = CH

Answer: (c) CH = C(CI)

2. Which of the following statements is incorrect with respect to a carbanion?

(a) Its hybridjzation is sp2 and geometry is planar (b) It is formed by heterolytic bond fission

(c) It is diamagnetic (d) It behaves as a charged nucleophile

Answer: (a) Its hybridjzation is sp2 and geometry is planar

3. Which of the following is not the mineral of magnesium?

(a) Kieserite (b) Dolomite

(c) Magnesite (d) Magnetite

Answer: (d) Magnetite

4. A refining method called "Cupellation" is mainly used in the metallurgy of Kehe&jCe (Cupellation) veeceke :

(a) Silver (b) Calcium

(c) Aluminium (d) Copper

Answer: (a) Silver

5. The anode mud in the electrolytic refining of silver contains :

(a) Au, Pb (b) Zn, Sn, Au

(c) Zn, Cu, Au (d) Au

Answer: (d) Au

6. The metallic lustre exhibited by freshly cut sodium piece is explained by :

(a) excitation of free protons of sodium metal (b) diffusion of sodium ions on the surface

(c) oscillations of loosely bound electrons (d) conversion of metal atoms to its shining oxide

Answer: (c) oscillations of loosely bound electrons

7. Which of the following materials contains the highest percent of iron?

(a) Pig iron (b) Wrought iron

(c) Cast iron (d) Steel

Answer: (b) Wrought iron

8. The IUPAC name of [Pt(NH) (NO)(CI)]SO is 3 4 2 4 [Pt(NH) (NO :

(a) tetramminechloronitroplatinum (IV) sulphate (b) chloronitrotetrammineplatinum (IV) sulphate

(c) tetramminechloronitroplatinum (II) sulphate (d) chlorotetramminenitroplatinum (IV) sulphate

Answer: (a) tetramminechloronitroplatinum (IV) sulphate

9. Which of the following complex ion is diamagnetic?

(a) [CoF]3 (b) [Ni(CN)]2

(c) [Ni(NH)]2+ (d) [NiCI]2

Answer: (b) [Ni(CN)]2

10. The most stable complex among the following is efvecve ceW mes Del :

(a) [CdCI]2 (b) [CdBr]2

(c) [Cd(CN)]2 (d) [CdI]2

Answer: (c) [Cd(CN)]2

11. Vitamin B is a complex of 12 efJe :

(a) Cobalt (III) ion (b) Chromium (III) ion

(c) Cobalt (II) ion (d) Chromium (II) ion

Answer: (a) Cobalt (III) ion

12. Transition metal compounds are usually colored. This is because of the electronic transition :

(a) from d-orbital to f-orbital (b) from d-orbital to p-orbital

(c) from d-orbital to s-orbital (d) within d-orbitals

Answer: (d) within d-orbitals

13. Which of the following hydrated transition metal ions is colorless?

(a) Ti(III) (b) Fe(II)

(c) Fe(III) (d) Ti(IV)

Answer: (d) Ti(IV)

14. Which of the following sequences of electron affinity about halogens is correct?

(a) F > Cl < Br 2 2 2 2 2 (b) F < Cl > Br

(c) F < Cl < Br 2 2 2 2 2 (d) F > Cl > Br

Answer: (a) F > Cl < Br 2 2 2 2 2

15. In hydrogen peroxide, the hybridization involved in oxygen atoms is :

(a) sp3d2 (b) sp

(c) sp2 (d) sp3

Answer: (d) sp3

16. The volume of ammonia obtained when 60 litres of dry hydrogen reacts with excess of dry nitrogen when all volumes measured at STP, would be peye meYeer hejceeCeg STP ceW veehes peeles nw, leye 60 efue :

(a) 0.04 m3 (b) 0.06 m3 16 YCT N +3H

(c) 0.02 m3 (d) 0.03 m3

Answer: (a) 0.04 m3

17. Orthophosphorus acid is DeeLeexHe :

(a) neutral (b) tribasic

(c) dibasic (d) monobasic

Answer: (c) dibasic

18. Mohr' salt is a primary standard reagent because :

(a) its molecular weight is fairly high (b) it has light green color

(c) it is cheaper and readily available (d) it is stable

Answer: (d) it is stable

19. Galvanized iron is obtained by coating iron with a thin film of ueesns hej Gmeke :

(a) Zn (b) Sn

(c) Cu (d) Al

Answer: (a) Zn

20. Generally nitric acid is not used in the preparation of hydrogen from metals because Oeeleg mes neF[^espeve yeveeles mece :

(a) metal becomes passive so that further reaction stops (b) it is a very strong oxidizing agent

(c) it forms an explosive metal nitrate (d) it is very difficult to handle nitric acid

Answer: (b) it is a very strong oxidizing agent

21. A fluoride of xenon formed by the reaction of Xe with excess of F at high pressure and 25 :

(a) a trigonal bipyramidal structure with two lone pairs (b) a tetrahedral structure with one lone pair

(c) a capped octahedral structure with one lone pair (d) a capped octahedral structure with two lone pairs

Answer: (c) a capped octahedral structure with one lone pair

22. The reducing power of Al, Ga, In and Tl are in the order of Al, Ga, In Deewj Tl :

(a) Ga > In > Al > Tl (b) Al > Ga > In > Tl

(c) Tl > In > Ga > Al (d) In > Ga > Al > Tl

Answer: (b) Al > Ga > In > Tl

23. The geometry of stannic chloride :

(a) square planar (b) tetrahedral

(c) square pyramidal (d) octahedral

Answer: (b) tetrahedral

24. The metal lead is readily soluble in meermee Oeeleg FmeceW legjvle efJeues :

(a) nitric acid (b) hydrochloric acid

(c) acetic acid (d) sulpuric acid

Answer: (a) nitric acid

25. EDTA complexometric titration involving estimation of hardness of water, makes use of EDTA :

(a) acid base indicator (b) redox indicator

(c) metal ion indicator (d) adsorption indicator

Answer: (c) metal ion indicator

Physics

26. The first law of thermodynamics is a special case of :

(a) the law of heat exchange (b) Newton's law

(c) Charles' law (d) the law of conservation of energy

Answer: (d) the law of conservation of energy

27. In an adiabatic process the quantity which remains constant is :

(a) Pressure (b) Volume

(c) Temperature (d) Total heat energy of the system

Answer: (d) Total heat energy of the system

28. A 10 V battery of negligible internal resistance is connected to 50 ohm resistance coil. The heat energy produced in 1 hour in joules will be:

(a) 4500 J (b) 8000 J

(c) 7200 J (d) 6500 J

Answer: (c) 7200 J

29. The laser material in He-Ne laser is activated by ?

(a) supersonic gas explosion (b) electrical discharge

(c) chemical reaction (d) optical pumping

Answer: (b) electrical discharge

30. The population inversion between energy states in a Ruby laser is achieved through ?

(a) optical pumping (b) lowering of temperature

(c) raising of temperature (d) vacuum pumping

Answer: (a) optical pumping

31. Fraunhofer spectrum is a ?

(a) Band absorption spectrum (b) Line emission spectrum

(c) Line absorption spectrum (d) Band emission spectrum

Answer: (c) Line absorption spectrum

32. Consider : A. The wavelength of scattered light may be greater or less than that of incident light. B. Above statement A is true for scattering of photons by electrons :

(a) A, B both are false (b) A is false, B is true

(c) A, B both are true (d) A is true, B is false

Answer: (d) A is true, B is false

33. The thermal conductivities of brick and pine wood are respectively 0.6 and 0.13W/(m0C). What thickness of brick has the same insulating ability at 5 cm of pine ?

(a) 30 cm (b) 23 cm

(c) 5 cm (d) 4.6 cm

Answer: (b) 23 cm

34. Transference of molecules from the vapour phase to the liquid phase is called ?

(a) Evaporation (b) None of these

(c) Condensation (d) Sublimation

Answer: (c) Condensation

35. A parallel plate capacitor has two layers of different dielectrics as shown in figure. The ratio of potential difference across the dielectric layers when connected to the battery is K Ka ?

(a) 2 (b) 1 : 1 Kb

(c) 1 (d) 1 K K b 2 2 K a

Answer: (a) 2

36. Water rises to a height of 10 cm in a capillary. Mercury falls to a depth of 3.42 cm in same capillary. If the relative density of mercury is 13.6 g/cc and its angle of contact is 135°, the ratio of surface tension of water and mercury is :

(a) 0.15 (b) 0.10

(c) 0.20 (d) 0.05

Answer: (a) 0.15

37. If density of earth increased by 2% and radius by 1% the acceleration due to gravity g will change as follows :

(a) Increase 5% (b) Decrease 3%

(c) Increase 3% (d) Decrease 5%

Answer: (c) Increase 3%

38. The same retarding force is applied to stop a train. If the speed is doubled, then the distance will be :

(a) doubled (b) The same

(c) half (d) four times

Answer: (d) four times

39. The speed of a boat in still water is 10 km/hr. If the boat crosses a 2 km wide river in 15 min along the shortest possible route, the water velocity in the river is :

(a) 4 km/hr (b) 6 km/hr

(c) 3 km/hr (d) 5 km/hr

Answer: (b) 6 km/hr

40. The gauge transformation in which $\nabla.A=0$, is called ?

(a) Gauss gauge (b) Longitudinal gauge ,

(c) Coulomb gauge (d) Lorentz gauge

Answer: (c) Coulomb gauge

41. Anderson's Bridge is used for measurement of ?

(a) Frequency of AC supply (b) Self-inductance

(c) Resistance (d) Capacitance

Answer: (b) Self-inductance

42. The given circuit diagram is equivalent to ?

(a) JK Flip-flop (b) Clocked RS Flip-flop

(c) T Flip-flop (d) D Flip-flop

Answer: (d) D Flip-flop

43. The amount of work done in rotating a magnet 1800 of moment M through from its position along the magnetic meridian is:

(a) MB (b) 1/2 MB

(c) zero (d) 2MB

Answer: (d) 2MB

44. A galvanometer connected in series with a high resistance is called :

(a) Ammeter (b) Wattmeter

(c) None of these (d) Voltmeter

Answer: (d) Voltmeter

45. The temperature of Sun is 6000 K and the 2.88×10−3 Wien's constant is mK. Assuming Sun to be a perfectly black body, the wavelength corresponding to the maximum intensity in the solar radiation must be ?

(a) 480 nm (b) None of the above

(c) 172.8 nm (d) 290 nm

Answer: (a) 480 nm

46. When a metal rod is heated it expands because ?

(a) The size of its atoms increase (b) The actual cause is unknown

(c) The distance among its atom increase (d) None of these

Answer: (c) The distance among its atom increase

47. The expansion of a string. obeying Hooke's law is x. The velocity of sound in this expended string is v. If the expansion is increased to 1.5x, then the velocity of sound in the string will be :

(a) 1.22v (b) 1.50v

(c) 0.61v (d) 0.75v

Answer: (a) 1.22v

48. Unit of surface tension is ?

(a) None of these (b) Dyne cm-2

(c) Dyne cm-1 (d) Dyne cm

Answer: (c) Dyne cm-1

49. A metal in which even Iron can float is :

(a) magnesium (b) maganese

(c) mercury (d) sodium

Answer: (c) mercury

50. The ratio of mass of a planet to that of the earth, if its radius is half that of the earth and acceleration due to gravity on its surface is twice that on earth's surface, is ?

(a) 0.33 (b) 0.5

(c) 2 (d) 0.25

Answer: (b) 0.5

SECTION B — Mathematics [50]

51. Inner automorphism corresponding to every element of an abelian group is?

(a) non trivial (b) trivial

(c) infinite (d) bounded

Answer: (b) trivial

52. Every uniformly continuous function on an interval is _____ on that interval ?

(a) oscillatory (b) convergent

(c) divergent (d) continuous

Answer: (d) continuous

53. Which of the following metric space is not complete?

(a) set of complex numbers (b) set of real numbers

(c) set of irrationals (d) set of rationals

Answer: (d) set of rationals

54. What powers of x does expansion of sin(x) contains?

(a) even powers of x (b) all powers of x

(c) any alternate powers of x (d) odd powers of x

Answer: (d) odd powers of x

55. In metric space which function is always continuous?

(a) distance function (b) bounded function

(c) discrete function (d) continuous function

Answer: (a) distance function

56. Let (X, d) be a metric space and E is contained in X, E is called nowhere dense set if _____ ?

(a) closure of E is finite (b) closure of E terminate after some steps

(c) closure of E is not defined (d) closure of E is empty

Answer: (d) closure of E is empty

57. Which theorem states that" An integral function attains every finite value with at-most one possible exception?

(a) Jensen's formula (b) Picard's theorem

(c) Jensen's inequality (d) Schwartz' lemma

Answer: (b) Picard's theorem

58. What is order of convergence of cosh z?

(a) two (b) one

(c) infinite (d) 0

Answer: (c) infinite

59. Which of the following group is not normal under usual ring operation?

(a) 3 ssg (b) 5 ssg

(c) 2 ssg (d) 7 ssg

Answer: (c) 2 ssg

60. Do C-R equations are necessary and sufficient for a function to be analytic?

(a) FALSE (b) TRUE

(c) can't say about nature of equations (d) depend on range of functions

Answer: (a) FALSE

61. The external direct product of two cyclic groups is _____ ?

(a) need not cyclic (b) always cyclic

(c) never cyclic (d) abelian

Answer: (a) need not cyclic

62. Let k be the number of the p-ssg of a finite group G. Then _____ ?

(a) k bipolarates (b) k doesn't divide O(G)

(c) k divides O(G) (d) k doesn't exist

Answer: (c) k divides O(G)

63. If f(z) is analytic function whose real part is constant then f(z) is _____ ?

(a) constant (b) Function of x only

(c) Function of x and y both (d) Function of y only

Answer: (a) constant

64. What are no. of elements of order 100 of Z(200)?

(a) 40 (b) 160

(c) 120 (d) 80

Answer: (a) 40

65. What is the slope of the tangent to the curve y = (x^2 4x ?

(a) 8 (b) 0

(c) 4 (d) 2 4x

Answer: (c) 4

66. dx x=2 13. Find out the number of equivalence classes that { 1,2,3}. can be defined by the set ?

(a) 125 (b) 5

(c) 72 (d) 16

Answer: (b) 5

67. Inner product spaces over the field of complex numbers are sometimes referred to as:

(a) abstract vector space (b) vector space

(c) real vector space (d) unitary space

Answer: (d) unitary space

68. Which of the following characteristic is included in the study of general procedure for tracing the algebraic curve?

(a) 1&2 correct (b) only 1

(c) 1&3 are correct (d) only 2

Answer: (c) 1&3 are correct

69. What will be the value of + + if x + y + z = 0 ?

(a) xyz (b) xyz (xz + yz + zx)

(c) 2xyz (d) 3xyz

Answer: (d) 3xyz

70. In which option we can evaluate the limit by using L Hospital rule?

(a) lim lnx x (b) lim tanx x

(c) lim (d) lim cosx x

Answer: (d) lim cosx x

71. The half-life of radium is 1600 years, i.e. it takes 1600 years for half of any quantity to decay. If a sample initially contains 50 g, how long will it be until it contains 45 g ?

(a) 282.4 years (b) 344.3 years

(c) 243.2 years (d) 212.3 years

Answer: (c) 243.2 years

72. What is the sum of the next three numbers in the sequence?

(a) 74 (b) 109

(c) 76 (d) 108

Answer: (b) 109

73. Let us say a, b, c are in AP then, which of the following in not true?

(a) b (b) b + a = c + b

(c) 2b = a + c (d) b + b = a + c

Answer: (b) b + a = c + b

74. Find out the common ratio of the GP if the first term of a GP is 1 and the sum of the third term and fifth term is 90 ?

(a) 4 (b) 9

(c) 3 (d) 2

Answer: (c) 3

75. What is the order of this equation?

(a) 0 (b) 2

(c) 3 (d) 1

Answer: (b) 2

76. A vector field with a vanishing curl is known as__ ?

(a) Rotational (b) Irrotatioal

(c) Cycloidal (d) Solenoidal

Answer: (b) Irrotatioal

77. Find the volume V under the plane z= 8x+6y over the rectangle R=[0,1] ?

(a) 30 units (b) 20 units 1 2

(c) 40 units (d) 10 units

Answer: (b) 20 units 1 2

78. Integration of (sin(x)+ cos (x)) ex is ___ ?

(a) ex sin (x) (b) (sin (x) + cos (x))

(c) cos (x) (d) ex tan (x) ex ex

Answer: (a) ex sin (x)

79. The Metric space is both complete and totally bounded is known as ____ ?

(a) Discrete (b) Complete

(c) Compact (d) Scalar

Answer: (c) Compact

80. If G is a finite group of order 217. Find out the number of generators of the group G ?

(a) 180 (b) 188

(c) 182 (d) 181

Answer: (a) 180

81. Which one is not in the automorphism group?

(a) associativity (b) identity

(c) closure (d) decomposition

Answer: (d) decomposition

82. Find the radius of convergence for the power ?

(a) 7 < |3x (b) 3!

(c) 3 |x+1| (d) (2x+a)

Answer: (a) 7 < |3x

83. A: All upper triangular matrices are in echelon form. B: All matrices in echelon form are upper triangular matrices ?

(a) Statement A is true and B is true (b) Statement A is false and B is true

(c) Statement A is false and B is false (d) Statement A is true and B is false

Answer: (d) Statement A is true and B is false

84. What is the area in between y = 6x, x = 3 and x ?

(a) 27 sq. unit YCT (b) 18 sq. unit

(c) 36 sq. unit (d) 9 sq. unit

Answer: (a) 27 sq. unit YCT

85. ap 11. If p is prime, then ?

(a) Pringsheim's theorem (b) Livoullie's theorem

(c) Cauchy's theorem (d) Fermet's theorem

Answer: (d) Fermet's theorem

86. A relation is equivalence if the relation is:

(a) Reflexive, symmetric, and transitive (b) Transitive, reflexive

(c) Symmetric, transitive (d) Reflexive, symmetric

Answer: (a) Reflexive, symmetric, and transitive

87. What is the area of ellipse whose small axis is 2 and large axis is 4?

(a) 4 (b) 8

(c) 64 (d) 16

Answer: (b) 8

88. What is the order of the equation d2y dy + +y=0?

(a) 1 (b) 3

(c) 4 d2y dy (d) 2

Answer: (d) 2

89. What are infimum and the supremum of the set ?

(a) 1, 0 (b) 0, 1

(c) 2, 1 (d) 1, 2

Answer: (b) 0, 1

90. The sequence {1 + is:

(a) Oscillates finitely (b) Divergent

(c) Convergent (d) Oscillates infinitely

Answer: (a) Oscillates finitely

91. What is the third step of process of mathematical model?

(a) Construct equation (b) Validate mathematical model

(c) Compute model output (d) Define variables and parameters

Answer: (a) Construct equation

92. Every non-empty set of real numbers, which is bounded above, has:

(a) infimum, not in R (b) supremum, not in R

(c) infimum in R (d) supremum in R

Answer: (d) supremum in R

93. Image of a closed and bounded interval under continuous map is:

(a) closed and bounded (b) closed and unbounded

(c) open and unbounded (d) open and bounded

Answer: (a) closed and bounded

94. Surface integral of the curl of a function over a surface bounded by a closed surface is equal to the line integral of the particular vector function around that surface." Which theorem is this?

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

(c) Stoke's theorem (d) Gauss Divergence theorem

Answer: (c) Stoke's theorem

95. Let {f}, {g} and {h} are real sequence and {f} < = {g} < = {h}, for all x ?

(a) 0 (b) a

(c) I (d) 1

Answer: (c) I

96. If f is a function, then it has ?

(a) unique differentiable point (b) unique limit

(c) unique continuous point (d) unique limit point

Answer: (b) unique limit

97. Which type of surface is circular cylinder?

(a) Fractal surface (b) Topological surface

(c) Implicit surface (d) Algebraic and differential surface

Answer: (d) Algebraic and differential surface

98. In metric space, if the function f is continuous, then:

(a) f is onto (b) f is uniformly continuous

(c) f is differentiable (d) f is sequentially continuous

Answer: (d) f is sequentially continuous

99. T is topology, then:

(a) may have two bases (b) may have more than one basis

(c) may have infinitely many bases (d) don't have any basis

Answer: (b) may have more than one basis

100. A closed and bounded subset of R is called ?

(a) connected set (b) totally bounded set
(c) path connected set (d) compact set
Answer: (d) compact set